

Facility Improvements For North Carolina Judicial Center Toilet Improvements Specifications

901 Corporate Center Drive
Raleigh, North Carolina

**Issue for Permit
08/28/2023**



 **Salas O'Brien**
1620 Midtown Place
Raleigh, NC 27609
919-832-8118
salasobrien.com
license (NC): F-1434

DIVISION 00 - GENERAL CONDITIONS

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- NCAOC General Terms and Conditions
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• Affidavits <ul style="list-style-type: none">❖ A – Listing of the Good Faith Effort❖ B - Intent to Perform Contract with Own Workforce❖ C – Portion of the Work to be Performed by Minority Firms❖ D – Good Faith Efforts
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ADVERTISEMENT FOR BIDS

Sealed proposals for Single-Prime bids will be received until 2:00 PM on September 26, 2023, at NC Administrative Office of the Courts, 901 Corporate Center Drive, Raleigh, NC 27607 for construction of NC Judicial Center – Toilet Improvements at which time and place bids will be opened and read.

A pre-bid meeting will be held at 10:00 AM on September 12, 2023, at NC Administrative Office of the Courts, 901 Corporate Center Drive, Raleigh, NC 27607. The meeting is also to identify preferred brand alternates and their performance standards that the owner will consider for approval on this project. All interested contractors and vendors are encouraged to attend.

Complete plans and specifications for this project can be obtained from Salas O'Brien, 1620 Midtown Place, Raleigh, NC 27609 (984-200-9029) during normal office hours after August 28, 2023.

Plans and Specifications are available electronically (Bid Deposit not required). Hard copies are available upon a Plan Deposit of One Hundred Dollars (\$100.00).

The Owner reserves the unqualified right to waive any informalities or reject any and all proposals. All inquires should be directed to:

Signed:

Joseph R. Honeycutt
Operations Services Officer
NC Administrative Offices of the Courts
901 Corporate Center Drive
Raleigh, NC 27607
919.890.1373

NOTICE TO BIDDERS

Sealed proposals will be received by the NC Administrative Office of the Courts in the Operations Service Center Conference Room, 901 Corporate Center Drive, Raleigh, NC 27607 up to 2:00 PM September 26, 2023, and immediately thereafter publicly opened and read for the furnishing of labor, material and equipment entering into the construction of

NC Judicial Center – Toilet Improvements
Bid #02-2023015

Bids will be received for single prime General Contractor. All proposals shall be lump sum.

Pre-Bid Meeting

An open pre-bid meeting will be held for all interested bidders at 10:00 AM on September 12, 2023 at NC Administrative Office of the Courts, 901 Corporate Center Drive, Raleigh, NC 27607. The meeting will address project specific questions, issues, bidding procedures and bid forms.

The meeting is also to identify preferred brand alternates and their performance standards that the owner will consider for approval on this project.

In accordance with General Statute GS 133-3, Specifications may list one or more preferred brands as an alternate to the base bid in limited circumstances. Specifications containing a preferred brand alternate under this section must identify the performance standards that support the preference. Performance standards for the preference must be approved in advance by the owner in an open meeting. Any alternate approved by the owner shall be approved only where (i) the preferred alternate will provide cost savings, maintain or improve the functioning of any process or system affected by the preferred item or items, or both, and (ii) a justification identifying these criteria is made available in writing to the public.

In accordance with GS133-3 and SCO procedures the following preferred brand items are being considered as Alternates by the owner for this project:

- A. Bathroom Wet Wall Tile (T-1)
- B. Bathroom Accent / Sink Wall Tile (T-2)
- C. Bathroom Floor Tile (T-3)
- D. Acoustical Ceiling Tile (ACT-1)
- E. Millwork – Plastic Laminate for Cabinets/Shelving (PLAM-1)
- C. Solid Surface for Counters (SSURF-1)
- D. Cabinet Door Pulls
- E. Restroom Partitions (BP-1)

Justification of any approvals will be made available to the public in writing no later than seven (7) days prior to bid date.

Complete plans, specifications and contract documents will be open for inspection in the offices of Salas O'Brien. They can also be obtained online at the following plan rooms:

Dodge Data & Analytics
<http://construction.com/dodge>

Associated General Contractors, (AGC)
Carolina Branch (through partnership with (iSqFt)
<http://www.isqft.com/>

Construct Connect
<http://constructconnect.com>

Hispanic Contractors Association of the Carolinas
(HCAC) (through partnership with (iSqFt)
<http://www.isqft.com/>

National Institute for Economic Development
<https://www.theinstitutenc.org/>

Complete plans, specifications and contract documents can be obtained by those qualified as prime bidders from Salas O'Brien, 1620 Midtown Place, Raleigh, NC 27609 (984-200-9029) during normal office hours after August 28, 2023, upon a Plan Deposit of \$ 100.00 in cash or certified check. The full plan deposit will be returned to those bidders provided all documents are returned in good, usable condition within ten (10) days after the bid date.

Plans and Specifications are also available electronically from Salas O'Brien. (Bid deposit not required).

NOTE: The bidder shall include with the bid proposal the form *Identification of Minority Business Participation* identifying the minority business participation it will use on the project and shall include either *Affidavit A* or *Affidavit B* as applicable. Forms and instructions are included within the Proposal Form in the bid documents. Failure to complete these forms is grounds for rejection of the bid. (GS143-128.2c Effective 1/1/2002.)

All contractors are hereby notified that they must have proper license as required under the state laws governing their respective trades.

General contractors are notified that Chapter 87, Article 1, General Statutes of North Carolina, will be observed in receiving and awarding general contracts. Contractors submitting bids on this project must have license classification for General Contracting.

Each proposal shall be accompanied by a cash deposit or a certified check drawn on some bank or trust company, insured by the Federal Deposit Insurance Corporation, of an amount equal to not less than five percent (5%) of the proposal, or in lieu thereof a bidder may offer a bid bond of five percent (5%) of the bid executed by a surety company licensed under the laws of North Carolina to execute the contract in accordance with the bid bond. Said deposit shall be retained by the owner as liquidated damages in event of failure of the successful bidder to execute the contract within ten days after the award or to give satisfactory surety as required by law.

A performance bond and a payment bond will be required for one hundred percent (100%) of the contract price.

Payment will be made based on ninety-five percent (95%) of monthly estimates and final payment made upon completion and acceptance of work.

No bid may be withdrawn after the scheduled closing time for the receipt of bids for a period of 60 days.

The owner reserves the right to reject any or all bids and to waive informalities.

Designer:

Integrated Design, PA

1111 Oberlin Road

Raleigh, NC 27605

919.832.6658

Owner:

NC Administrative Office of the Courts

901 Corporate Center Drive

Raleigh, NC 27607

919.890.1373

**INSTRUCTIONS TO BIDDERS
AND
GENERAL CONDITIONS OF THE CONTRACT**

STANDARD FORM FOR CONSTRUCTION PROJECTS

**STATE CONSTRUCTION OFFICE
NORTH CAROLINA
DEPARTMENT OF ADMINISTRATION**

Form OC-15

This document is intended for use on State capital construction projects and shall not be used on any project that is not reviewed and approved by the State Construction Office. Extensive modification to the General Conditions by means of “Supplementary General Conditions” is strongly discouraged. State agencies and institutions may include special requirements in “Division 1 – General Requirements” of the specifications, where they do not conflict with the General Conditions.

Twenty Fourth Edition January 2013

INSTRUCTIONS TO BIDDERS

For a proposal to be considered it must be in accordance with the following instructions:

1. PROPOSALS

Proposals must be made in strict accordance with the Form of Proposal provided therefor, and all blank spaces for bids, alternates, and unit prices applicable to bidder's work shall be properly filled in. When requested alternates are not bid, the proposer shall so indicate by the words "No Bid". Any blanks shall also be interpreted as "No Bid". The bidder agrees that bid on Form of Proposal detached from specifications will be considered and will have the same force and effect as if attached thereto. Photocopied or faxed proposals will not be considered. Numbers shall be stated both in writing and in figures for the base bids and alternates. If figures and writing differ, the written number will supersede the figures.

Any modifications to the Form of Proposal (including alternates and/or unit prices) will disqualify the bid and may cause the bid to be rejected.

The bidder shall fill in the Form of Proposal as follows:

- a. If the documents are executed by a sole owner, that fact shall be evidenced by the word "Owner" appearing after the name of the person executing them.
- b. If the documents are executed by a partnership, that fact shall be evidenced by the word "Co-Partner" appearing after the name of the partner executing them.
- c. If the documents are executed on the part of a corporation, they shall be executed by either the president or the vice president and attested by the secretary or assistant secretary in either case, and the title of the office of such persons shall appear after their signatures. The seal of the corporation shall be impressed on each signature page of the documents.
- d. If the proposal is made by a joint venture, it shall be executed by each member of the joint venture in the above form for sole owner, partnership or corporation, whichever form is applicable.
- e. All signatures shall be properly witnessed.
- f. If the contractor's license of a bidder is held by a person other than an owner, partner or officer of a firm, then the licensee shall also sign and be a party to the proposal. The title "Licensee" shall appear under his/her signature.

Proposals should be addressed as indicated in the Advertisement for Bids and be delivered, enclosed in an opaque sealed envelope, marked "Proposal" and bearing the title of the work, name of the bidder, and the contractor's license number of the bidder. Bidders should clearly mark on the outside of the bid envelope which contract(s) they are bidding.

Bidder shall identify on the bid, the minority businesses that will be utilized on the project with corresponding total dollar value of the bid and affidavit listing good faith efforts or an affidavit indicating work under contract will be self-performed, as required by G.S. 143-128.2(c) and G.S. 143-128.2(f). Failure to comply with these requirements is grounds for rejection of the bid.

For projects bid in the single-prime alternative, the names and license numbers of major subcontractors shall be listed on the proposal form.

It shall be the specific responsibility of the bidder to deliver his bid to the proper official at the selected place and prior to the announced time for the opening of bids. Later delivery of a bid for any reason, including delivery by any delivery service, shall disqualify the bid.

Unit prices quoted in the proposal shall include overhead and profit and shall be the full compensation for the contractor's cost involved in the work. See General Conditions, Article 19c-1.

2. EXAMINATION OF CONDITIONS

It is understood and mutually agreed that by submitting a bid the bidder acknowledges that he has carefully examined all documents pertaining to the work, the location, accessibility and general character of the site of the work and all existing buildings and structures within and adjacent to the site, and has satisfied himself as to the nature of the work, the condition of existing buildings and structures, the conformation of the ground, the character, quality and quantity of the material to be encountered, the character of the equipment, machinery, plant and any other facilities needed preliminary to and during prosecution of the work, the general and local conditions, the construction hazards, and all other matters, including, but not limited to, the labor situation which can in any way affect the work under the contract, and including all safety measures required by the Occupational Safety and Health Act of 1970 and all rules and regulations issued pursuant thereto. It is further mutually agreed that by submitting a proposal the bidder acknowledges that he has satisfied himself as to the feasibility and meaning of the plans, drawings, specifications and other contract documents for the construction of the work and that he accepts all the terms, conditions and stipulations contained therein; and that he is prepared to work in cooperation with other contractors performing work on the site.

Reference is made to contract documents for the identification of those surveys and investigation reports of subsurface or latent physical conditions at the site or otherwise affecting performance of the work which have been relied upon by the designer in preparing the documents. The owner will make copies of all such surveys and reports available to the bidder upon request.

Each bidder may, at his own expense, make such additional surveys and investigations as he may deem necessary to determine his bid price for the performance of the work. Any on-site investigation shall be done at the convenience of the owner. Any reasonable request for access to the site will be honored by the owner.

3. BULLETINS AND ADDENDA

Any addenda to specifications issued during the time of bidding are to be considered covered in the proposal and in closing a contract they will become a part thereof. It shall be the bidder's responsibility to ascertain prior to bid time the addenda issued and to see that his bid includes any changes thereby required.

Should the bidder find discrepancies in, or omission from, the drawings or documents or should he be in doubt as to their meaning, he shall at once notify the designer who will send written instructions in the form of addenda to all bidders. Notification should be no later than seven (7) days prior to the date set for receipt of bids. Neither the owner nor the designer will be responsible for any oral instructions.

All addenda should be acknowledged by the bidder(s) on the Form of Proposal. However, even if not acknowledged, by submitting a bid, the bidder has certified that he has reviewed all issued addenda and has included all costs associated within his bid.

4. BID SECURITY

Each proposal shall be accompanied by a cash deposit or a certified check drawn on some bank or trust company insured by the Federal Deposit Insurance Corporation, or a bid bond in an amount equal to not less than five percent (5%) of the proposal, said deposit to be retained by the owner as liquidated damages in event of failure of the successful bidder to execute the contract within ten (10) days after the award or to give satisfactory surety as required by law (G.S. 143-129).

Bid bond shall be conditioned that the surety will, upon demand, forthwith make payment to the obligee upon said bond if the bidder fails to execute the contract. The owner may retain bid securities of any bidder(s) who may have a reasonable chance of award of contract for the full duration of time stated in the Notice to Bidders. Other bid securities may be released sooner, at the discretion of the owner. All bid securities (cash or certified checks) shall be returned to the bidders promptly after award of contracts, and no later than seven (7) days after expiration of the holding period stated in the Notice to Bidders. Standard Form of Bid Bond is included in these specifications and shall be used.

5. RECEIPT OF BIDS

Bids shall be received in strict accordance with requirements of the General Statutes of North Carolina. Bid security shall be required as prescribed by statute. Prior to the closing of the bid, the bidder will be permitted to change or withdraw his bid. Guidelines for opening of public construction bids are available from the State Construction Office.

6. OPENING OF BIDS

Upon opening, all bids shall be read aloud. Once bidding is closed, there shall not be any withdrawal of bids by any bidder and no bids may be returned by the designer to any bidder. After the opening of bids, no bid may be withdrawn, except under the provisions of General Statute 143-129.1, for a period of thirty days unless otherwise specified. Should the successful bidder default and fail to execute a contract, the contract may be awarded to the next lowest and responsible bidder. The owner reserves the unqualified right to reject any and all bids. Reasons for rejection may include, but shall not be limited to, the following:

- a. If the Form of Proposal furnished to the bidder is not used or is altered.
- b. If the bidder fails to insert a price for all bid items, alternate and unit prices requested.
- c. If the bidder adds any provisions reserving the right to accept or reject any award.
- d. If there are unauthorized additions or conditional bids, or irregularities of any kind which tend to make the proposal incomplete, indefinite or ambiguous as to its meaning.
- e. If the bidder fails to complete the proposal form where information is requested so the bid may be properly evaluated by the owner.
- f. If the unit prices contained in the bid schedule are unacceptable to the owner and the State Construction Office.
- g. If the bidder fails to comply with other instructions stated herein.

7. BID EVALUATION

The award of the contract will be made to the lowest responsible bidder as soon as practical. The owner may award on the basis of the base bid and any alternates the owner chooses.

Before awarding a contract, the owner may require the apparent low bidder to qualify himself to be a responsible bidder by furnishing any or all of the following data:

- a. The latest financial statement showing assets and liabilities of the company or other information satisfactory to the owner.
- b. A listing of completed projects of similar size.
- c. Permanent name and address of place of business.
- d. The number of regular employees of the organization and length of time the organization has been in business under present name.
- e. The name and home office address of the surety proposed and the name and address of the responsible local claim agent.
- f. The names of members of the firms who hold appropriate trade licenses, together with license numbers.
- g. If prequalified, contractor info will be reviewed and evaluated comparatively to submitted prequalification package.

Failure or refusal to furnish any of the above information, if requested, shall constitute a basis for disqualification of any bidder.

In determining the lowest responsible, responsive bidder, the owner shall take into consideration the bidder's compliance with the requirements of G.S. 143-128.2(c), the past performance of the bidder on construction contracts for the State with particular concern given to completion times, quality of work, cooperation with other contractors, and cooperation with the designer and owner. Failure of the low bidder to furnish affidavit and/or documentation as required by G.S. 143-128.2(c) shall constitute a basis for disqualification of the bid.

Should the owner adjudge that the apparent low bidder is not the lowest responsible, responsive bidder by virtue of the above information, said apparent low bidder will be so notified and his bid security shall be returned to him.

8. PERFORMANCE BOND

The successful bidder, upon award of contract, shall furnish a performance bond in an amount equal to 100 percent of the contract price. See Article 35, General Conditions.

9. PAYMENT BOND

The successful bidder, upon award of contract, shall furnish a payment bond in an amount equal to 100 percent of the contract price. See Article 35, General Conditions.

10. PAYMENTS

Payments to the successful bidders (contractors) will be made on the basis of monthly estimates. See Article 31, General Conditions.

11. PRE-BID CONFERENCE

Prior to the date set for receiving bids, the Designer may arrange and conduct a Pre-Bid Conference for all prospective bidders. The purpose of this conference is to review project requirements and to respond to questions from prospective bidders and their subcontractors or material suppliers related to the intent of bid documents. Attendance by prospective bidders shall be as required by the "Notice to Bidders".

12. SUBSTITUTIONS

In accordance with the provisions of G.S. 133-3, material, product, or equipment substitutions proposed by the bidders to those specified herein can only be considered during the bidding phase until ten (10) days prior to the receipt of bids when submitted to the Designer with sufficient data to confirm material, product, or equipment equality. Proposed substitutions submitted after this time will be considered only as potential change order.

Submittals for proposed substitutions shall include the following information:

- a. Name, address, and telephone number of manufacturer and supplier as appropriate.
- b. Trade name, model or catalog designation.
- c. Product data including performance and test data, reference standards, and technical descriptions of material, product, or equipment. Include color samples and samples of available finishes as appropriate.
- d. Detailed comparison with specified products including performance capabilities, warranties, and test results.
- e. Other pertinent data including data requested by the Designer to confirm product equality.

If a proposed material, product, or equipment substitution is deemed equal by the Designer to those specified, all bidders of record will be notified by Addendum.

GENERAL CONDITIONS OF THE CONTRACT

The use or reproduction of this document or any part thereof is authorized for and limited to use on projects of the State of North Carolina, and is distributed by, through and at the discretion of the State Construction Office, Raleigh, North Carolina, for that distinct and sole purpose.

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ARTICLE 1 - DEFINITIONS

- a. The **contract documents** consist of the Notice to Bidders; Instructions to Bidders; General Conditions of the Contract; special conditions if applicable; Supplementary General Conditions; the drawing and specifications, including all bulletins, addenda or other modifications of the drawings and specifications incorporated into the documents prior to their execution; the proposal; the contract; the performance bond; the payment bond; insurance certificates; the approval of the attorney general; and the certificate of the Office of State Budget and Management. All of these items together form the contract.
- b. The **owner** is the State of North Carolina through the agency named in the contract.
- c. The **designer(s)** are those referred to within this contract, or their authorized representatives. The Designer(s), as referred to herein, shall mean architect and/or engineer. They will be referred to hereinafter as if each were of the singular number, masculine gender.
- d. The **contractor**, as referred to hereinafter, shall be deemed to be either of the several contracting parties called the "Party of the First Part" in either of the several contracts in connection with the total project. Where, in special instances hereinafter, a particular contractor is intended, an adjective precedes the word "contractor," as "general," "heating," etc. For the purposes of a single prime contract, the term Contractor shall be deemed to be the single contracting entity identified as the "Party of the First Part" in the single Construction Contract. Any references or adjectives that name or infer multiple prime contractors shall be interpreted to mean the single prime Contractor.
- e. A **subcontractor**, as the term is used herein, shall be understood to be one who has entered into a direct contract with a contractor, and includes one who furnishes materials worked to a special design in accordance with plans and specifications covered by the contract, but does not include one who only sells or furnishes materials not requiring work so described or detailed.
- f. **Written notice** shall be defined as notice in writing delivered in person to the contractor, or to a partner of the firm in the case of a partnership, or to a member of the contracting organization, or to an officer of the organization in the case of a corporation, or sent to the last known business address of the contracting organization by registered mail.
- g. **Work**, as used herein as a noun, is intended to include materials, labor, and workmanship of the appropriate contractor.
- h. The **project** is the total construction work to be performed under the contract documents by the several contractors.
- i. **Project Expediter**, as used herein, is an entity stated in the contract documents, designated to effectively facilitate scheduling and coordination of work activities. See Article 14(f) for responsibilities of a Project Expediter. **For the purposes of a single prime contract, the single prime contractor shall be designated as the Project Expediter.**
- j. **Change order**, as used herein, shall mean a written order to the contractor subsequent to the signing of the contract authorizing a change in the contract. The change order shall be signed by the contractor, designer and the owner, and approved by the State Construction Office, in that order (Article 19).

- k. **Field Order**, as used herein, shall mean a written approval for the contractor to proceed with the work requested by owner prior to issuance of a formal Change Order. The field order shall be signed by the contractor, designer, owner, and State Construction Office.
- l. **Time of completion**, as stated in the contract documents, is to be interpreted as consecutive calendar days measured from the date established in the written Notice to Proceed, or such other date as may be established herein (Article 23).
- m. **Liquidated damages**, as stated in the contract documents [, is an amount reasonably estimated in advance to cover the consequential damages associated with the Owner's economic loss in not being able to use the Project for its intended purposes at the end of the contract's completion date as amended by change order, if any, by reason of failure of the contractor(s) to complete the work within the time specified. Liquidated damages does not include the Owner's extended contract administration costs (including but not limited to additional fees for architectural and engineering services, testing services, inspection services, commissioning services, etc.), such other damages directly resulting from delays caused solely by the contractor, or consequential damages that the Owner identified in the bid documents that may be impacted by any delay caused solely by the Contractor (e.g., if a multi-phased project-subsequent phases, delays in start other projects that are dependent on the completion of this Project, extension of leases and/or maintenance agreements for other facilities).
- n. **Surety**, as used herein, shall mean the bonding company or corporate body which is bound with and for the contractor, and which engages to be responsible for the contractor and his acceptable performance of the work.
- o. **Routine written communications between the Designer and the Contractor** are any communication other than a "request for information" provided in letter, memo, or transmittal format, sent by mail, courier, electronic mail, or facsimile. Such communications can not be identified as "request for information".
- p. **Clarification or Request for information (RFI)** is a request from the Contractor seeking an interpretation or clarification by the Designer relative to the contract documents. The RFI, which shall be labeled (RFI), shall clearly and concisely set forth the issue or item requiring clarification or interpretation and why the response is needed. The RFI must set forth the Contractor's interpretation or understanding of the contract documents requirements in question, along with reasons for such an understanding.
- q. **Approval** means written or imprinted acknowledgement that materials, equipment or methods of construction are acceptable for use in the work.
- r. **Inspection** shall mean examination or observation of work completed or in progress to determine its compliance with contract documents.
- s. **"Equal to" or "approved equal"** shall mean materials, products, equipment, assemblies, or installation methods considered equal by the bidder in all characteristics (physical, functional, and aesthetic) to those specified in the contract documents. Acceptance of equal is subject to approval of Designer and owner.
- t. **"Substitution" or "substitute"** shall mean materials, products, equipment, assemblies, or installation methods deviating in at least one characteristic (physical, functional, or aesthetic) from those specified, but which in the opinion of the bidder would improve competition and/or enhance the finished installation. Acceptance of substitution is subject to the approval of the Designer and owner.

- u. **Provide** shall mean furnish and install complete in place, new, clean, operational, and ready for use.
- v. **Indicated and shown** shall mean provide as detailed, or called for, and reasonably implied in the contract documents.
- w. **Special inspector** is one who inspects materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with the approved construction documents and referenced standards.
- x. **Commissioning** is a quality assurance process that verifies and documents that building components and systems operate in accordance to the owner's project requirements and the project design documents.
- y. **Designer Final Inspection** is the inspection performed by the design team to determine the completeness of the project in accordance with approved plans and specifications. This inspection occurs prior to SCO final inspection.
- z. **SCO Final Inspection** is the inspection performed by the State Construction Office to determine the completeness of the project in accordance with NC Building Codes and approved plans and specifications.
- aa. **Beneficial Occupancy** is requested by the owner and is occupancy or partial occupancy of the building after all life safety items have been completed as determined by the State Construction Office. Life safety items include but not limited to fire alarm, sprinkler, egress and exit lighting, fire rated walls, egress paths and security.
- bb. Final Acceptance is the date in which the State Construction Office accepts the construction as totally complete. This includes the SCO Final Inspection and certification by the designer that all punch lists are completed.

ARTICLE 2 - INTENT AND EXECUTION OF DOCUMENTS

- a. The drawings and specifications are complementary, one to the other, and that which is shown on the drawings or called for in the specifications shall be as binding as if it were both called for and shown. The intent of the drawings and specifications is to establish the scope of all labor, materials, transportation, equipment, and any and all other things necessary to provide a bid for a complete job. In case of discrepancy or disagreement in the contract documents, the order of precedence shall be: Form of Contract, specifications, large-scale detail drawings, small-scale drawings.
- b. The wording of the specifications shall be interpreted in accordance with common usage of the language except that words having a commonly used technical or trade meaning shall be so interpreted in preference to other meanings.
- c. The contractor shall execute each copy of the proposal, contract, performance bond and payment bond as follows:
 1. If the documents are executed by a sole owner, that fact shall be evidenced by the word "Owner" appearing after the name of the person executing them.
 2. If the documents are executed by a partnership, that fact shall be evidenced by the word "Co-Partner" appearing after the name of the partner executing them.

3. If the documents are executed on the part of a corporation, they shall be executed by either the president or the vice president and attested by the secretary or assistant secretary in either case, and the title of the office of such persons shall appear after their signatures. The seal of the corporation shall be impressed on each signature page of the documents.
4. If the documents are made by a joint venture, they shall be executed by each member of the joint venture in the above form for sole owner, partnership or corporation, whichever form is applicable to each particular member.
5. All signatures shall be properly witnessed.
6. If the contractor's license is held by a person other than an owner, partner or officer of a firm, then the licensee shall also sign and be a party to the contract. The title "Licensee" shall appear under his/her signature.
7. The bonds shall be executed by an attorney-in-fact. There shall be attached to each copy of the bond a certified copy of power of attorney properly executed and dated.
8. Each copy of the bonds shall be countersigned by an authorized individual agent of the bonding company licensed to do business in North Carolina. The title "Licensed Resident Agent" shall appear after the signature.
9. The seal of the bonding company shall be impressed on each signature page of the bonds.
10. The contractor's signature on the performance bond and the payment bond shall correspond with that on the contract. The date of performance and payment bond shall not be prior to the date of the contract.

ARTICLE 3 - CLARIFICATIONS AND DETAIL DRAWINGS

- a. In such cases where the nature of the work requires clarification by the designer, such clarification shall be furnished by the designer with reasonable promptness by means of written instructions or detail drawings, or both. Clarifications and drawings shall be consistent with the intent of contract documents, and shall become a part thereof.
- b. The contractor(s) and the designer shall prepare, if deemed necessary, a schedule fixing dates upon which foreseeable clarifications will be required. The schedule will be subject to addition or change in accordance with progress of the work. The designer shall furnish drawings or clarifications in accordance with that schedule. The contractor shall not proceed with the work without such detail drawings and/or written clarifications.

ARTICLE 4 - COPIES OF DRAWINGS AND SPECIFICATIONS

The designer or Owner shall furnish free of charge to the contractors electronic copies of plans and specifications. If requested by the contractor, paper copies of plans and specifications shall be furnished free of charge as follows:

- a. General contractor - Up to twelve (12) sets of general contractor drawings and specifications, up to six (6) sets of which shall include drawings and specifications of all other contracts, plus a clean set of black line prints on white paper of all appropriate drawings, upon which the contractor shall clearly and legibly record all work-in-place that is at variance with the contract documents.

- b. Each other contractor - Up to six (6) sets of the appropriate drawings and specifications, up to three (3) sets of which shall include drawings and specifications of all other contracts, plus a clean set of black line prints on white paper of all appropriate drawings, upon which the contractor shall clearly and legibly record all work-in-place that is at variance with the contract documents.
- c. Additional sets shall be furnished at cost, including mailing, to the contractor upon request by the contractor. This cost shall be stated in the bidding documents.
- d. For the purposes of a single-prime contract, the contractor shall receive up to 30 sets of drawings and specifications, plus a clean set of black line prints on white paper of all appropriate drawings, upon which the contractor shall clearly and legibly record all work-in-place that is at variance with the contract documents.

ARTICLE 5 - SHOP DRAWINGS, SUBMITTALS, SAMPLES, DATA

- a. Within 15 consecutive calendar days after the notice to proceed, each prime contractor shall submit a schedule for submission of all shop drawings, product data, samples, and similar submittals through the Project Expediter to the Designer. This schedule shall indicate the items, relevant specification sections, other related submittal, data, and the date when these items will be furnished to the designer.
- b. The Contractor(s) shall review, approve and submit to the Designer all Shop Drawings, Coordination Drawings, Product Data, Samples, Color Charts, and similar submittal data required or reasonably implied by the Contract Documents. Required Submittals shall bear the Contractor's stamp of approval, any exceptions to the Contract Documents shall be noted on the submittals, and copies of all submittals shall be of sufficient quantity for the Designer to retain up to three (3) copies of each submittal for his own use plus additional copies as may be required by the Contractor. Submittals shall be presented to the Designer in accordance with the schedule submitted in paragraph (a). so as to cause no delay in the activities of the Owner or of separate Contractors.
- c. The Designer shall review required submittals promptly, noting desired corrections if any, and retaining three (3) copies (1 for the Designer, 1 for the owner and 1 for SCO) for his use. The remaining copies of each submittal shall be returned to the Contractor not later than twenty (20) days from the date of receipt by the Designer, for the Contractor's use or for corrections and resubmittal as noted by the Designer. When resubmittals are required, the submittal procedure shall be the same as for the original submittals.
- d. Approval of shop drawings/submittals by the Designer shall not be construed as relieving the Contractor from responsibility for compliance with the design or terms of the contract documents nor from responsibility of errors of any sort in the shop drawings, unless such lack of compliance or errors first have been called in writing to the attention of the Designer by the Contractor.

ARTICLE 6 - WORKING DRAWINGS AND SPECIFICATIONS AT THE JOB SITE

- a. The contractor shall maintain, in readable condition at his job office, one complete set of working drawings and specifications for his work including all shop drawings. Such drawings and specifications shall be available for use by the designer, his authorized representative, owner or State Construction Office.

- b. The contractor shall maintain at the job office, a day-to-day record of work-in-place that is at variance with the contract documents. Such variations shall be fully noted on project drawings by the contractor and submitted to the designer upon project completion and no later than 30 days after final acceptance of the project.
- c. The contractor shall maintain at the job office a record of all required tests that have been performed, clearly indicating the scope of work inspected and the date of approval or rejection.

ARTICLE 7 - OWNERSHIP OF DRAWINGS AND SPECIFICATIONS

All drawings and specifications are instruments of service and remain the property of the owner. The use of these instruments on work other than this contract without permission of the owner is prohibited. All copies of drawings and specifications other than contract copies shall be returned to the owner upon request after completion of the work.

ARTICLE 8 - MATERIALS, EQUIPMENT, EMPLOYEES

- a. The contractor shall, unless otherwise specified, supply and pay for all labor, transportation, materials, tools, apparatus, lights, power, heat, sanitary facilities, water, scaffolding and incidentals necessary for the completion of his work, and shall install, maintain and remove all equipment of the construction, other utensils or things, and be responsible for the safe, proper and lawful construction, maintenance and use of same, and shall construct in the best and most workmanlike manner, a complete job and everything incidental thereto, as shown on the plans, stated in the specifications, or reasonably implied therefrom, all in accordance with the contract documents.
- b. All materials shall be new and of quality specified, except where reclaimed material is authorized herein and approved for use. Workmanship shall at all times be of a grade accepted as the best practice of the particular trade involved, and as stipulated in written standards of recognized organizations or institutes of the respective trades except as exceeded or qualified by the specifications.
- c. Upon notice, the contractor shall furnish evidence as to quality of materials.
- d. Products are generally specified by ASTM or other reference standard and/or by manufacturer's name and model number or trade name. When specified only by reference standard, the Contractor may select any product meeting this standard, by any manufacturer. When several products or manufacturers are specified as being equally acceptable, the Contractor has the option of using any product and manufacturer combination listed. However, the contractor shall be aware that the cited examples are used only to denote the quality standard of product desired and that they do not restrict bidders to a specific brand, make, manufacturer or specific name; that they are used only to set forth and convey to bidders the general style, type, character and quality of product desired; and that equivalent products will be acceptable. Request for substitution of materials, items, or equipment shall be submitted to the designer for approval or disapproval; such approval or disapproval shall be made by the designer prior to the opening of bids. Alternate materials may be requested after the award if it can clearly be demonstrated that it is an added benefit to the owner and the designer and owner approves.
- e. The designer is the judge of equality for proposed substitution of products, materials or equipment.

- g. If at any time during the construction and completion of the work covered by these contract documents, the language, conduct, or attire of any workman of the various crafts be adjudged a nuisance to the owner or designer, or if any workman be considered detrimental to the work, the contractor shall order such parties removed immediately from grounds.

ARTICLE 9 - ROYALTIES, LICENSES AND PATENTS

It is the intention of the contract documents that the work covered herein will not constitute in any way infringement of any patent whatsoever unless the fact of such patent is clearly evidenced herein. The contractor shall protect and save harmless the owner against suit on account of alleged or actual infringement. The contractor shall pay all royalties and/or license fees required on account of patented articles or processes, whether the patent rights are evidenced hereinafter.

ARTICLE 10 - PERMITS, INSPECTIONS, FEES, REGULATIONS

- a. The contractor shall give all notices and comply with all laws, ordinances, codes, rules and regulations bearing on the conduct of the work under this contract. If the contractor observes that the drawings and specifications are at variance therewith, he shall promptly notify the designer in writing. See Instructions to Bidders, Paragraph 3, Bulletins and Addenda. Any necessary changes required after contract award shall be made by change order in accordance with Article 19. If the contractor performs any work knowing it to be contrary to such laws, ordinances, codes, rules and regulations, and without such notice to the designer, he shall bear all cost arising therefrom. Additional requirements implemented after bidding will be subject to equitable negotiations.
- b. All work under this contract shall conform to the North Carolina State Building Code and other State, local and national codes as are applicable. The cost of all required inspections and permits shall be the responsibility of the contractor and included within the bid proposal. All water taps, meter barrels, vaults and impact fees shall be paid by the contractor unless otherwise noted.
- d. Projects constructed by the State of North Carolina or by any agency or institution of the State are not subject to inspection by any county or municipal authorities and are not subject to county or municipal building codes. The contractor shall, however, cooperate with the county or municipal authorities by obtaining building permits. Permits shall be obtained at no cost.
- e. Projects involving local funding (community colleges) are subject also to county and municipal building codes and inspection by local authorities. The contractor shall pay the cost of these permits and inspections.

ARTICLE 11 - PROTECTION OF WORK, PROPERTY AND THE PUBLIC

- a. The contractors shall be jointly responsible for the entire site and the building or construction of the same and provide all the necessary protections, as required by the owner or designer, and by laws or ordinances governing such conditions. They shall be responsible for any damage to the owner's property, or of that of others on the job, by them, their personnel, or their subcontractors, and shall make good such damages. They shall be responsible for and pay for any damages caused to the owner. All contractors shall have access to the project at all times.
- b. The contractor shall provide cover and protect all portions of the structure when the work is not in progress, provide and set all temporary roofs, covers for doorways, sash and windows, and all other materials necessary to protect all the work on the building, whether set by him, or any of the subcontractors. Any work damaged through the lack of proper protection or from any other cause, shall be repaired or replaced without extra cost to the owner.
- c. No fires of any kind will be allowed inside or around the operations during the course of construction without special permission from the designer and owner.
- d. The contractor shall protect all trees and shrubs designated to remain in the vicinity of the operations by building substantial boxes around same. He shall barricade all walks, roads, etc., as directed by the designer to keep the public away from the construction. All trenches, excavations or other hazards in the vicinity of the work shall be well barricaded and properly lighted at night.
- e. The contractor shall provide all necessary safety measures for the protection of all persons on the job, including the requirements of the A.G.C. *Accident Prevention Manual in Construction*, as amended, and shall fully comply with all state laws or regulations and North Carolina State Building Code requirements to prevent accident or injury to persons on or about the location of the work. He shall clearly mark or post signs warning of hazards existing, and shall barricade excavations, elevator shafts, stairwells and similar hazards. He shall protect against damage or injury resulting from falling materials and he shall maintain all protective devices and signs throughout the progress of the work.
- f. The contractor shall adhere to the rules, regulations and interpretations of the North Carolina Department of Labor relating to Occupational Safety and Health Standards for the Construction Industry (Title 29, Code of Federal Regulations, Part 1926, published in Volume 39, Number 122, Part II, June 24, 1974, *Federal Register*), and revisions thereto as adopted by General Statutes of North Carolina 95-126 through 155.
- g. The contractor shall designate a responsible person of his organization as safety officer/inspector to inspect the project site for unsafe health and safety hazards, to report these hazards to the contractor for correction, and whose duties also include accident prevention on the project, and to provide other safety and health measures on the project site as required by the terms and conditions of the contract. The name of the safety inspector shall be made known to the designer and owner at the time of the preconstruction conference and in all cases prior to any work starting on the project.
- h. In the event of emergency affecting the safety of life, the protection of work, or the safety of adjoining properties, the contractor is hereby authorized to act at his own discretion, without further authorization from anyone, to prevent such threatened injury or damage.

Any compensation claimed by the contractor on account of such action shall be determined as provided for under Article 19(b).

- i. Any and all costs associated with correcting damage caused to adjacent properties of the construction site or staging area shall be borne by the contractor. These costs shall include but not be limited to flooding, mud, sand, stone, debris, and discharging of waste products.

ARTICLE 12 - SEDIMENTATION POLLUTION CONTROL ACT OF 1973

- a. Any land-disturbing activity performed by the contractor(s) in connection with the project shall comply with all erosion control measures set forth in the contract documents and any additional measures which may be required in order to ensure that the project is in full compliance with the Sedimentation Pollution Control Act of 1973, as implemented by Title 15, North Carolina Administrative Code, Chapter 4, Sedimentation Control, Subchapters 4A, 4B and 4C, as amended (15 N.C.A.C. 4A, 4B and 4C).
- b. Upon receipt of notice that a land-disturbing activity is in violation of said act, the contractor(s) shall be responsible for ensuring that all steps or actions necessary to bring the project in compliance with said act are promptly taken.
- c. The contractor(s) shall be responsible for defending any legal actions instituted pursuant to N.C.G.S. 113A-64 against any party or persons described in this article.
- d. To the fullest extent permitted by law, the contractor(s) shall indemnify and hold harmless the owner, the designer and the agents, consultants and employees of the owner and designer, from and against all claims, damages, civil penalties, losses and expenses, including, but not limited to, attorneys' fees, arising out of or resulting from the performance of work or failure of performance of work, provided that any such claim, damage, civil penalty, loss or expense is attributable to a violation of the Sedimentation Pollution Control Act. Such obligation shall not be construed to negate, abridge or otherwise reduced any other right or obligation of indemnity which would otherwise exist as to any party or persons described in this article.

ARTICLE 13 - INSPECTION OF THE WORK

- a. It is a condition of this contract that the work shall be subject to inspection during normal working hours and during any time work is in preparation and progress by the designer, designated official representatives of the owner, State Construction Office and those persons required by state law to test special work for official approval. The contractor shall therefore provide safe access to the work at all times for such inspections.
- b. All instructions to the contractor will be made only by or through the designer or his designated project representative. Observations made by official representatives of the owner shall be conveyed to the designer for review and coordination prior to issuance to the contractor.
- c. All work shall be inspected by designer, special inspector and/or State Construction Office prior to being covered by the contractor. Contractor shall give a minimum two weeks notice unless otherwise agreed to by all parties. If inspection fails, after the first reinspection all costs associated with additional reinspections shall be borne by the contractor.

- d. Where special inspection or testing is required by virtue of any state laws, instructions of the designer, specifications or codes, the contractor shall give adequate notice to the designer of the time set for such inspection or test, if the inspection or test will be conducted by a party other than the designer. Such special tests or inspections will be made in the presence of the designer, or his authorized representative, and it shall be the contractor's responsibility to serve ample notice of such tests.
- e. All laboratory tests shall be paid by the owner unless provided otherwise in the contract documents except the general contractor shall pay for laboratory tests to establish design mix for concrete, and for additional tests to prove compliance with contract documents where materials have tested deficient except when the testing laboratory did not follow the appropriate ASTM testing procedures.
- f. Should any work be covered up or concealed prior to inspection and approval by the designer, special inspector, and/or State Construction Office such work shall be uncovered or exposed for inspection, if so requested by the designer in writing. Inspection of the work will be made upon notice from the contractor. All cost involved in uncovering, repairing, replacing, recovering and restoring to design condition, the work that has been covered or concealed will be paid by the contractor involved.

ARTICLE 14 - CONSTRUCTION SUPERVISION AND SCHEDULE

- a. Throughout the progress of the work, each contractor shall keep at the job site, a competent superintendent and supervisory staff satisfactory to the designer and the owner. The superintendent and supervisory staff shall not be changed without the consent of the designer and owner unless said superintendent ceases to be employed by the contractor or ceases to be competent as determined by the contractor, designer or owner. The superintendent and other staff designated by the contractor in writing shall have authority to act on behalf of the contractor, and instructions, directions or notices given to him shall be as binding as if given to the contractor. However, directions, instructions, and notices shall be confirmed in writing.
- b. The contractor shall examine and study the drawings and specifications and fully understand the project design, and shall provide constant and efficient supervision to the work. Should he discover any discrepancies of any sort in the drawings or specifications, he shall report them to the designer without delay. He will not be held responsible for discrepancies in the drawings and/or specifications, but shall be held responsible to report them should they become known to him.
- c. All contractors shall be required to cooperate and consult with each other during the construction of this project. Prior to installation of work, all contractors shall jointly prepare coordination drawings, showing locations of various ductworks, piping, motors, pumps, and other mechanical or electrical equipment, in relation to the structure, walls and ceilings. These drawings shall be submitted to the designer through the Project Expediter for information only. Each contractor shall lay out and execute his work to cause the least delay to other contractors. Each contractor shall be financially responsible for any damage to other contractor's work and for undue delay caused to other contractors on the project.
- d. The contractor is required to attend job site progress conferences as called by the designer. The contractor shall be represented at these job progress conferences by both home office and project personnel. These representatives shall have authority to act on behalf of the contractor. These meetings shall be open to subcontractors, material

suppliers and any others who can contribute toward maintaining required job progress. It shall be the principal purpose of these meetings, or conferences, to effect coordination, cooperation and assistance in every practical way toward the end of maintaining progress of the project on schedule and to complete the project within the specified contract time. Each contractor shall be prepared to assess progress of the work as required in his particular contract and to recommend remedial measures for correction of progress as may be appropriate. The designer or his authorized representative shall be the coordinator of the conferences and shall preside as chairman. The contractor shall turn over a copy of his daily reports to the Designer and Owner at the job site progress conference. Owner will determine daily report format.

- e. The contractor(s) shall, employ an engineer or a land surveyor licensed in the State of North Carolina to lay out the work and to establish a bench mark in a location where same will not be disturbed and where direct instruments sights may be taken.
- f. The designer shall designate a Project Expediter on projects involving two or more prime contracts. The Project Expediter shall be designated in the Supplementary General Conditions. The Project Expediter shall have at a minimum the following responsibilities.
 - 1. Prepare the project construction schedule and shall allow all prime contractors (multi-prime contract) and subcontractors (single-prime contract) performing general, plumbing, HVAC, and electrical work equal input into the preparation of the initial construction schedule.
 - 2. Maintain a project progress schedule for all contractors.
 - 3. Give adequate notice to all contractors to ensure efficient continuity of all phases of the work.
 - 4. Notify the designer of any changes in the project schedule.
 - 5. Recommend to the owner whether payment to a contractor shall be approved.
- g. It shall be the responsibility of the Project Expediter to cooperate with and obtain from several prime contractors and subcontractors on the job, their respective work activities and integrate these activities into a project construction schedule in form of a detailed bar chart or Critical Path Method (CPM), schedule. Each prime contractor shall provide work activities within fourteen (14) days of request by the Project Expediter. A “work activity”, for scheduling purposes, shall be any component or contractual requirement of the project requiring at least one (1) day, but not more than fourteen (14) days, to complete or fulfill. The project construction schedule shall graphically show all salient features of the work required to construct the project from start to finish and within the allotted time established in the contract. The time (in days) between the contractor’s early completion and contractual completion dates is part of the project total float time; and shall be used as such, unless amended by a change order. On a multi-prime project, each prime contractor shall review the proposed construction schedule and approve same in writing. The Project Expediter shall submit the proposed construction schedule to the designer for comments. The complete Project construction schedule shall be of the type set forth in the Supplementary General Condition or subparagraph (1) or (2) below, as appropriate:

1. For a project with total contracts of \$500,000 or less, a bar chart schedule will satisfy the above requirement. The schedule shall indicate the estimated starting and completion dates for each major element of the work.
2. For a project with total contracts over \$500,000, a Critical Path Method (CPM) schedule shall be utilized to control the planning and scheduling of the Work. The CPM schedule shall be the responsibility of the Project Expediter and shall be paid for by the Project Expediter.

Bar Chart Schedule: Where a bar chart schedule is required, it shall be time-scaled in weekly increments, shall indicate the estimated starting and completion dates for each major element of the work by trade and by area, level, or zone, and shall schedule dates for all salient features, including but not limited to the placing of orders for materials, submission of shop drawings and other Submittals for approval, approval of shop drawings by designers, the manufacture and delivery of material, the testing and the installation of materials, supplies and equipment, and all Work activities to be performed by the Contractor. The Contractor shall allow sufficient time in his schedule for all commissioning, required inspections and completion of final punchlist(s). Each Work activity will be assigned a time estimate by the Contractor. One day shall be the smallest time unit used.

CPM Schedule: Where a CPM schedule is required, it shall be in time-scaled precedence format using the Project Expediter's logic and time estimates. The CPM schedule shall be drawn or plotted with activities grouped or zoned by Work area or subcontract as opposed to a random (or scattered) format. The CPM schedule shall be time-scaled on a weekly basis and shall be drawn or plotted at a level of detail and logic which will schedule all salient features of the work to be performed by the Contractor. The Contractor shall allow sufficient time in his schedule for all commissioning, required inspections and completion of final punchlist(s).. Each Work activity will be assigned a time estimate by the Contractor. One day shall be the smallest time unit used.

The CPM schedule will identify and describe each activity, state the duration of each activity, the calendar dates for the early and late start and the early and late finish of each activity, and clearly highlight all activities on the critical path. "Total float" and "free float" shall be indicated for all activities. Float time shall not be considered for the exclusive use or benefit of either the Owner or the Contractor, but must be allocated in the best interest of completing the Work within the Contract time. Extensions to the Contract time, when granted by Change Order, will be granted only when equitable time adjustment exceeds the Total Float in the activity or path of activities affected by the change. On contracts with a price over \$2,500,000, the CPM schedule shall also show what part of the Contract Price is attributable to each activity on the schedule, the sum of which for all activities shall equal the total Contract Price.

Early Completion of Project: The Contractor may attempt to complete the project prior to the Contract Completion Date. However, such planned early completion shall be for the Contractor's convenience only and shall not create any additional rights of the Contractor or obligations of the Owner under this Contract, nor shall it change the Time

for Completion or the Contract Completion Date. The Contractor shall not be required to pay liquidated damages to the Owner because of its failure to complete by its planned earlier date. Likewise, the Owner shall not pay the Contractor any additional compensation for early completion nor will the Owner owe the Contractor any compensation should the Owner, its officers, employees, or agents cause the Contractor not to complete earlier than the date required by the Contract Documents.

- h. The proposed project construction schedule shall be presented to the designer no later than fifteen (15) days after written notice to proceed. No application for payment will be processed until this schedule is accepted by the designer and owner.
- i. The approved project construction schedule shall be distributed to all contractors and displayed at the job site by the Project Expediter.
- j. The several contractors shall be responsible for their work activities and shall notify the Project Expediter of any necessary changes or adjustments to their work. The Project Expediter shall maintain the project construction schedule, making biweekly adjustments, updates, corrections, etc., that are necessary to finish the project within the Contract time, keeping all contractors and the designer fully informed. Copy of a bar chart schedule annotated to show the current progress shall be submitted by the Contractor(s) to the designer, along with monthly request for payment. For project requiring CPM schedule, the Contractor shall submit a biweekly report of the status of all activities. The bar chart schedule or status report shall show the actual Work completed to date in comparison with the original Work scheduled for all activities. If any activities of the work of several contractors are behind schedule, the contractor must indicate in writing, what measures will be taken to bring each such activity back on schedule and to ensure that the Contract Completion Date is not exceeded. A plan of action and recovery schedule shall be developed and submitted to the designer by the Project Expediter, when (1) the contractor's report indicates delays, that are in the opinion of the designer or the owner, of sufficient magnitude that the contractor's ability to complete the work by the scheduled completion is brought into question; (2) the updated construction schedule is thirty (30) days behind the planned or baseline schedule and no legitimate time extensions, as determined by the Designer, are in process; and (3) the contractor desires to make changes in the logic (sequencing of work) or the planned duration of future activities of the CPM schedule which, in the opinion of the designer or the owner, are of a major nature. The plan of action, when required shall be submitted to the Owner for review within two (2) business days of the Contractor receiving the Owner's written demand. The recovery schedule, when required, shall be submitted to the Owner within five (5) calendar days of the Contractor's receiving the Owner's written demand. Failure to provide an updated construction schedule or a recovery schedule may be grounds for rejection of payment applications or withholding of funds as set forth in Article 33.
- k. The Project Expediter shall notify each contractor of such events or time frames that are critical to the progress of the job. Such notice shall be timely and reasonable. Should the progress be delayed due to the work of any of the several contractors, it shall be the duty of the Project Expediter to immediately notify the contractor(s) responsible for such delay, the designer, the State Construction Office and other prime contractors. The designer shall determine the contractor(s) who caused the delays and notify the bonding company of the responsible contractor(s) of the delays; and shall make a recommendation to the owner regarding further action.
- l. Designation as Project Expediter entails an additional project control responsibility and does not alter in any way the responsibility of the contractor so designated, nor the

responsibility of the other contractors involved in the project. The project expeditor's Superintendent(s) shall be in attendance at the Project site at all times when work is in progress unless conditions are beyond the control of the Contractor or until termination of the Contract in accordance with the Contract Documents. It is understood that such Superintendent shall be acceptable to the Owner and Designer and shall be the one who will be continued in that capacity for the duration of the project unless he ceases to be on the Contractor's payroll or the Owner otherwise agrees. The Superintendent shall not be employed on any other project for or by the Contractor or by any other entity during the course of the Work. If the Superintendent is employed by the Contractor on another project without the Owner's approval, then the Owner may deduct from the Contractor's monthly general condition costs and amount representing the Superintendent's cost and shall deduct that amount for each month thereafter until the Contractor has the Superintendent back on the Owner's Project full-time.

ARTICLE 15 - SEPARATE CONTRACTS AND CONTRACTOR RELATIONSHIPS

- a. Effective from January 1, 2002, Chapter 143, Article 8, was amended, to allow public contracts to be delivered by the following delivery methods: single-prime, dual (single-prime and separate-prime), construction manager at risk, and alternative contracting method as approved by the State Building Commission. The owner reserves the right to prepare separate specifications, receive separate bids, and award separate contracts for such other major items of work as may be in the best interest of the State. For the purposes of a single prime contract, refer to Article 1 – Definitions.
- b. All contractors shall cooperate with each other in the execution of their work, and shall plan their work in such manner as to avoid conflicting schedules or delay of the work. See Article 14, Construction Supervision.
- c. If any part of contractor's work depends upon the work of another contractor, defects which may affect that work shall be reported to the designer in order that prompt inspection may be made and the defects corrected. Commencement of work by a contractor where such condition exists will constitute acceptance of the other contractor's work as being satisfactory in all respects to receive the work commenced, except as to defects which may later develop. The designer shall be the judge as to the quality of work and shall settle all disputes on the matter between contractors.
- d. Any mechanical or electrical work such as sleeves, inserts, chases, openings, penetrations, etc., which is located in the work of the general contractor shall be built in by the general contractor. The respective mechanical and electrical contractors shall set all sleeves, inserts and other devices that are to be incorporated into the structure in cooperation and under the supervision of the general contractor. The responsibility for the exact location of such items shall be that of the mechanical and/or electrical contractor.
- e. The designer and the owner shall have access to the work whenever it is in preparation and progress and during normal working hours. The contractor shall provide facilities for such access so the designer may perform his functions under the contract documents.
- f. Should a contractor cause damage to the work or property of another contractor, he shall be directly responsible, and upon notice, shall promptly settle the claim or otherwise resolve the dispute.

ARTICLE 16 - SUBCONTRACTS AND SUBCONTRACTORS

- a. Within thirty (30) days after award of the contract, the contractor shall submit to the designer, owner and to the State Construction Office a list giving the names and addresses of subcontractors and equipment and material suppliers he proposes to use, together with the scope of their respective parts of the work. Should any subcontractor be disapproved by the designer or owner, the designer or owner shall submit his reasons for disapproval in writing to the State Construction Office for its consideration with a copy to the contractor. If the State Construction Office concurs with the designer's or owner's recommendation, the contractor shall submit a substitute for approval. The designer and owner shall act promptly in the approval of subcontractors, and when approval of the list is given, no changes of subcontractors will be permitted except for cause or reason considered justifiable by the designer or owner.
- b. The designer will furnish to any subcontractor, upon request, evidence regarding amounts of money paid to the contractor on account of the subcontractor's work.
- c. The contractor is and remains fully responsible for his own acts or omissions as well as those of any subcontractor or of any employee of either. The contractor agrees that no contractual relationship exists between the subcontractor and the owner in regard to the contract, and that the subcontractor acts on this work as an agent or employee of the contractor.
- d. The owner reserves the right to limit the amount of portions of work to be subcontracted as hereinafter specified.

ARTICLE 17 - CONTRACTOR AND SUBCONTRACTOR RELATIONSHIPS

The contractor agrees that the terms of these contract documents shall apply equally to each subcontractor as to the contractor, and the contractor agrees to take such action as may be necessary to bind each subcontractor to these terms. The contractor further agrees to conform to the Code of Ethical Conduct as adopted by the Associated General Contractors of America, Inc., with respect to contractor-subcontractor relationships, and that payments to subcontractors shall be made in accordance with the provisions of G.S. 143-134.1 titled Interest on final payments due to prime contractors: payments to subcontractors.

- a. On all public construction contracts which are let by a board or governing body of the state government or any political subdivision thereof, except contracts let by the Department of Transportation pursuant to G.S. 136-28.1, the balance due prime contractors shall be paid in full within 45 days after respective prime contracts of the project have been accepted by the owner, certified by the architect, engineer or designer to be completed in accordance with terms of the plans and specifications, or occupied by the owner and used for the purpose for which the project was constructed, whichever occurs first. Provided, however, that whenever the architect or consulting engineer in charge of the project determines that delay in completion of the project in accordance with terms of the plans and specifications is the fault of the contractor, the project may be occupied and used for the purposes for which it was constructed without payment of any interest on amounts withheld past the 45 day limit. No payment shall be delayed because of the failure of another prime contractor on such project to complete his contract. Should final payment to any prime contractor beyond the date such contracts have been certified to be completed by the designer or architect, accepted by the owner, or occupied by the owner and used for the purposes for which the project was constructed, be delayed by more than 45 days, said prime contractor shall be paid interest, beginning on the 46th day, at the rate of one percent (1%) per month or fraction thereof unless a lower rate is

agreed upon on such unpaid balance as may be due. In addition to the above final payment provisions, periodic payments due a prime contractor during construction shall be paid in accordance with the payment provisions of the contract documents or said prime contractor shall be paid interest on any such unpaid amount at the rate stipulated above for delayed final payments. Such interest shall begin on the date the payment is due and continue until the date on which payment is made. Such due date may be established by the terms of the contract. Funds for payment of such interest on state-owned projects shall be obtained from the current budget of the owning department, institution or agency. Where a conditional acceptance of a contract exists, and where the owner is retaining a reasonable sum pending correction of such conditions, interest on such reasonable sum shall not apply.

- b. Within seven days of receipt by the prime contractor of each periodic or final payment, the prime contractor shall pay the subcontractor based on work completed or service provided under the subcontract. Should any periodic or final payment to the subcontractor be delayed by more than seven days after receipt of periodic or final payment by the prime contractor, the prime contractor shall pay the subcontractor interest, beginning on the eighth day, at the rate of one percent (1%) per month or fraction thereof on such unpaid balance as may be due.
- c. The percentage of retainage on payments made by the prime contractor to the subcontractor shall not exceed the percentage of retainage on payments made by the owner to the prime contractor. Any percentage of retainage on payments made by the prime contractor to the subcontractor that exceeds the percentage of retainage on payments made by the owner to the prime contractor shall be subject to interest to be paid by the prime contractor to the subcontractor at the rate of one percent (1%) per month or fraction thereof.
- d. Nothing in this section shall prevent the prime contractor at the time of application and certification to the owner from withholding application and certification to the owner for payment to the subcontractor for unsatisfactory job progress; defective construction not remedied; disputed work; third-party claims filed or reasonable evidence that claim will be filed; failure of subcontractor to make timely payments for labor, equipment and materials; damage to prime contractor or another subcontractor; reasonable evidence that subcontract cannot be completed for the unpaid balance of the subcontract sum; or a reasonable amount for retainage not to exceed the initial percentage retained by owner.

ARTICLE 18 - DESIGNER'S STATUS

- a. The designer shall provide general administration of the performance of construction contracts, including liaison and necessary inspection of the work to ensure compliance with plans and specifications. He is the agent of the owner only for the purpose of constructing this work and to the extent stipulated in the contract documents. He has authority to direct work to be performed, to stop work, to order work removed, or to order corrections of faulty work, where any such action by the designer may be necessary to assure successful completion of the work.
- b. The designer is the impartial interpreter of the contract documents, and, as such, he shall exercise his powers under the contract to enforce faithful performance by both the owner and the contractor, taking sides with neither.
- c. Should the designer cease to be employed on the work for any reason whatsoever, then the owner shall employ a competent replacement who shall assume the status of the former designer.

- d. The designer and his consultants will make inspections of the project. He will inspect the progress, the quality and the quantity of the work.
- e. The designer and the owner shall have access to the work whenever it is in preparation and progress during normal working hours. The contractor shall provide facilities for such access so the designer and owner may perform their functions under the contract documents.
- f. Based on the designer's inspections and evaluations of the project, the designer shall issue interpretations, directives and decisions as may be necessary to administer the project. His decisions relating to artistic effect and technical matters shall be final, provided such decisions are within the limitations of the contract.

ARTICLE 19 - CHANGES IN THE WORK

- a. The owner may have changes made in the work covered by the contract. These changes will not invalidate and will not relieve or release the contractor from any guarantee given by him pertinent to the contract provisions. These changes will not affect the validity of the guarantee bond and will not relieve the surety or sureties of said bond. All extra work shall be executed under conditions of the original contract.
- b. Except in an emergency endangering life or property, no change shall be made by the contractor except upon receipt of approved change order or written field order from the designer, countersigned by the owner and the state construction office authorizing such change. No claim for adjustments of the contract price shall be valid unless this procedure is followed.

A field order, transmitted by fax, electronically, or hand delivered, may be used where the change involved impacts the critical path of the work. A formal change order shall be issued as expeditiously as possible.

In the event of emergency endangering life or property, the contractor may be directed to proceed on a time and material basis whereupon the contractor shall proceed and keep accurately on such form as specified by the designer or owner, a correct account of costs together with all proper invoices, payrolls and supporting data. Upon completion of the work the change order will be prepared as outlined under either Method "c(1)" or Method "c(2)" or both.

- c. In determining the values of changes, either additive or deductive, contractors are restricted to the use of the following methods:
 - 1. Where the extra work involved is covered by unit prices quoted in the proposal, or subsequently agreed to by the Contractor, Designer, Owner and State Construction Office the value of the change shall be computed by application of unit prices based on quantities, estimated or actual as agreed of the items involved, except in such cases where a quantity exceeds the estimated quantity allowance in the contract by one hundred percent (100%) or more. In such cases, either party may elect to proceed under subparagraph c2 herein. If neither party elects to proceed under c2, then unit prices shall apply.
 - 2. The contracting parties shall negotiate and agree upon the equitable value of the change prior to issuance of the change order, and the change order shall stipulate the corresponding lump sum adjustment to the contract price.

- d. Under Paragraph "b" and Methods "c(2)" above, the allowances for overhead and profit combined shall be as follows: all contractors (the single contracting entity (prime), his subcontractors(1st tier subs), or their sub-subcontractors (2nd tier subs, 3rd tier subs, etc)) shall be allowed a maximum of 10% on work they each self-perform; the prime contractor shall be allowed a maximum of 5% on contracted work of his 1st tier sub; 1st tier, 2nd tier, 3rd tier, etc contractors shall be allowed a maximum of 2.5% on the contracted work of their subs. ; Under Method "c(1)", no additional allowances shall be made for overhead and profit. In the case of deductible change orders, under Method "c(2)" and Paragraph (b) above, the contractor shall include no less than five percent (5%) profit, but no allowances for overhead.
- e. The term "net cost" as used herein shall mean the difference between all proper cost additions and deductions. The "cost" as used herein shall be limited to the following:
1. The actual costs of materials and supplies incorporated or consumed as part of the work;
 2. The actual costs of labor expended on the project site; labor expended in coordination, change order negotiation, record document maintenance, shop drawing revision or other tasks necessary to the administration of the project are considered overhead whether they take place in an office or on the project site.
 3. The actual costs of labor burden, limited to the costs of social security (FICA) and Medicare/Medicaid taxes; unemployment insurance costs; health/dental/vision insurance premiums; paid employee leave for holidays, vacation, sick leave, and/or petty leave, not to exceed a total of 30 days per year; retirement contributions; worker's compensation insurance premiums; and the costs of general liability insurance when premiums are computed based on payroll amounts; the total of which shall not exceed thirty percent (30%) of the actual costs of labor;
 4. The actual costs of rental for tools, excluding hand tools; equipment; machinery; and temporary facilities required for the work;
 5. The actual costs of premiums for bonds, insurance, permit fees, and sales or use taxes related to the work.

Overtime and extra pay for holidays and weekends may be a cost item only to the extent approved by the owner.

- f. Should concealed conditions be encountered in the performance of the work below grade, or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the contract documents, the contract sum and time for completion may be equitably adjusted by change order upon claim by either party made within thirty (30) days after the condition has been identified. The cost of such change shall be arrived at by one of the foregoing methods. All change orders shall be supported by a unit cost breakdown showing method of arriving at net cost as defined above.
- g. In all change orders, the procedure will be for the designer to request proposals for the change order work in writing. The contractor will provide such proposal and supporting data in suitable format. The designer shall verify correctness. Delay in the processing of the change order due to lack of proper submittal by the contractor of all required supporting data shall not constitute grounds for a time extension or basis of a claim. Within fourteen (14) days after receipt of the contractor's accepted proposal including all supporting documentation required by the designer, the designer shall prepare the change order and forward to the contractor for his signature or otherwise respond, in writing, to

the contractor's proposal. Within seven (7) days after receipt of the change order executed by the contractor, the designer shall, certify the change order by his signature, and forward the change order and all supporting data to the owner for the owner's signature. The owner shall execute the change order and forward to the State Construction Office for final approval, within seven (7) days of receipt. The State Construction Office shall act on the change order within seven (7) days. In case of emergency or extenuating circumstances, approval of changes may be obtained verbally by telephone or field orders approved by all parties, then shall be substantiated in writing as outlined under normal procedure.

- h. At the time of signing a change order, the contractor shall be required to certify as follows:

"I certify that my bonding company will be notified forthwith that my contract has been changed by the amount of this change order, and that a copy of the approved change order will be mailed upon receipt by me to my surety."

- i. A change order, when issued, shall be full compensation, or credit, for the work included, omitted or substituted. It shall show on its face the adjustment in time for completion of the project as a result of the change in the work.
- j. If, during the progress of the work, the owner requests a change order and the contractor's terms are unacceptable, the owner, with the approval of the State Construction Office, may require the contractor to perform such work on a time and material basis whereupon the contractor shall proceed and keep accurately on such form as specified by the Designer or owner, a correct account of cost together with all proper invoices, payrolls and supporting data. Upon completion of the work a change order will be prepared with allowances for overhead and profit per paragraph d. above and "net cost" and "cost" per paragraph e. above. Without prejudice, nothing in this paragraph shall preclude the owner from performing or to have performed that portion of the work requested in the change order.

ARTICLE 20 - CLAIMS FOR EXTRA COST

- a. Should the contractor consider that as a result of instructions given by the designer, he is entitled to extra cost above that stated in the contract, he shall give written notice thereof to the designer within seven (7) days without delay. The written notice shall clearly state that a claim for extra cost is being made and shall provide a detailed justification for the extra cost. The contractor shall not proceed with the work affected until further advised, except in emergency involving the safety of life or property, which condition is covered in Article 19(b) and Article 11(h). No claims for extra compensation shall be considered unless the claim is so made. The designer shall render a written decision within seven (7) days of receipt of claim.
- b. The contractor shall not act on instructions received by him from persons other than the designer, and any claims for extra compensation or extension of time on account of such instruction will not be honored. The designer shall not be responsible for misunderstandings claimed by the contractor of verbal instructions which have not been confirmed in writing, and in no case shall instructions be interpreted as permitting a departure from the contract documents unless such instruction is confirmed in writing and supported by a properly authorized change order.
- c. Should a claim for extra compensation that complies with the requirements of (a) above by the contractor and is denied by the designer or owner, and cannot be resolved by a

representative of the State Construction Office, the contractor may request a mediation in connection with GS 143-128(f1) in the dispute resolution rules adopted by the State Building Commission (1 N.C.A.C. 30H .0101 through .1001). If the contractor is unable to resolve its claim as a result of mediation, the contractor may pursue the claim in accordance with the provisions of G.S. 143-135.3, or G.S. 143-135.6 where Community Colleges are the owner, and the following:

1. A contractor who has not completed a contract with a board for construction or repair work and who has not received the amount he claims is due under the contract may submit a verified written claim to the director of the State Construction Office of the Department of Administration for the amount the contractor claims is due. The director may deny, allow or compromise the claim, in whole or in part. A claim under this subsection is not a contested case under Chapter 150B of the General Statutes.
2. (a) A contractor who has completed a contract with a board for construction or repair work and who has not received the amount he claims is due under the contract may submit a verified written claim to the director of the State Construction Office of the Department of Administration for the amount the contractor claims is due. The claim shall be submitted within sixty (60) days after the contractor receives a final statement of the board's disposition of his claim and shall state the factual basis for the claim.
 - (b) The director shall investigate a submitted claim within ninety (90) days of receiving the claim, or within any longer time period upon which the director and the contractor agree. The contractor may appear before the director, either in person or through counsel, to present facts and arguments in support of his claim. The director may allow, deny or compromise the claim, in whole or in part. The director shall give the contractor a written statement of the director's decision on the contractor's claim.
 - (c) A contractor who is dissatisfied with the director's decision on a claim submitted under this subsection may commence a contested case on the claim under Chapter 150B of the General Statutes. The contested case shall be commenced within sixty (60) days of receiving the director's written statement of the decision.
 - (d) As to any portion of a claim that is denied by the director, the contractor may, in lieu of the procedures set forth in the preceding subsection of this section, within six (6) months of receipt of the director's final decision, institute a civil action for the sum he claims to be entitled to under the contract by filing a verified complaint and the issuance of a summons in the Superior Court of Wake County or in the superior court of any county where the work under the contract was performed. The procedure shall be the same as in all civil actions except that all issues shall be tried by the judge, without a jury.

ARTICLE 21 - MINOR CHANGES IN THE WORK

The designer will have the authority to order minor changes in the work not involving an adjustment in the contract sum or time for completion, and not inconsistent with the intent of the contract documents. Such changes shall be effected by written order, copied to the State Construction Office, and shall be binding on the owner and the contractor.

ARTICLE 22 - UNCORRECTED FAULTY WORK

Should the correction of faulty or damaged work be considered inadvisable or inexpedient by the owner and the designer, the owner shall be reimbursed by the contractor. A change order will be issued to reflect a reduction in the contract sum.

ARTICLE 23 - TIME OF COMPLETION, DELAYS, EXTENSION OF TIME

- a. The time of completion is stated in the Supplementary General Conditions and in the Form of Construction Contract. The Project Expediter, upon notice of award of contract, shall prepare a construction schedule to complete the project within the time of completion as required by Article 14.
- b. The contractors shall commence work to be performed under this agreement on a date to be specified in a written Notice to Proceed from the designer and shall fully complete all work hereunder within the time of completion stated. Time is of the essence and the contractor acknowledges the Owner will likely suffer financial damage for failure to complete the work within the time of completion. For each day in excess of the above number of days, the contractor(s) shall pay the owner the sum stated as liquidated damages reasonably estimated in advance to cover the losses to be incurred by the owner by reason of failure of said contractor(s) to complete the work within the time specified, such time being in the essence of this contract and a material consideration thereof.
- c. In the event of multiple prime contractors, the designer shall be the judge as to the division of responsibility between the contractor(s), based on the construction schedule, weekly reports and job records, and shall apportion the amount of liquidated damages to be paid by each of them, according to delay caused by any or all of them.
- d. If the contractor is delayed at any time in the progress of his work solely by any act or negligence of the owner, the designer, or by any employee of either; by any separate contractor employed by the owner; by changes ordered in the work; by labor disputes at the project site; by abnormal weather conditions not reasonably anticipated for the locality where the work is performed; by unavoidable casualties; by any causes beyond the contractor's control; or by any other causes which the designer and owner determine may justify the delay, then the contract time may be extended by change order only for the time which the designer and owner may determine is reasonable.

Time extensions will not be granted for rain, wind, snow or other natural phenomena of normal intensity for the locality where work is performed. For purpose of determining extent of delay attributable to unusual weather phenomena, a determination shall be made by comparing the weather for the contract period involved with the average of the preceding five (5) year climatic range during the same time interval based on the National Oceanic and Atmospheric Administration National Weather Service statistics for the locality where work is performed and on daily weather logs kept on the job site by the contractor reflecting the effect of the weather on progress of the work and initialed by the designer's representative. No weather delays shall be considered after the building is dried in unless work claimed to be delayed is on the critical path of the baseline schedule or approved updated schedule. Time extensions for weather delays, acts of God, labor disputes, fire, delays in transportation, unavoidable casualties or other delays which are beyond the control of the Owner do not entitle the Contractor to compensable damages for delays. Any contractor claim for compensable damages for delays is limited to delays caused solely by the owner or its agents. Contractor caused delays shall be accounted for before owner or designer caused delays in the case of concurrent delays.

- e. Request for extension of time shall be made in writing to the designer, copies to the owner and SCO, within twenty (20) days following cause of delay. In case of continuing cause for delay, the Contractor shall notify the Designer to the designer, copies to the owner and SCO, of the delay within 20 days of the beginning of the delay and only one claim is necessary.
- f. The contractor shall notify his surety in writing of extension of time granted.
- g. No claim for time extension shall be allowed on account of failure of the designer to furnish drawings or instructions until twenty (20) days after demand for such drawings and/or instructions. See Article 5c. Demand must be in written form clearly stating the potential for delay unless the drawings or instructions are provided. Any delay granted will begin after the twenty (20) day demand period is concluded.

ARTICLE 24 - PARTIAL UTILIZATION/BENEFICIAL OCCUPANCY

- a. The owner may desire to occupy or utilize all or a portion of the project prior to the completion of the project.
- b. Should the owner request a utilization of a building or portion thereof, the designer shall perform a designer final inspection of area after being notified by the contractor that the area is ready for such. After the contractor has completed designer final inspection punch list and the designer has verified, then the designer shall schedule a beneficial occupancy inspection at a time and date acceptable to the owner, contractor(s) and State Construction Office. If beneficial occupancy is granted by the State Construction Office, in such areas the following will be established:
 - 1. The beginning of guarantees and warranties period for the equipment necessary to support. in the area.
 - 2. The owner assumes all responsibilities for utility costs for entire building.
 - 2. Contractor will obtain consent of surety.
 - 3. Contractor will obtain endorsement from insurance company permitting beneficial occupancy.
- c. The owner shall have the right to exclude the contractor from any part of the project which the designer has so certified to be substantially complete, but the owner will allow the contractor reasonable access to complete or correct work to bring it into compliance with the contract.
- d. Occupancy by the owner under this article will in no way relieve the contractor from his contractual requirement to complete the project within the specified time. The contractor will not be relieved of liquidated damages because of beneficial occupancy. The designer may prorate liquidated damages based on the percentage of project occupied.

ARTICLE 25 - FINAL INSPECTION, ACCEPTANCE, AND PROJECT CLOSEOUT

- a. Upon notification from the contractor(s) that the project is complete and ready for inspection, the designer shall make a Designer final inspection to verify that the project is complete and ready for SCO final inspection. Prior to SCO final inspection, the contractor(s) shall complete all items requiring corrective measures noted at the Designer

final inspection. The designer shall schedule a SCO final inspection at a time and date acceptable to the owner, contractor(s) and State Construction Office.

- b. At the SCO final inspection, the designer and his consultants shall, if job conditions warrant, record a list of items that are found to be incomplete or not in accordance with the contract documents. At the conclusion of the SCO final inspection, the designer and State Construction Office representative shall make one of the following determinations:
 - 1. That the project is completed and accepted.
 - 2. That the project will be accepted subject to the correction of the list of discrepancies (punch list). All punch list items must be completed within thirty (30) days of SCO final inspection or the owner may invoke Article 28, Owner's Right to Do Work.
 - 4. That the project is not complete and another date for a SCO final inspection will be established.
- c. Within fourteen (14) days of final acceptance per Paragraph b1 or within fourteen (14) days after completion of punch list per Paragraph b2 above, the designer shall certify the work and issue applicable certificate(s) of compliance.
- d. Any discrepancies listed or discovered after the date of SCO final inspection and acceptance under Paragraphs b1 or b2 above shall be handled in accordance with Article 42, Guarantee.
- f. The final acceptance date will establish the following:
 - 1. The beginning of guarantees and warranties period.
 - 2. The date on which the contractor's insurance coverage for public liability, property damage and builder's risk may be terminated.
 - 3. That no liquidated damages (if applicable) shall be assessed after this date.
 - 4. The termination date of utility cost to the contractor.
- g. **Prior to issuance of final acceptance date, the contractor shall have his authorized representatives visit the project and give full instructions to the designated personnel regarding operating, maintenance, care, and adjustment of all equipment and special construction elements. In addition, the contractor shall provide to the owner a complete instructional video (media format acceptable to the owner) on the operation, maintenance, care and adjustment of all equipment and special construction elements.**

ARTICLE 26 - CORRECTION OF WORK BEFORE FINAL PAYMENT

- a. Any work, materials, fabricated items or other parts of the work which have been condemned or declared not in accordance with the contract by the designer shall be promptly removed from the work site by the contractor, and shall be immediately replaced by new work in accordance with the contract at no additional cost to the owner. Work or property of other contractors or the owner, damaged or destroyed by virtue of such faulty work, shall be made good at the expense of the contractor whose work is faulty.

- b. Correction of condemned work described above shall commence within twenty-four (24) hours after receipt of notice from the designer, and shall make satisfactory progress, as determined by the designer, until completed.
- c. Should the contractor fail to proceed with the required corrections, then the owner may complete the work in accordance with the provisions of Article 28.

ARTICLE 27 - CORRECTION OF WORK AFTER FINAL PAYMENT

See Article 35, Performance Bond and Payment Bond, and Article 42, Guarantee. Neither the final certificate, final payment, occupancy of the premises by the owner, nor any provision of the contract, nor any other act or instrument of the owner, nor the designer, shall relieve the contractor from responsibility for negligence, or faulty material or workmanship, or failure to comply with the drawings and specifications. Contractor shall correct or make good any defects due thereto and repair any damage resulting there from, which may appear during the guarantee period following final acceptance of the work except as stated otherwise under Article 42, Guarantee. The owner will report any defects as they may appear to the contractor and establish a time limit for completion of corrections by the contractor. The owner will be the judge as to the responsibility for correction of defects.

ARTICLE 28 - OWNER'S RIGHT TO DO WORK

If, during the progress of the work or during the period of guarantee, the contractor fails to prosecute the work properly or to perform any provision of the contract, the owner, after seven (7) days' written notice sent by certified mail, return receipt requested, to the contractor from the designer, may perform or have performed that portion of the work. The cost of the work may be deducted from any amounts due or to become due to the contractor, such action and cost of same having been first approved by the designer. Should the cost of such action of the owner exceed the amount due or to become due the contractor, then the contractor or his surety, or both, shall be liable for and shall pay to the owner the amount of said excess.

ARTICLE 29 - ANNULMENT OF CONTRACT

If the contractor fails to begin the work under the contract within the time specified, or the progress of the work is not maintained on schedule, or the work is not completed within the time above specified, or fails to perform the work with sufficient workmen and equipment or with sufficient materials to ensure the prompt completion of said work, or shall perform the work unsuitably or shall discontinue the prosecution of the work, or if the contractor shall become insolvent or be declared bankrupt or commit any act of bankruptcy or insolvency, or allow any final judgment to stand against him unsatisfied for a period of forty-eight (48) hours, or shall make an assignment for the benefit of creditors, or for any other cause whatsoever shall not carry on the work in an acceptable manner, the owner may give notice in writing, sent by certified mail, return receipt requested, to the contractor and his surety of such delay, neglect or default, specifying the same, and if the contractor within a period of seven (7) days after such notice shall not proceed in accordance therewith, then the owner shall, declare this contract in default, and, thereupon, the surety shall promptly take over the work and complete the performance of this contract in the manner and within the time frame specified. In the event the surety shall fail to take over the work to be done under this contract within seven (7) days after being so notified and notify the owner in writing, sent by certified mail, return receipt requested, that he is taking the same over and stating that he will diligently pursue and complete the same, the owner shall have full power and authority, without violating the contract, to take the prosecution of the work out of the hands of said contractor, to appropriate or use any or all contract materials and equipment on the grounds as may be suitable and acceptable and may enter into an agreement, either by public letting or negotiation, for the completion of said contract according to the terms and provisions thereof

or use such other methods as in his opinion shall be required for the completion of said contract in an acceptable manner. All costs and charges incurred by the owner, together with the costs of completing the work under contract, shall be deducted from any monies due or which may become due said contractor and surety. In case the expense so incurred by the owner shall be less than the sum which would have been payable under the contract, if it had been completed by said contractor, then the said contractor and surety shall be entitled to receive the difference, but in case such expense shall exceed the sum which would have been payable under the contract, then the contractor and the surety shall be liable and shall pay to the owner the amount of said excess.

ARTICLE 30 - CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE THE CONTRACT

- a. Should the work be stopped by order of a court having jurisdiction, or by order of any other public authority for a period of three months, due to cause beyond the fault or control of the contractor, or if the owner should fail or refuse to make payment on account of a certificate issued by the designer within forty-five (45) days after receipt of same, then the contractor, after fifteen (15) days' written notice sent by certified mail, return receipt requested, to the owner and the designer, may suspend operations on the work or terminate the contract.
- b. The owner shall be liable to the contractor for the cost of all materials delivered and work performed on this contract plus 10 percent overhead and profit and shall make such payment. The designer shall be the judge as to the correctness of such payment.

ARTICLE 31 - REQUEST FOR PAYMENT

- a. Not later than the fifth day of the month, the contractor shall submit to the designer a request for payment for work done during the previous month. The request shall be in the form agreed upon between the contractor and the designer, but shall show substantially the value of work done and materials delivered to the site during the period since the last payment, and shall sum up the financial status of the contract with the following information:
 1. Total of contract including change orders.
 2. Value of work completed to date.
 3. Less five percent (5%) retainage, provided however, that after fifty percent (50%) of the contractor's work has been satisfactorily completed on schedule, with approval of the owner and the State Construction Office and written consent of the surety, further requirements for retainage will be waived only so long as work continues to be completed satisfactorily and on schedule.
 4. Less previous payments.
 5. Current amount due.
- b. The contractor, upon request of the designer, shall substantiate the request with invoices of vouchers or payrolls or other evidence.
- c. Prior to submitting the first request, the contractor shall prepare for the designer a schedule showing a breakdown of the contract price into values of the various parts of the work, so arranged as to facilitate payments to subcontractors in accordance with Article 17, Contractor and Subcontractor Relationships. The contractor(s) shall list the

value of each subcontractor and supplier, identifying each minority business subcontractor and supplier as listed in Affidavit C, if applicable.

- d. When payment is made on account of stored materials and equipment, such materials must be stored on the owner's property, and the requests for payments shall be accompanied by invoices or bills of sale or other evidence to establish the owner's title to such materials and equipment. Such payments will be made only for materials that have been customized or fabricated specifically for this project. Raw materials or commodity products including but not limited to piping, conduit, CMU, metal studs and gypsum board may not be submitted. Responsibility for such stored materials and equipment shall remain with the contractor regardless of ownership title. Such stored materials and equipment shall not be removed from the owner's property. Should the space for storage on-site be limited, the contractor, at his option, shall be permitted to store such materials and/or equipment in a suitable space off-site. Should the contractor desire to include any such materials or equipment in his application for payment, they must be stored in the name of the owner in an independent, licensed, bonded warehouse approved by the designer, owner and the State Construction Office and located as close to the site as possible. The warehouse selected must be approved by the contractor's bonding and insurance companies; the material to be paid for shall be assigned to the owner and shall be inspected by the designer. Upon approval by the designer, owner and SCO of the storage facilities and materials and equipment, payment therefore will be certified. Responsibility for such stored materials and equipment shall remain with the contractor. Such stored materials and equipment shall not be moved except for transportation to the project site. Under certain conditions, the designer may approve storage of materials at the point of manufacture, which conditions shall be approved by the designer, the owner and the State Construction Office prior to approval for the storage and shall include an agreement by the storing party which unconditionally gives the State absolute right to possession of the materials at anytime. Bond, security and insurance protection shall continue to be the responsibility of the contractor(s).
- e. In the event of beneficial occupancy, retainage of funds due the contractor(s) may be reduced with the approval of the State Construction Office to an equitable amount to cover the list of items to be completed or corrected. Retainage may not be reduced to less than two and one-half (2 1/2) times the estimated value of the work to be completed or corrected. Reduction of retainage must be with the consent and approval of the contractor's bonding company.

ARTICLE 32 - CERTIFICATES OF PAYMENT AND FINAL PAYMENT

- a. Within five (5) days from receipt of request for payment from the contractor, the designer shall issue and forward to the owner a certificate for payment. This certificate shall indicate the amount requested or as approved by the designer. If the certificate is not approved by the designer, he shall state in writing to the contractor and the owner his reasons for withholding payment.
- b. No certificate issued or payment made shall constitute an acceptance of the work or any part thereof. The making and acceptance of final payment shall constitute a waiver of all claims by the owner except:
 - 1. Claims arising from unsettled liens or claims against the contractor.
 - 2. Faulty work or materials appearing after final payment.
 - 3. Failure of the contractor to perform the work in accordance with drawings and specifications, such failure appearing after payment.

4. As conditioned in the performance bond and payment bond.
- c. The making and acceptance of final payment shall constitute a waiver of all claims by the contractor except those claims previously made and remaining unsettled (Article 20(c)).
- d. Prior to submitting request for final payment to the designer for approval, the contractor shall fully comply with all requirements specified in the “project closeout” section of the specifications. These requirements include but not limited to the following:
 1. Submittal of Product and Operating Manuals, Warranties and Bonds, Guarantees, Maintenance Agreements, As-Built Drawings, Certificates of Inspection or Approval from agencies having jurisdiction. (The designer must approve the Manuals prior to delivery to the owner).
 2. Transfer of Required attic stock material and all keys in an organized manner.
 3. Record of Owner’s training.
 4. Resolution of any final inspection discrepancies.
 5. Granting access to Contractor’s records, if Owner’s internal auditors have made a request for such access pursuant to Article 52.
- e. The contractor shall forward to the designer, the final application for payment along with the following documents:
 1. List of minority business subcontractors and material suppliers showing breakdown of contract amounts and total actual payments to subs and material suppliers.
 2. Affidavit of Release of Liens.
 3. Affidavit of contractors of payment to material suppliers and subcontractors. (See Article 36).
 4. Consent of Surety to Final Payment.
 5. Certificates of state agencies required by state law.
- f. The designer will not authorize final payment until the work under contract has been certified by designer, certificates of compliance issued, and the contractor has complied with the closeout requirements. The designer shall forward the contractor’s final application for payment to the owner along with respective certificate(s) of compliance required by law.

ARTICLE 33 - PAYMENTS WITHHELD

- a. The designer with the approval of the State Construction Office may withhold payment for the following reasons:
 1. Faulty work not corrected.

2. The unpaid balance on the contract is insufficient to complete the work in the judgment of the designer.
 3. To provide for sufficient contract balance to cover liquidated damages that will be assessed.
- b. The secretary of the Department of Administration may authorize the withholding of payment for the following reasons:
 1. Claims filed against the contractor or evidence that a claim will be filed.
 2. Evidence that subcontractors have not been paid.
 - c. The Owner may withhold all or a portion of Contractor's general conditions costs set forth in the approved schedule of values, if Contractor has failed to comply with: (1) a request to access its records by Owner's internal auditors pursuant to Article 52; (2) a request for a plan of action and/or recovery schedule under Article 14.j or provide The Owner; (3) a request to provide an electronic copies of Contractor's baseline schedule, updates with all logic used to create the schedules in the original format of the scheduling software; and (4) Contractor's failure to have its Superintendent on the Project full-time; (
 - d. When grounds for withholding payments have been removed, payment will be released. Delay of payment due the contractor without cause will make owner liable for payment of interest to the contractor in accordance with G.S. 143-134.1. As provided in G.S.143-134.1(e) the owner shall not be liable for interest on payments withheld by the owner for unsatisfactory job progress, defective construction not remedied, disputed work, or third-party claims filed against the owner or reasonable evidence that a third-party claim will be filed.

ARTICLE 34 - MINIMUM INSURANCE REQUIREMENTS

The work under this contract shall not commence until the contractor has obtained all required insurance and verifying certificates of insurance have been approved in writing by the owner. These certificates shall document that coverages afforded under the policies will not be cancelled, reduced in amount or coverages eliminated until at least thirty (30) days after mailing written notice, by certified mail, return receipt requested, to the insured and the owner of such alteration or cancellation. If endorsements are needed to comply with the notification or other requirements of this article copies of the endorsements shall be submitted with the certificates.

a. Worker's Compensation and Employer's Liability

The contractor shall provide and maintain, until final acceptance, workmen's compensation insurance, as required by law, as well as employer's liability coverage with minimum limits of \$100,000.

b. Public Liability and Property Damage

The contractor shall provide and maintain, until final acceptance, comprehensive general liability insurance, including coverage for premises operations, independent contractors, completed operations, products and contractual exposures, as shall protect such contractors from claims arising out of any bodily injury, including accidental death, as well as from claims for property damages which may arise from operations under this contract, whether such operations be by the contractor or by any subcontractor, or by

anyone directly or indirectly employed by either of them and the minimum limits of such insurance shall be as follows:

Bodily Injury: \$500,000 per occurrence
Property Damage: \$100,000 per occurrence / \$300,000 aggregate

In lieu of limits listed above, a \$500,000 combined single limit shall satisfy both conditions.

Such coverage for completed operations must be maintained for at least two (2) years following final acceptance of the work performed under the contract.

c. Property Insurance (Builder's Risk/Installation Floater)

The contractor shall purchase and maintain property insurance until final acceptance, upon the entire work at the site to the full insurable value thereof. This insurance shall include the interests of the owner, the contractor, the subcontractors and sub-subcontractors in the work and shall insure against the perils of fire, wind, rain, flood, extended coverage, and vandalism and malicious mischief. If the owner is damaged by failure of the contractor to purchase or maintain such insurance, then the contractor shall bear all reasonable costs properly attributable thereto; the contractor shall effect and maintain similar property insurance on portions of the work stored off the site when request for payment per articles so includes such portions.

d. Deductible

Any deductible, if applicable to loss covered by insurance provided, is to be borne by the contractor.

e. Other Insurance

The contractor shall obtain such additional insurance as may be required by the owner or by the General Statutes of North Carolina including motor vehicle insurance, in amounts not less than the statutory limits.

f. Proof of Carriage

The contractor shall furnish the owner with satisfactory proof of carriage of the insurance required before written approval is granted by the owner.

ARTICLE 35 - PERFORMANCE BOND AND PAYMENT BOND

- a. Each contractor shall furnish a performance bond and payment bond executed by a surety company authorized to do business in North Carolina. The bonds shall be in the full contract amount. Bonds shall be executed in the form bound with these specifications.
- b. All bonds shall be countersigned by an authorized agent of the bonding company who is licensed to do business in North Carolina.

ARTICLE 36 - CONTRACTOR'S AFFIDAVIT

The final payment of retained amount due the contractor on account of the contract shall not become due until the contractor has furnished to the owner through the designer an affidavit signed, sworn and notarized to the effect that all payments for materials, services or subcontracted work in connection with his contract have been satisfied, and that no claims or

liens exist against the contractor in connection with this contract. In the event that the contractor cannot obtain similar affidavits from subcontractors to protect the contractor and the owner from possible liens or claims against the subcontractor, the contractor shall state in his affidavit that no claims or liens exist against any subcontractor to the best of his (the contractor's) knowledge, and if any appear afterward, the contractor shall save the owner harmless.

ARTICLE 37 - ASSIGNMENTS

The contractor shall not assign any portion of this contract nor subcontract in its entirety. Except as may be required under terms of the performance bond or payment bond, no funds or sums of money due or become due the contractor under the contract may be assigned.

ARTICLE 38 - USE OF PREMISES

- a. The contractor(s) shall confine his apparatus, the storage of materials and the operations of his workmen to limits indicated by law, ordinances, permits or directions of the designer and owner and shall not exceed those established limits in his operations.
- b. The contractor(s) shall not load or permit any part of the structure to be loaded with a weight that will endanger its safety.
- c. The contractor(s) shall enforce the designer's and owner's instructions regarding signs, advertisements, fires and smoking.
- d. No firearms, any type of alcoholic beverages, or drugs (other than those prescribed by a physician) will be permitted at the job site.

ARTICLE 39 - CUTTING, PATCHING AND DIGGING

- a. The contractor shall do all cutting, fitting or patching of his work that may be required to make its several parts come together properly and fit it to receive or be received by work of other contractors shown upon or reasonably implied by the drawings and specifications for the completed structure, as the designer may direct.
- b. Any cost brought about by defective or ill-timed work shall be borne by the party responsible therefor.
- c. No contractor shall endanger any work of another contractor by cutting, digging or other means. No contractor shall cut or alter the work of any other contractor without the consent of the designer and the affected contractor(s).

ARTICLE 40 - UTILITIES, STRUCTURES, SIGNS

- a. The contractor shall provide necessary and adequate facilities for water, electricity, gas, oil, sewer and other utility services which maybe necessary and required for completion of the project including all utilities required for testing, cleaning, balancing, and sterilization of designated plumbing, mechanical and electrical systems. Any permanent meters installed shall be listed in the contractor's name until work has a final acceptance. The contractor will be solely responsible for all utility costs prior to final acceptance. Contractor shall contact all affected utility companies prior to bid to determine their requirements to provide temporary and permanent service and include all costs associated with providing those services in their bid. Coordination of the work of the utility companies during construction is the sole responsibility of the contractor.

- b. Meters shall be relisted in the owner's name on the day following final acceptance of the Project Expediter's work, and the owner shall pay for services used after that date.
- c. The owner shall be reimbursed for all metered utility charges after the meter is relisted in the owner's name and prior to completion and acceptance of the work of **all** contractors. Reimbursement shall be made by the contractor whose work has not been completed and accepted. If the work of two or more contractors has not been completed and accepted, reimbursement to the owner shall be paid by the contractors involved on the basis of assessments by the designer.
- d. Prior to the operation of permanent systems, the Project Expediter will provide temporary power, lighting, water, and heat to maintain space temperature above freezing, as required for construction operations.
- e. All contractors shall have the permanent building systems in sufficient readiness for furnishing temporary climatic control at the time a building is enclosed and secured. The HVAC systems shall maintain climatic control throughout the enclosed portion of the building sufficient to allow completion of the interior finishes of the building. A building shall be considered enclosed and secured when windows, doorways (exterior, mechanical, and electrical equipment rooms), and hardware are installed; and other openings have protection which will provide reasonable climatic control. The appropriate time to start the mechanical systems and climatic condition shall be jointly determined by the contractor(s), the designer and owner. Use of the equipment in this manner shall be subject to the approval of the Designer and owner and shall in no way affect the warranty requirements of the contractor(s).
- f. The electrical contractor shall have the building's permanent power wiring distribution system in sufficient readiness to provide power as required by the HVAC contractor for temporary climatic control.
- g. The electrical contractor shall have the building's permanent lighting system ready at the time the general contractor begins interior painting and shall provide adequate lighting in those areas where interior painting and finishing is being performed.
- h. Each prime contractor shall be responsible for his permanently fixed service facilities and systems in use during progress of the work. The following procedures shall be strictly adhered to:
 - 1. Prior to final acceptance of work by the State Construction Office, each contractor shall remove and replace any parts of the permanent building systems damaged through use during construction.
 - 2. Temporary filters as recommended by the equipment manufacturer in order to keep the equipment and ductwork clean and free of dust and debris shall be installed in each of the heating and air conditioning units and at each return grille during construction. New filters shall be installed in each unit prior to the owner's acceptance of the work.
 - 3. Extra effort shall be maintained to keep the building and the site adjacent to the building clean and under no circumstances shall air systems be operated if finishing and site work operations are creating dust in excess of what would be considered normal if the building were occupied.
 - 4. It shall be understood that any warranty on equipment presented to the owner shall extend from the day of final acceptance by the owner. The cost of warranting the

equipment during operation in the finishing stages of construction shall be borne by the contractor whose system is utilized.

5. The electrical contractor shall have all lamps in proper working condition at the time of final project acceptance.
 - i. The Project Expediter shall provide, if required and where directed, a shed for toilet facilities and shall furnish and install in this shed all water closets required for a complete and adequate sanitary arrangement. These facilities will be available to other contractors on the job and shall be kept in a neat and sanitary condition at all times. Chemical toilets are acceptable.
 - j. The Project Expediter shall, if required by the Supplementary General Conditions and where directed, erect a temporary field office, complete with lights, telephone, heat and air conditioning. A portion of this office shall be partitioned off, of sufficient size, for the use of a resident inspector, should the designer so direct.
 - k. On multi-story construction projects, the Project Expediter shall provide temporary elevators, lifts, or other special equipment for the general use of all contractors. The cost for such elevators, lifts or other special equipment and the operation thereof shall be included in the Project Expediter's bid.
 - l. The Project Expediter will erect one sign on the project if required. The sign shall be of sound construction, and shall be neatly lettered with black letters on white background. The sign shall bear the name of the project, and the names of prime contractors on the project, and the name of the designer and consultants. Directional signs may be erected on the owner's property subject to approval of the owner with respect to size, style and location of such directional signs. Such signs may bear the name of the contractor and a directional symbol. No other signs will be permitted except by permission of the owner.

ARTICLE 41 - CLEANING UP

- a. The contractors shall keep the building and surrounding area reasonably free from rubbish at all times, and shall remove debris from the site on a timely basis or when directed to do so by the designer or Project Expediter. The Project Expediter shall provide an on site refuse container(s) for the use of all contractors. Each contractor shall remove their rubbish and debris from the building on a daily basis. The Project Expediter shall broom clean the building as required to minimize dust and dirt accumulation.
- b. The Project Expediter shall provide and maintain suitable all-weather access to the building.
- c. Before final inspection and acceptance of the building, each contractor shall clean his portion of the work, including glass, hardware, fixtures, masonry, tile and marble (using no acid), clean and wax all floors as specified, and completely prepare the building for use by the owner, with no cleaning required by the owner.

ARTICLE 42 - GUARANTEE

- a. The contractor shall unconditionally guarantee materials and workmanship against patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve (12) months following the date of final acceptance of the work or beneficial occupancy and shall replace such defective materials or workmanship without cost to the owner.

- b. Where items of equipment or material carry a manufacturer's warranty for any period in excess of twelve (12) months, then the manufacturer's warranty shall apply for that particular piece of equipment or material. The contractor shall replace such defective equipment or materials, without cost to the owner, within the manufacturer's warranty period.
- c. Additionally, the owner may bring an action for latent defects caused by the negligence of the contractor which is hidden or not readily apparent to the owner at the time of beneficial occupancy or final acceptance, whichever occurred first, in accordance with applicable law.
- d. Guarantees for roof, equipment, materials, and supplies shall be stipulated in the specifications sections governing such roof, equipment, materials, or supplies.

ARTICLE 43 - CODES AND STANDARDS

Wherever reference is given to codes, standard specifications or other data published by regulating agencies including, but not limited to, national electrical codes, North Carolina state building codes, federal specifications, ASTM specifications, various institute specifications, etc., it shall be understood that such reference is to the latest edition including addenda published prior to the date of the contract documents.

ARTICLE 44 - INDEMNIFICATION

To the fullest extent permitted by law, the contractor shall indemnify and hold harmless the owner, the designer and the agents, consultants and employees of the owner and designer, from and against all claims, damages, losses and expenses, including, but not limited to, attorneys' fees, arising out of or resulting from the performance or failure of performance of the work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including the loss of use resulting there from, and (2) is caused in whole or in part by any negligent act or omission of the contractor, the contractor's subcontractor, or the agents of either the contractor or the contractor's subcontractor. Such obligation shall not be construed to negate, abridge or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this article.

ARTICLE 45 - TAXES

- a. Federal excise taxes do not apply to materials entering into state work (Internal Revenue Code, Section 3442(3)).
- b. Federal transportation taxes do not apply to materials entering into state work (Internal Revenue Code, Section 3475(b) as amended).
- c. North Carolina sales tax and use tax, as required by law, do apply to materials entering into state work and such costs shall be included in the bid proposal and contract sum.
- d. Local option sales and use taxes, as required by law, do apply to materials entering into state work as applicable and such costs shall be included in the bid proposal and contract sum.
- e. **Accounting Procedures for Refund of County Sales & Use Tax**

Amount of county sales and use tax paid per contractor's statements:

Contractors performing contracts for state agencies shall give the state agency for whose project the property was purchased a signed statement containing the information listed in G.S. 105-164.14(e).

The Department of Revenue has agreed that in lieu of obtaining copies of sales receipts from contractors, an agency may obtain a certified statement as of April 1, 1991 from the contractor setting forth the date, the type of property and the cost of the property purchased from each vendor, the county in which the vendor made the sale and the amount of local sales and use taxes paid thereon. If the property was purchased out-of-state, the county in which the property was delivered should be listed. The contractor should also be notified that the certified statement may be subject to audit.

In the event the contractors make several purchases from the same vendor, such certified statement must indicate the invoice numbers, the inclusive dates of the invoices, the total amount of the invoices, the counties, and the county sales and use taxes paid thereon.

Name of taxing county: The position of a sale is the retailer's place of business located within a taxing county where the vendor becomes contractually obligated to make the sale. Therefore, it is important that the county tax be reported for the county of sale rather than the county of use.

When property is purchased from out-of-state vendors and the county tax is charged, the county should be identified where delivery is made when reporting the county tax.

Such statement must also include the cost of any tangible personal property withdrawn from the contractor's warehouse stock and the amount of county sales or use tax paid thereon by the contractor.

Similar certified statements by his subcontractors must be obtained by the general contractor and furnished to the claimant.

Contractors are not to include any tax paid on supplies, tools and equipment which they use to perform their contracts and should include only those building materials, supplies, fixtures and equipment which actually become a part of or annexed to the building or structure.

ARTICLE 46 - EQUAL OPPORTUNITY CLAUSE

The non-discrimination clause contained in Section 202 (Federal) Executive Order 11246, as amended by Executive Order 11375, relative to equal employment opportunity for all persons without regard to race, color, religion, sex or national origin, and the implementing rules and regulations prescribed by the secretary of Labor, are incorporated herein.

ARTICLE 47 - EMPLOYMENT OF INDIVIDUALS WITH DISABILITIES

The contractor(s) agree not to discriminate against any employee or applicant for employment because of physical or mental disabilities in regard to any position for which the employee or applicant is qualified. The contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified individuals with such disabilities without discrimination based upon their physical or mental disability in all employment practices.

ARTICLE 48 - ASBESTOS-CONTAINING MATERIALS (ACM)

The State of North Carolina has attempted to address all asbestos-containing materials that are to be disturbed in the project. However, there may be other asbestos-containing materials in the work areas that are not to be disturbed and do not create an exposure hazard.

Contractors are reminded of the requirements of instructions under Instructions to Bidders and General Conditions of the Contract, titled Examination of Conditions. Statute 130A, Article 19, amended August 3, 1989, established the Asbestos Hazard Management Program that controls asbestos abatement in North Carolina. The latest edition of *Guideline Criteria for Asbestos Abatement* from the State Construction Office is to be incorporated in all asbestos abatement projects for the Capital Improvement Program.

ARTICLE 49 - MINORITY BUSINESS PARTICIPATION

GS 143-128.2 establishes a ten percent (10%) goal for participation by minority businesses in total value of work for each State building project. The document, *Guidelines for Recruitment and Selection of Minority Businesses for Participation in State Construction Contracts* including Affidavits and Appendix E are hereby incorporated into and made a part of this contract.

ARTICLE 50 – CONTRACTOR EVALUATION

The contractor's overall work performance on the project shall be fairly evaluated in accordance with the State Building Commission policy and procedures, for determining qualifications to bid on future State capital improvement projects. In addition to final evaluation, interim evaluation may be prepared during the progress of project. The document, *Contractor Evaluation Procedures*, is hereby incorporated and made a part of this contract. The owner may request the contractor's comments to evaluate the designer.

ARTICLE 51 – GIFTS

Pursuant to N.C. Gen. Stat. § 133-32, it is unlawful for any vendor or contractor (i.e. architect, bidder, contractor, construction manager, design professional, engineer, subcontractor, supplier, vendor, etc.), to make gifts or to give favors to any State employee. This prohibition covers those vendors and contractors who: (1) have a contract with a governmental agency; or (2) have performed under such a contract within the past year; or (3) anticipate bidding on such a contract in the future. For additional information regarding the specific requirements and exemptions, vendors and contractors are encouraged to review G.S. Sec. 133-32.

During the construction of the Project, the Contractor is prohibited from making gifts to any of the Owner's employees, Owner's project representatives (architect, engineers, construction manager and their employees), employees of the State Construction Office and/or any other State employee that may have any involvement, influence, responsibilities, oversight, management and/or duties that pertain to and/or relate to the contract administration, financial administration and/or disposition of claims arising from and/or relating to the Contract and/or Project.

ARTICLE 52 – AUDITING-ACCESS TO PERSONS AND RECORDS

In accordance with N.C. General Statute 147-64.7, the State Auditor shall have access to Contractor's officers, employees, agents and/or other persons in control of and/or responsible for the Contractor's records that relate to this Contracts for purposes of conducting audits under the referenced statute. The Owner's internal auditors shall also have the right to access and copy the Contractor's records relating to the Contract and Project during the term of the Contract and within two years following the completion of the Project/close-out of the Contract to verify accounts, accuracy, information, calculations and/or data affecting and/or

relating to Contractor's requests for payment, requests for change orders, change orders, claims for extra work, requests for time extensions and related claims for delay/extended general conditions costs, claims for lost productivity, claims for loss efficiency, claims for idle equipment or labor, claims for price/cost escalation, pass-through claims of subcontractors and/or suppliers, and/or any other type of claim for payment or damages from Owner and/or its project representatives.

ARTICLE 53 – NORTH CAROLINA FALSE CLAIMS ACT

The North Carolina False Claims Act ("NCFCA"), N.C. Gen. Stat. § 1-605 through 1-618, applies to this Contract. The Contractor should familiarize itself with the entire NCFCA and should seek the assistance of an attorney if it has any questions regarding the NCFCA and its applicability to any requests, demands and/or claims for payment its submits to the State through the contracting state agency, institution, university or community college.

The purpose of the NCFCA "is to deter persons from knowingly causing or assisting in causing the State to pay claims that are false or fraudulent and to provide remedies in the form of treble damages and civil penalties when money is obtained from the State by reason of a false or fraudulent claim." (Section 1-605(b).) A contractor's liability under the NCFCA may arise from, but is not limited to: requests for payment, invoices, billing, claims for extra work, requests for change orders, requests for time extensions, claims for delay damages/extended general conditions costs, claims for lost productivity, claims for loss efficiency, claims for idle equipment or labor, claims for price/cost escalation, pass-through claims of subcontractors and/or suppliers, documentation used to support any of the foregoing requests or claims, and/or any other request for payment from the State through the contracting state agency, institution, university or community college. The parts of the NCFCA that are most likely to be enforced with respect to this type of contract are as follows:

- A "claim" is "[a]ny request or demand, whether under a contract or otherwise, for money or property and whether or not the State has title to the money or property that (i) is presented to an officer, employee, or agent of the State or (ii) is made to a contractor ... if the money or property is to be spent or used on the State's behalf or to advance a State program or interest and if the State government: (a) provides or has provided any portion of the money or property that is requested or demanded; or (b) will reimburse such contractor ... for any portion of the money or property which is requested or demanded." (Section 1-606(2).)
- "Knowing" and "knowingly." – Whenever a person, with respect to information, does any of the following: (a) Has actual knowledge of the information; (b) Acts in deliberate ignorance of the truth or falsity of the information; and/or (c) Acts in reckless disregard of the truth or falsity of the information. (Section 1-606(4).) Proof of specific intent to defraud is not required. (Section 1-606(4).)
- "Material" means having a natural tendency to influence, or be capable of influencing, the payment or receipt of money or property. (Section 1-606(4).)
- Liability. – "Any person who commits any of the following acts shall be liable to the State for three times the amount of damages that the State sustains because of the act of that person[:]. ... (1) Knowingly presents or causes to be presented a false or fraudulent claim for payment or approval. (2) Knowingly makes, uses, or causes to be made or used, a false record or statement material to a false or fraudulent claim. (3) Conspires to commit a violation of subdivision (1), (2) ..." (Section 1-607(a)(1), (2).)

- The NCFCA shall be interpreted and construed so as to be consistent with the federal False Claims Act, 31 U.S.C. § 3729, et seq., and any subsequent amendments to that act. (Section 1-616(c).)

Finally, the contracting state agency, institution, university or community college may refer any suspected violation of the NCFCA by the Contractor to the Attorney General's Office for investigation. Under Section 1-608(a), the Attorney General is responsible for investigating any violation of NCFCA, and may bring a civil action against the Contractor under the NCFCA. The Attorney General's investigation and any civil action relating thereto are independent and not subject to any dispute resolution provision set forth in this Contract. (See Section 1-608(a).)

ARTICLE 54 – TERMINATION FOR CONVENIENCE

Owner may at any time and for any reason terminate Contractor's services and work at Owner's convenience. Upon receipt of such notice, Contractor shall, unless the notice directs otherwise, immediately discontinue the work and placing of orders for materials, facilities and supplies in connection with the performance of this Agreement.

Upon such termination, Contractor shall be entitled to payment only as follows: (1) the actual cost of the work completed in conformity with this Agreement; plus, (2) such other costs actually incurred by Contractor as are permitted by the prime contract and approved by Owner; (3) plus ten percent (10%) of the cost of the work referred to in subparagraph (1) above for overhead and profit. There shall be deducted from such sums as provided in this subparagraph the amount of any payments made to Contractor prior to the date of the termination of this Agreement. Contractor shall not be entitled to any claim or claim of lien against Owner for any additional compensation or damages in the event of such termination and payment.

1 **SUPPLEMENTARY GENERAL CONDITIONS**

2
3 **GENERAL**

4
5 The following SUPPLEMENTARY GENERAL CONDITIONS modify, delete and/or add to the "Instructions to Bidders
6 and General Conditions of the Contract", Form OC-15, Twenty Fourth Edition, January, 2013) Articles 1 through 54
7 inclusive. Where any original article, paragraph, subparagraph, or clause is supplemented, the provisions of such
8 article, paragraph, subparagraph, or clause shall remain in effect and the supplemental provisions shall be
9 considered as added thereto. Where any original article, paragraph, subparagraph, or clause is amended, voided, or
10 superseded by any of the following paragraphs, the provisions of such article, paragraph, subparagraph, or clause
11 not so amended, voided or superseded shall remain in effect.
12

13
14 **INSTRUCTIONS TO BIDDERS**

15 Add the following subparagraph at the end of paragraph 2:

16
17
18 "By submitting a bid, the Bidder represents that the has reviewed all Contract Documents and that the cost of all
19 materials and equipment shown or indicated in the Contract Documents have been included in the Bid Sum(s) and
20 that all costs for materials and labor associated with the installation of such equipment have been included in the Bid
21 Sum(s)."
22

23
24 **GENERAL CONDITIONS OF THE CONTRACT**

25
26
27 **ARTICLE 1 - DEFINITIONS**

28
29 Add the following at the end of paragraph c:

30
31 "The terms designer, architect, etc., when used in these Contract Documents, shall, unless otherwise specifically
32 defined, mean **INTEGRATED DESIGN, PA**, 1111 Oberlin Road, Raleigh, North Carolina 27605."
33

34 Revise paragraph r to read as follows:

35
36 "**Inspection** shall mean observation by the designer(s) of the work completed or in progress only to determine if such
37 work is generally in accordance with the requirements of the Contract Documents."
38

39
40 **ARTICLE 2 – INTENT AND EXECUTION OF DOCUMENTS**

41
42 Add the following at the end of paragraph a:

43
44 "The language of the Contract Documents is American English. The Contractor(s) may request clarification, by the
45 designer, of any words and/or terms whose meaning(s) or use may be unclear or ambiguous. Contractor(s)
46 supervisory personnel, including supervisory personnel of subcontractors, shall be sufficiently knowledgeable and
47 proficient in the use of the American English language to read, understand, and comply with the requirements of the
48 Contract Documents and communicate, using American English, with the Owner and Designer."
49
50
51

1 **ARTICLE 5 - SHOP DRAWINGS, SUBMITTALS, SAMPLES, DATA**

2
3 Revise paragraph d to read as follows:

4
5 "d. Submittal review by the designer shall be only for the limited purpose of checking for conformance with the design
6 concept and the information expressed in the Contract Documents. This review shall not include review of the
7 accuracy or completeness of details, such as quantities, dimensions, weights or gauges, fabrication processes,
8 construction means or methods, coordination of the work with other trades or construction safety precautions, all of
9 which shall be the sole responsibility of the Contractor. Review of a specific item shall not indicate that the designer
10 has reviewed the entire assembly of which the item is a component. The designer shall not be required to review
11 partial submissions or those for which submissions of correlated items have not been received."
12

13
14 **ARTICLE 10 - PERMITS, INSPECTIONS, FEES, REGULATIONS**

15
16 Add new paragraph f as follows:

17
18 "f. The cost for connection fees, tap fees, impact fees, and all other governmental levies imposed on the project shall
19 be the responsibility of the Contractor."
20

21
22 **ARTICLE 11 - PROTECTION OF WORK, PROPERTY AND THE PUBLIC**

23
24 Add new paragraph j:

25
26 "j. In the event the Contractor encounters on the site material reasonably believed to be asbestos (see Article 48),
27 polychlorinated biphenyl (PCB), or any other material deemed 'hazardous' by the U.S. Environmental Protection
28 Agency, which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and
29 report the condition to the Owner and designer in writing. The Work in the affected area shall not thereafter be
30 resumed except by written agreement of the Owner and Contractor if in fact the material is 'hazardous' and has not
31 been rendered harmless. The Work in the affected area shall be resumed in the absence of 'hazardous materials', or
32 when it has been rendered harmless, by written agreement of the Owner and Contractor. Lead and/or lead based
33 paint is hereby specifically excluded from this section. The Contractor may be required to work with lead and/or lead
34 based paint as a normal part of the construction process."
35

36 Add new paragraph k:

37
38 k. Neither the professional activities of the Designer, nor the presence of the Designer or the Designer's employees
39 and subconsultants at a construction site, shall relieve the Contractor(s) and any other entity of their obligations,
40 duties, and responsibilities including, but not limited to, construction means, methods, sequences, techniques, or
41 procedures necessary for performing, superintending, or coordinating all portions of the work of construction in
42 accordance with the contract documents and any health or safety precautions required by any regulatory agencies.
43 The Designer and Designer's personnel have no authority to exercise any control over any construction contractor or
44 other entity or their employees in connection with their work or any health or safety precautions. The Contractor(s) is
45 solely responsible for jobsite safety. The Designer and the Designer's consultants shall be indemnified and shall be
46 made additional insureds under the Contractor's general liability insurance policy."
47

48
49 **ARTICLE 14 - CONSTRUCTION SUPERVISION AND SCHEDULE**

50
51 Add new paragraph m as follows:

52
53 "m. The project expediter shall be the single prime Contractor."
54
55

1 ARTICLE 18 – DESIGNER'S STATUS

2
3 Delete the second sentence of paragraph d.

4
5 Add new paragraph g as follows:

6
7 "g. The Designer reserves the right to petition the Owner for compensation of additional services due to the
8 Contractor submitting: 1) more than two submittals for any shop drawing or other submittal; 2) an extensive number
9 of claims and the majority of such claims are rejected. The Contractor is hereby advised of this condition in the event
10 that the Owner elects to adjust the Contractor's compensation as a result thereof."
11

12
13 **ARTICLE 23 - TIME OF COMPLETION, DELAYS, EXTENSION OF TIME**

14
15 Add the following sentence after the first sentence of paragraph a:

16
17 "The Contractor shall achieve Substantial Completion of the entire Work not later than Five Hundred Forty (540)
18 consecutive calendar days after the date of the Notice to Proceed, subject to adjustments of this Contract time as
19 provided in the Contract Documents."
20

21
22 **ARTICLE 25 – FINAL INSPECTION, ACCEPTANCE AND PROJECT CLOSEOUT**

23
24 Append the following to paragraph b2:

25
26 "A subsequent review shall be scheduled by the designer upon Contractor's notification to the designer that the
27 discrepancies listed in the punch list have been corrected in their entirety by the contractor."
28

29
30 **ARTICLE 38 - USE OF PREMISES**

31
32 Add the following new paragraph e:

33
34 "e. The Contractor shall strictly adhere to the Owner's rules, regulations, and required standards of behavior for
35 workmen defined by the 'Owner's Requirements' included at the end of these Supplementary Conditions."
36

37
38 **ARTICLE 40 - UTILITIES, STRUCTURES, SIGNS**

39 Add new paragraph m:

40
41 "m. The project expediter shall, in accordance with paragraphs i, j, and l, provide the following:

42
43 Toilets
44 Temporary Field Office
45 Project Sign"
46
47
48

1 **LIST OF PROJECT DRAWINGS**
2

COVR100	COVER SHEET
COVR101	CODE DATA
COVR102A	LIFE SAFETY FIRST FLOOR - BUILDINGS A, B, C
COVR102B	LIFE SAFETY FIRST FLOOR - BUILDING W
COVR103	LIFE SAFETY SECOND FLOOR - BUILDINGS A, B, C
COVR104	LIFE SAFETY LOWER LEVEL - BUILDING C
COVR105	GENERAL NOTES
COVR106	UL DETAILS
A100	1ST FLOOR BUILDING A - DEMO & NEW WORK PLANS & CEILING PLANS
A101	1ST FLOOR BUILDING B - DEMO & NEW WORK PLANS & CEILING PLANS
A102	1ST FLOOR BUILDING B - DEMO & NEW WORK PLANS & CEILING PLANS
A103	1ST FLOOR BUILDING C - DEMO & NEW WORK PLANS & CEILING PLANS
A104	1ST FLOOR WAREHOUSE - DEMO & NEW WORK PLANS & CEILING PLANS
A105	2ND FLOOR BUILDING A - DEMO & NEW WORK PLANS & CEILING PLANS
A106	2ND FLOOR BUILDING B - DEMO & NEW WORK PLANS & CEILING PLANS
A107	2ND FLOOR BUILDING C - DEMO & NEW WORK PLANS & CEILING PLANS
A108	LL BUILDING C - DEMO & NEW WORK PLANS & CEILING PLANS
A411	ADA ACCESSIBILITY & FIXTURE GUIDELINES
A412	RESTROOM ELEVATIONS
A413	RESTROOM ELEVATIONS
A414	RESTROOL ELEVATIONS & DETAILS
A501	WALL DETAILS & STANDARDS
A601	FINISH SPECIFICATIONS & SCHEDULE
FP001	STANDARDS, SYMBOLS & ABBREVIATIONS
FP100	FIRST FLOOR BUILDING A FLOOR PLANS AND ENLARGED PLANS
FP101	FIRST FLOOR BUILDING B FLOOR PLANS AND ENLARGED PLANS
FP102	FIRST FLOOR WAREHOUSE FLOOR PLANS AND ENLARGED PLANS
P001	STANDARDS, SYMBOLS & ABBREVIATIONS
P010	LOWER LEVEL BUILDING C FLOOR PLANS AND ENLARGED PLANS
P100	FIRST FLOOR BUILDING A FLOOR PLANS AND ENLARGED PLANS
P101	FIRST FLOOR BUILDING B FLOOR PLANS AND ENLARGED PLANS
P102	FIRST FLOOR BUILDING B FLOOR PLANS AND ENLARGED PLANS
P103	FIRST FLOOR BUILDING C FLOOR PLANS AND ENLARGED PLANS
P104	FIRST FLOOR WAREHOUSE FLOOR PLANS AND ENLARGED PLANS
P200	SECOND FLOOR BUILDING A FLOOR PLANS AND ENLARGED PLANS
P201	SECOND FLOOR BUILDING B FLOOR PLANS AND ENLARGED PLANS
P202	SECOND FLOOR BUILDING C FLOOR PLANS AND ENLARGED PLANS
H001	STANDARDS, SYMBOLS & ABBREVIATIONS
H010	LOWER LEVEL BUILDING C FLOOR PLANS AND ENLARGED PLANS
H101	FIRST FLOOR BUILDING B FLOOR PLANS AND ENLARGED PLANS
H102	FIRST FLOOR BUILDING B FLOOR PLANS AND ENLARGED PLANS
H103	FIRST FLOOR BUILDING C FLOOR PLANS AND ENLARGED PLANS

H104	FIRST FLOOR WAREHOUSE FLOOR PLANS AND ENLARGED PLANS
H201	SECOND FLOOR BUILDING B FLOOR PLANS AND ENLARGED PLANS
H202	SECOND FLOOR BUILDING C FLOOR PLANS AND ENLARGED PLANS
H203	ROOF PLAN
E001	STANDARDS, SYMBOLS & ABBREVIATIONS
E010	LOWER LEVEL BUILDING C FLOOR PLANS AND ENLARGED PLANS
E100	FIRST FLOOR BUILDING A FLOOR PLANS AND ENLARGED PLANS
E101	FIRST FLOOR BUILDING B FLOOR PLANS AND ENLARGED PLANS
E102	FIRST FLOOR BUILDING B FLOOR PLANS AND ENLARGED PLANS
E103	FIRST FLOOR BUILDING C FLOOR PLANS AND ENLARGED PLANS
E104	FIRST FLOOR WAREHOUSE FLOOR PLANS AND ENLARGED PLANS
E200	SECOND FLOOR BUILDING A FLOOR PLANS AND ENLARGED PLANS
E201	SECOND FLOOR BUILDING B FLOOR PLANS AND ENLARGED PLANS
E202	SECOND FLOOR BUILDING C FLOOR PLANS AND ENLARGED PLANS

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OWNER REQUIREMENTS

Project requirements from the NC Judicial Branch are outlined in the NC Judicial Branch Terms and Conditions, immediately following these Supplementary General Conditions.

END OF SUPPLEMENTARY CONDITIONS

ATTACHMENT X: NCAOC GENERAL TERMS & CONDITIONS

1. **TRAVEL EXPENSES**: **All travel expenses should be included in the Contractor's proposed costs. Separately stated travel expenses will not be reimbursed.** In the event that the Contractor may be eligible to be reimbursed for travel expenses arising under the performance of this Agreement, reimbursement will be at the out-of-state rates set forth in N.C.G.S. § 138-6; as amended from time to time. The Contractor agrees to use the lowest available airfare not requiring a weekend stay and to use the lowest available rate for rental vehicles. All Contractor incurred travel expenses shall be billed on a monthly basis, shall be supported by receipt and shall be paid by the NCAOC within thirty (30) days after invoice approval. Travel expenses exceeding the foregoing rates shall not be paid by the NCAOC. The NCAOC will reimburse travel allowances only for days on which the Contractor is required to be in North Carolina performing services under this Agreement.
2. **PROHIBITION AGAINST CONTINGENT FEES AND GRATUITIES**: The Contractor warrants that it has not paid, and agrees not to pay, any bonus, commission, fee, or gratuity to any employee or official of the Judicial Branch for the purpose of obtaining any contract or award issued by the Judicial Branch. Subsequent discovery by the Judicial Branch of non-compliance with these provisions shall constitute sufficient cause for immediate termination of all outstanding Agreements. Violations of this provision may result in debarment of the Contractor.
3. **AVAILABILITY OF FUNDS**: Any and all payments to the Contractor shall be dependent upon and subject to the availability of funds to the NCAOC for the purpose set forth in this Agreement.
4. **ADVERTISING**: Contractor agrees not to use the existence of this Agreement or the name of the State of North Carolina, the Judicial Branch, or the NCAOC as part of any commercial advertising or marketing of products or services. The Contractor may inquire whether the NCAOC is willing to act as a reference by providing factual information directly to other prospective customers.
5. **GENERAL INDEMNITY**: The Contractor shall hold and save the NCAOC, its officers, agents, and employees, harmless from liability of any kind, including all claims and losses accruing or resulting to any other person, firm, or corporation furnishing or supplying work, services, materials, or supplies in connection with the performance of this Agreement, and from any and all claims and losses accruing or resulting to any person, firm, or corporation that may be injured or damaged by the Contractor in the performance of this Agreement and that are attributable to the negligence or intentionally tortious acts of the Contractor, subcontractors, or their employees or agents provided that the NCAOC notifies the Contractor within thirty (30) days of the NCAOC's actual knowledge such claims. The Contractor represents and warrants that it shall make no claim of any kind or nature against the NCAOC's agents who are involved in the delivery or processing of the Contractor's goods or services to the NCAOC. The representation and warranty in the preceding sentence shall survive the termination or expiration of this Agreement.
6. **PAYMENT TERMS**: Payment terms are Net not later than thirty (30) days after receipt of correct invoice or acceptances of goods or services, whichever is later. The NCAOC is responsible for all payments to the Contractor under this Agreement.
7. **ASSIGNMENT AND SUBCONTRACTING**: The Contractor shall not assign, outsource, or otherwise transfer any interests, rights, or obligations under this Agreement, notwithstanding whether voluntarily, by operation of law, change of control, or merger, without prior express written consent of the NCAOC. The Contractor shall not subcontract any work under this Agreement without the written consent of the NCAOC and the Designer.
8. **NOTICES**: Any notices required under this Agreement should be delivered to the Contract Administrator for the NCAOC or the Project Manager for the Contractor. Unless otherwise

specified in this Agreement, any notices shall be delivered in writing by U.S. Mail, Commercial Courier, facsimile, email, or by hand unless otherwise specified in this Agreement.

9. **TITLES AND HEADINGS:** Titles and Headings in this Agreement are used for convenience only and do not define, limit, or proscribe the language of terms identified by such Titles and Headings.
10. **AMENDMENT:** This Agreement may not be amended orally or by performance. Any amendment, including Change Orders, must be made in written form and signed by duly authorized representatives of the NCAOC and the Contractor.
11. **INSURANCE COVERAGE:** The Contractor shall, during the term of this Agreement, maintain in full force and effect, the insurance described in this section. The Contractor shall acquire such insurance from an insurance carrier or carriers licensed to conduct business in the State of North Carolina and having a rating of A-, Class VII or better, in the most recently published edition of Best's Reports. Failure to buy and maintain the required insurance may result in this Agreement's termination. Coverage shall be written on an occurrence basis. The Contractor shall provide proof of the required insurance coverage to the NCAOC. The minimum acceptable limits shall be as indicated below with no deductible for each of the following categories:
 - a. Worker's Compensation - The Contractor shall provide and maintain Worker's Compensation Insurance, as required by the laws of North Carolina, as well as employer's liability coverage with minimum limits of \$500,000.00, covering all of Contractor's employees who are engaged in any work under this Agreement in North Carolina. If any work is subcontracted, the Contractor shall require the subcontractor to provide the same coverage for any of its employees engaged in any work under the Contract.
 - b. Commercial General Liability - General Liability Coverage on a Comprehensive Broad Form on an occurrence basis in the minimum amount of \$1,000,000.00 Combined Single Limit. Coverage of defense cost shall be in excess of the limit of liability.
 - c. Automobile - Automobile Liability Insurance, to include liability coverage, covering all owned, hired and non-owned vehicles, used within North Carolina in connection with the Agreement. The minimum combined single limit shall be \$250,000.00 bodily injury and property damage; \$250,000.00 uninsured/under insured motorist; and \$2,500.00 medical payment.
12. **TAXES:** The Judicial Branch is exempt from Federal excise taxes, and no payment will be made for any personal property taxes levied on the Contractor or for any taxes levied on employee wages. The Judicial Branch may have additional exemptions or exclusions for federal or state taxes. Evidence of such additional exemptions or exclusions may be provided to Contractor, as applicable, during the term of this Agreement. Applicable state or local sales taxes shall be invoiced as a separate item.
13. **GOVERNING LAWS, JURISDICTION, AND VENUE:**
 - a. This Agreement is made under and shall be governed and construed in accordance with the laws of the State of North Carolina without regard to conflict of law principles. The place of this Agreement, its situs and forum, shall be Wake County, North Carolina, where all matters, whether sounding in contract or in tort, relating to its validity, construction, interpretation and enforcement shall be determined. Contractor agrees and submits, solely for matters relating to this Agreement, to the jurisdiction of the courts of the State of North Carolina and stipulates that Wake County shall be the proper venue for all matters.
 - b. Except to the extent the provisions of the Agreement are clearly inconsistent therewith, the applicable provisions of the Uniform Commercial Code as modified and adopted in North Carolina shall govern this Agreement. To the extent the Agreement entails both the supply of "goods" and "services," such shall be deemed "goods" within the meaning of the Uniform

Commercial Code, except when deeming such services as "goods" would result in a clearly unreasonable interpretation.

- 14. DEFAULT:** In the event services or other deliverable furnished or performed by the Contractor during performance of this Agreement fail to conform to any material requirement(s) of this Agreement's specifications, notice of the failure is provided by the Judicial Branch, and if the failure is not cured within ten (10) days, the Judicial Branch may cancel this Agreement. Default may be cause for debarment as provided in 09 NCAC 06B.1206. The rights and remedies of the NCAOC provided above shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Agreement.
- a. If Contractor fails to deliver or provide correct services or other deliverables within the time required by this Agreement, the NCAOC shall provide written notice of said failure to Contractor, and by such notice require performance assurance measures. Contractor is responsible for the delays resulting from its failure to deliver or provide services or other deliverables.
 - b. Contractor will use reasonable efforts to mitigate delays, costs or expenses arising from assumptions in the Contractor's offer documents that prove erroneous or are otherwise invalid. Any deadline that is affected by any such failure in assumptions or performance by the NCAOC shall be extended by an amount of time reasonably necessary to compensate for the effect of such failure.
- 15. FORCE MAJEURE:** Neither party shall be deemed to be in default of its obligations hereunder if and so long as it is prevented from performing such obligations as a result of events beyond its reasonable control, including without limitation, fire, power failures, any act of war, hostile foreign action, nuclear explosion, riot, strikes, civil insurrection, earthquake, hurricane, tornado, plague, epidemic, pandemic, outbreaks of infectious disease, or any other public health crisis, including quarantine or other restrictions on gatherings, or other catastrophic natural event or act of God.
- 16. COMPLIANCE WITH LAWS:** The Contractor shall comply with all laws, ordinances, codes, rules, regulations, and licensing requirements that are applicable to the conduct of its business, including those of federal, state, and local agencies having jurisdiction or authority.
- 17. TERMINATION:** Any notice of termination made under this Agreement shall be transmitted via US Mail, Certified Return Receipt Requested. The period of notice for termination shall begin on the day the return receipt is signed and dated.
- a. The parties may mutually terminate this Agreement by written agreement at any time.
 - b. The Judicial Branch may terminate this Agreement, in whole or in part, pursuant to Paragraph 14, (Default), pursuant to the ATTACHMENT E: NCAOC SPECIAL TERMS AND CONDITIONS FOR CONSTRUCTION CONTRACTS NOT INVOLVING A BUILDING, or for any of the following:
 - i. Termination for Cause: In the event any goods, software, or service furnished by the Contractor during performance fails to conform to any material specification or requirement of this Agreement, and the failure is not cured within the specified time after providing written notice thereof to Contractor, the NCAOC may cancel and procure the articles or services from other sources; holding Contractor liable for any excess costs occasioned thereby. The rights and remedies of the NCAOC provided above shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Agreement. Contractor shall not be relieved of liability to the NCAOC for damages sustained by the NCAOC arising from Contractor's breach of this Agreement; and the NCAOC may, in its discretion, withhold any payment due as a setoff until such time as the damages are finally determined or as agreed by the parties. Voluntary or involuntary bankruptcy or receivership by Contractor shall be cause for termination.

- ii. Termination for Convenience Without Cause: The Judicial Branch may terminate this Agreement in whole or in part by giving thirty (30) days prior notice in writing to the Contractor. Contractor shall be entitled to sums due as compensation for deliverables provided and services performed in conformance with this Agreement. In the event this Agreement is terminated for the convenience of the NCAOC, the NCAOC will pay for all work performed and products delivered in conformance with this Agreement up to the date of termination.

18. SEVERABILITY. In the event that a court of competent jurisdiction holds that a provision or requirement of this Agreement violates any applicable law, each such provision or requirement shall be enforced only to the extent it is not in violation of law or is not otherwise unenforceable and all other provisions and requirements of this Agreement shall remain in full force and effect. All promises, requirement, terms, conditions, provisions, representations, guarantees, and warranties contained herein shall survive the expiration or termination date unless specifically provided otherwise herein, or unless superseded by applicable federal or State statute, including statutes of repose or limitation.

19. FEDERAL INTELLECTUAL PROPERTY BANKRUPTCY PROTECTION ACT: The Parties agree that the Judicial Branch shall be entitled to all rights and benefits of the Federal Intellectual Property Bankruptcy Protection Act, Public Law 100-506, codified at 11 U.S.C. 365(n), and any amendments thereto.

20. TIME IS OF THE ESSENCE: Time is of the essence in the performance of this Agreement.

21. ELECTRONIC PROCUREMENT: This section applies to all contracts that include E-Procurement as identified in the body of the solicitation document (e.g., RFP)). Purchasing shall be conducted through the Statewide E-Procurement Service. The NCAOC's third-party agent shall serve as the Supplier Manager for this E-Procurement Service. The Contractor shall register for the Statewide E-Procurement Service within two (2) business days of notification of award in order to receive an electronic purchase order resulting from award of this Agreement.

- a. The successful Contractor(s) shall pay a transaction fee of 1.75% (.0175) on the total dollar amount (excluding sales taxes) of each purchase order issued through the Statewide E-Procurement Service. This applies to all purchase orders, regardless of the quantity or dollar amount of the purchase order. The transaction fee shall neither be charged to nor paid by the NCAOC, or by any NCAOC approved users of this Agreement. The transaction fee shall not be stated or included as a separate item in this Agreement or any invoice. There are no additional fees or charges to the Contractor for the services rendered by the Supplier Manager under this Agreement. Contractor will receive a credit for transaction fees they paid for the purchase of any item(s) if an item(s) is returned through no fault of the Contractor. Transaction fees are non-refundable when an item is rejected and returned, or declined, due to the Contractor's failure to perform or comply with specifications or requirements of this Agreement.
- b. Contractor will be invoiced monthly for the NCAOC's transaction fee by the Supplier Manager. The transaction fee shall be based on purchase orders issued for the prior month. Unless Supplier Manager receives written notice from the Contractor identifying with specificity any errors in an invoice within thirty (30) days of the receipt of invoice, such invoice shall be deemed to be correct, and Contractor shall have waived its right to later dispute the accuracy and completeness of the invoice. Payment of the transaction fee by the Contractor is due to the account designated by the State within thirty (30) days after receipt of the correct invoice for the transaction fee, which includes payment of all portions of an invoice not in dispute. Within thirty (30) days of the receipt of invoice, Contractor may request in writing an extension of the invoice payment due date for that portion of the transaction fee invoice for which payment of the related goods by the NCAOC has not been

received by the Contractor. If payment of the transaction fee invoice is not received by the NCAOC within this payment period, it shall be considered a material breach of this Agreement. The Supplier Manager shall provide, whenever reasonably requested by the Contractor in writing (including electronic documents), supporting documentation from the E-Procurement Service that accounts for the amount of the invoice.

- c. The Supplier Manager will capture the order from the NCAOC approved user, including the shipping and payment information, and submit the order in accordance with the E-Procurement Service. Subsequently, the Supplier Manager will send those orders to the appropriate Contractor. The NCAOC, not the Supplier Manager, shall be responsible for the solicitation, offers received, evaluation of offers received, award of contract, and the payment for goods delivered.
 - d. Contractor agrees at all times to maintain the confidentiality of its user name and password for the Statewide E-Procurement Services. If a Contractor is a corporation, partnership, or other legal entity, then the Contractor may authorize its employees to use its password. Contractor shall be responsible for all activity and all charges for such employees. Contractor agrees not to permit a third party to use the Statewide E-Procurement Services through its account. If there is a breach of security through the Contractor's account, Contractor shall immediately change its password and notify the Supplier Manager of the security breach by e-mail. Contractor shall cooperate with the NCAOC, the State, and the Supplier Manager to mitigate and correct any security breach.
- 22. WAIVER.** Neither the failure nor any delay on the part of Contractor or the NCAOC to exercise any right, remedy, power, or privilege under this Agreement shall operate as a waiver or prevent any subsequent enforcement of such term or obligation.
- 23. AUDITS.** The State Auditor shall have access to all persons and records in accordance with N.C.G.S. § 147-64.7 and other applicable laws or regulations. The NCAOC's internal auditors shall also have access to all persons and records of the Contractor for three (3) years after this Agreement is completed or terminated.
- 24. SOVEREIGN IMMUNITY.** The NCAOC does not waive its sovereign immunity, any qualified immunity of its officials or employees, or any other immunities at law by entering into this Agreement.
- 25. COUNTERPARTS AND SIGNATURES.** This Agreement may be executed by facsimile or digital signature, and in counterparts, each of which (including signature pages) will be deemed an original, but all of which together will constitute one and the same instrument. To the extent signed in handwriting and then delivered by means of electronic transmission in portable document format ("PDF"), this Agreement shall be treated in all manner and respects as an original agreement or instrument and shall be considered to have the same force and legal effect as an original signature.

GUIDELINES FOR RECRUITMENT AND SELECTION OF MINORITY BUSINESSES FOR PARTICIPATION IN STATE CONSTRUCTION CONTRACTS

In accordance with G.S. 143-128.2 (effective January 1, 2002) these guidelines establish goals for minority participation in single-prime bidding, separate-prime bidding, construction manager at risk, and alternative contracting methods, on State construction projects in the amount of \$300,000 or more. The legislation provides that the State shall have a verifiable ten percent (10%) goal for participation by minority businesses in the total value of work for each project for which a contract or contracts are awarded. These requirements are published to accomplish that end.

SECTION A: INTENT

It is the intent of these guidelines that the State of North Carolina, as awarding authority for construction projects, and the contractors and subcontractors performing the construction contracts awarded shall cooperate and in good faith do all things legal, proper and reasonable to achieve the statutory goal of ten percent (10%) for participation by minority businesses in each construction project as mandated by GS 143-128.2. Nothing in these guidelines shall be construed to require contractors or awarding authorities to award contracts or subcontracts to or to make purchases of materials or equipment from minority-business contractors or minority-business subcontractors who do not submit the lowest responsible, responsive bid or bids.

SECTION B: DEFINITIONS

1. Minority - a person who is a citizen or lawful permanent resident of the United States and who is:
 - a. Black, that is, a person having origins in any of the black racial groups in Africa;
 - b. Hispanic, that is, a person of Spanish or Portuguese culture with origins in Mexico, South or Central America, or the Caribbean Islands, regardless of race;
 - c. Asian American, that is, a person having origins in any of the original peoples of the Far East, Southeast Asia and Asia, the Indian subcontinent, the Pacific Islands;
 - d. American Indian, that is, a person having origins in any of the original peoples of North America; or
 - e. Female
2. Minority Business - means a business:
 - a. In which at least fifty-one percent (51%) is owned by one or more minority persons, or in the case of a corporation, in which at least fifty-one percent (51%) of the stock is owned by one or more minority persons or socially and economically disadvantaged individuals; and
 - b. Of which the management and daily business operations are controlled by one or more of the minority persons or socially and economically disadvantaged individuals who own it.
3. Socially and economically disadvantaged individual - means the same as defined in 15 U.S.C. 637. "Socially disadvantaged individuals are those who have been subjected to racial or ethnic prejudice or cultural bias because of their identity as a member of a group without regard to their individual qualities". "Economically disadvantaged individuals are those socially disadvantaged individuals whose ability to compete in the free enterprise system has been impaired due to diminished capital and credit opportunities as compared to others in the same business area who are not socially disadvantaged".
4. Public Entity - means State and all public subdivisions and local governmental units.
5. Owner - The State of North Carolina, through the Agency/Institution named in the contract.
6. Designer – Any person, firm, partnership, or corporation, which has contracted with the State of North Carolina to perform architectural or engineering, work.
7. Bidder - Any person, firm, partnership, corporation, association, or joint venture seeking to be awarded a public contract or subcontract.

8. Contract - A mutually binding legal relationship or any modification thereof obligating the seller to furnish equipment, materials or services, including construction, and obligating the buyer to pay for them.
9. Contractor - Any person, firm, partnership, corporation, association, or joint venture which has contracted with the State of North Carolina to perform construction work or repair.
10. Subcontractor - A firm under contract with the prime contractor or construction manager at risk for supplying materials or labor and materials and/or installation. The subcontractor may or may not provide materials in his subcontract.

SECTION C: RESPONSIBILITIES

1. Office for Historically Underutilized Businesses, Department of Administration (hereinafter referred to as HUB Office).

The HUB Office has established a program, which allows interested persons or businesses qualifying as a minority business under G.S. 143-128.2, to obtain certification in the State of North Carolina procurement system. The information provided by the minority businesses will be used by the HUB Office to:

- a. Identify those areas of work for which there are minority businesses, as requested.
- b. Make available to interested parties a list of prospective minority business contractors and subcontractors.
- c. Assist in the determination of technical assistance needed by minority business contractors.

In addition to being responsible for the certification/verification of minority businesses that want to participate in the State construction program, the HUB Office will:

- (1) Maintain a current list of minority businesses. The list shall include the areas of work in which each minority business is interested.
- (2) Inform minority businesses on how to identify and obtain contracting and subcontracting opportunities through the State Construction Office and other public entities.
- (3) Inform minority businesses of the contracting and subcontracting process for public construction building projects.
- (4) Work with the North Carolina trade and professional organizations to improve the ability of minority businesses to compete in the State construction projects.
- (5) The HUB Office also oversees the minority business program by:
 - a. Monitoring compliance with the program requirements.
 - b. Assisting in the implementation of training and technical assistance programs.
 - c. Identifying and implementing outreach efforts to increase the utilization of minority businesses.
 - d. Reporting the results of minority business utilization to the Secretary of the Department of Administration, the Governor, and the General Assembly.

2. State Construction Office

The State Construction Office will be responsible for the following:

- a. Furnish to the HUB Office a minimum of twenty-one days prior to the bid opening the following:
 - (1) Project description and location;
 - (2) Locations where bidding documents may be reviewed;
 - (3) Name of a representative of the owner who can be contacted during the advertising period to advise who the prospective bidders are;
 - (4) Date, time and location of the bid opening.
 - (5) Date, time and location of prebid conference, if scheduled.
- b. Attending scheduled prebid conference, if necessary, to clarify requirements of the general statutes regarding minority-business participation, including the bidders' responsibilities.

- c. Reviewing the apparent low bidders' statutory compliance with the requirements listed in the proposal, that must be complied with, if the bid is to be considered as responsive, prior to award of contracts. The State reserves the right to reject any or all bids and to waive informalities.
- d. Reviewing of minority business requirements at Preconstruction conference.
- e. Monitoring of contractors' compliance with minority business requirements in the contract documents during construction.
- f. Provide statistical data and required reports to the HUB Office.
- g. Resolve any protest and disputes arising after implementation of the plan, in conjunction with the HUB Office.

3. Owner

Before awarding a contract, owner shall do the following:

- a. Develop and implement a minority business participation outreach plan to identify minority businesses that can perform public building projects and to implement outreach efforts to encourage minority business participation in these projects to include education, recruitment, and interaction between minority businesses and non-minority businesses.
- b. Attend the scheduled prebid conference.
- c. At least 10 days prior to the scheduled day of bid opening, notify minority businesses that have requested notices from the public entity for public construction or repair work and minority businesses that otherwise indicated to the Office for Historically Underutilized Businesses an interest in the type of work being bid or the potential contracting opportunities listed in the proposal. The notification shall include the following:
 - 1. A description of the work for which the bid is being solicited.
 - 2. The date, time, and location where bids are to be submitted.
 - 3. The name of the individual within the owner's organization who will be available to answer questions about the project.
 - 4. Where bid documents may be reviewed.
 - 5. Any special requirements that may exist.
- d. Utilize other media, as appropriate, likely to inform potential minority businesses of the bid being sought.
- e. Maintain documentation of any contacts, correspondence, or conversation with minority business firms made in an attempt to meet the goals.
- f. Review, jointly with the designer, all requirements of G.S. 143-128.2(c) and G.S. 143-128.2(f) – (i.e. bidders' proposals for identification of the minority businesses that will be utilized with corresponding total dollar value of the bid and affidavit listing good faith efforts, or affidavit of self-performance of work, if the contractor will perform work under contract by its own workforce) - prior to recommendation of award to the State Construction Office.
- g. Evaluate documentation to determine good faith effort has been achieved for minority business utilization prior to recommendation of award to State Construction Office.
- h. Review prime contractors' pay applications for compliance with minority business utilization commitments prior to payment.
- i. Make documentation showing evidence of implementation of Owner's responsibilities available for review by State Construction Office and HUB Office, upon request

4. Designer

Under the single-prime bidding, separate prime bidding, construction manager at risk, or alternative contracting method, the designer will:

- a. Attend the scheduled prebid conference to explain minority business requirements to the prospective bidders.
- b. Assist the owner to identify and notify prospective minority business prime and subcontractors of potential contracting opportunities.
- c. Maintain documentation of any contacts, correspondence, or conversation with minority business firms made in an attempt to meet the goals.
- d. Review jointly with the owner, all requirements of G.S. 143-128.2(c) and G.S.143-128.2(f) – (i.e. bidders' proposals for identification of the minority businesses that will be utilized with

corresponding total dollar value of the bid and affidavit listing Good Faith Efforts, or affidavit of self-performance of work, if the contractor will perform work under contract by its own workforce) - prior to recommendation of award.

- e. During construction phase of the project, review “MBE Documentation for Contract Payment” – (Appendix E) for compliance with minority business utilization commitments. Submit Appendix E form with monthly pay applications to the owner and forward copies to the State Construction Office.
- f. Make documentation showing evidence of implementation of Designer’s responsibilities available for review by State Construction Office and HUB Office, upon request.

5. Prime Contractor(s), CM at Risk, and Its First-Tier Subcontractors

Under the single-prime bidding, the separate-prime bidding, construction manager at risk and alternative contracting methods, contractor(s) will:

- a. Attend the scheduled prebid conference.
- b. Identify or determine those work areas of a subcontract where minority businesses may have an interest in performing subcontract work.
- c. At least ten (10) days prior to the scheduled day of bid opening, notify minority businesses of potential subcontracting opportunities listed in the proposal. The notification will include the following:
 - (1) A description of the work for which the subbid is being solicited.
 - (2) The date, time and location where subbids are to be submitted.
 - (3) The name of the individual within the company who will be available to answer questions about the project.
 - (4) Where bid documents may be reviewed.
 - (5) Any special requirements that may exist, such as insurance, licenses, bonds and financial arrangements.

If there are more than three (3) minority businesses in the general locality of the project who offer similar contracting or subcontracting services in the specific trade, the contractor(s) shall notify three (3), but may contact more, if the contractor(s) so desires.

- d. During the bidding process, comply with the contractor(s) requirements listed in the proposal for minority participation.
- e. Identify on the bid, the minority businesses that will be utilized on the project with corresponding total dollar value of the bid and affidavit listing good faith efforts as required by G.S. 143-128.2(c) and G.S. 143-128.2(f).
- f. Make documentation showing evidence of implementation of PM, CM-at-Risk and First-Tier Subcontractor responsibilities available for review by State Construction Office and HUB Office, upon request.
- g. Upon being named the apparent low bidder, the Bidder shall provide one of the following: (1) an affidavit (Affidavit C) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the applicable goal; (2) if the percentage is not equal to the applicable goal, then documentation of all good faith efforts taken to meet the goal. Failure to comply with these requirements is grounds for rejection of the bid and award to the next lowest responsible and responsive bidder.
- h. The contractor(s) shall identify the name(s) of minority business subcontractor(s) and corresponding dollar amount of work on the schedule of values. The schedule of values shall be provided as required in Article 31 of the General Conditions of the Contract to facilitate payments to the subcontractors.
- i. The contractor(s) shall submit with each monthly pay request(s) and final payment(s), “MBE Documentation for Contract Payment” – (Appendix E), for designer’s review.
- j. During the construction of a project, at any time, if it becomes necessary to replace a minority business subcontractor, immediately advise the owner, State Construction Office, and the Director of the HUB Office in writing, of the circumstances involved. The prime contractor shall make a good faith effort to replace a minority business subcontractor with another minority business subcontractor.

- k. If during the construction of a project additional subcontracting opportunities become available, make a good faith effort to solicit subbids from minority businesses.
- l. It is the intent of these requirements apply to all contractors performing as prime contractor and first tier subcontractor under construction manager at risk on state projects.

6. Minority Business Responsibilities

While minority businesses are not required to become certified in order to participate in the State construction projects, it is recommended that they become certified and should take advantage of the appropriate technical assistance that is made available. In addition, minority businesses who are contacted by owners or bidders must respond promptly whether or not they wish to submit a bid.

SECTION 4: DISPUTE PROCEDURES

It is the policy of this state that disputes that involves a person's rights, duties or privileges, should be settled through informal procedures. To that end, minority business disputes arising under these guidelines should be resolved as governed under G.S. 143-128(g).

SECTION 5: These guidelines shall apply upon promulgation on state construction projects. Copies of these guidelines may be obtained from the Department of Administration, State Construction Office, (physical address) 301 North Wilmington Street, Suite 450, NC Education Building, Raleigh, North Carolina, 27601-2827, (mail address) 1307 Mail Service Center, Raleigh, North Carolina, 27699-1307, phone (919) 807-4100, Website: www.nc-sco.com

SECTION 6: In addition to these guidelines, there will be issued with each construction bid package provisions for contractual compliance providing minority business participation in the state construction program.

MINORITY BUSINESS CONTRACT PROVISIONS (CONSTRUCTION)

APPLICATION:

The **Guidelines for Recruitment and Selection of Minority Businesses for Participation in State Construction Contracts** are hereby made a part of these contract documents. These guidelines shall apply to all contractors regardless of ownership. Copies of these guidelines may be obtained from the Department of Administration, State Construction Office, (physical address) 301 North Wilmington Street, Suite 450, NC Education Building, Raleigh, North Carolina, 27601-2827, (mail address) 1307 Mail Service Center, Raleigh, North Carolina, 27699-1307, phone (919) 807-4100, Website: <http://www.nc-sco.com>

MINORITY BUSINESS SUBCONTRACT GOALS:

The goals for participation by minority firms as subcontractors on this project have been set at 10%.

The bidder must identify on its bid, the minority businesses that will be utilized on the project with corresponding total dollar value of the bid and affidavit (Affidavit A) listing good faith efforts **or** affidavit (Affidavit B) of self-performance of work, if the bidder will perform work under contract by its own workforce, as required by G.S. 143-128.2(c) and G.S. 143-128.2(f).

The lowest responsible, responsive bidder must provide Affidavit C, that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the applicable goal.

OR

Provide Affidavit D, that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, **with documentation of Good Faith Effort, if the percentage is not equal to the applicable goal.**

OR

Provide Affidavit B, which includes sufficient information for the State to determine that the bidder does not customarily subcontract work on this type project.

The above information must be provided as required. Failure to submit these documents is grounds for rejection of the bid.

MINIMUM COMPLIANCE REQUIREMENTS:

All written statements, affidavits or intentions made by the Bidder shall become a part of the agreement between the Contractor and the State for performance of this contract. Failure to comply with any of these statements, affidavits or intentions, or with the minority business Guidelines shall constitute a breach of the contract. A finding by the State that any information submitted either prior to award of the contract or during the performance of the contract is inaccurate, false or incomplete, shall also constitute a breach of the contract. Any such breach may result in termination of the contract in accordance with the termination provisions contained in the contract. It shall be solely at the option of the State whether to terminate the contract for breach.

In determining whether a contractor has made Good Faith Efforts, the State will evaluate all efforts made by the Contractor and will determine compliance in regard to quantity, intensity, and results of these efforts. Good Faith Efforts include:

- (1) Contacting minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor or available on State or local government maintained lists at least 10 days before the bid or proposal date and notifying them of the nature and scope of the work to be performed.
- (2) Making the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bid or proposals are due.
- (3) Breaking down or combining elements of work into economically feasible units to facilitate minority participation.
- (4) Working with minority trade, community, or contractor organizations identified by the Office for Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- (5) Attending any prebid meetings scheduled by the public owner.
- (6) Providing assistance in getting required bonding or insurance or providing alternatives to bonding or insurance for subcontractors.
- (7) Negotiating in good faith with interested minority businesses and not rejecting them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- (8) Providing assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisting minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- (9) Negotiating joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- (10) Providing quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

APPENDIX E

MBE DOCUMENTATION FOR CONTRACT PAYMENTS

Prime Contractor/Architect: _____

Address & Phone: _____

Project Name: _____

Pay Application #: _____ Period: _____

The following is a list of payments made to Minority Business Enterprises on this project for the above-mentioned period.

MBE FIRM NAME	* INDICATE TYPE OF MBE	AMOUNT PAID THIS MONTH	TOTAL PAYMENTS TO DATE	TOTAL AMOUNT COMMITTED

*Minority categories: Black, African American (B), Hispanic (H), Asian American (A), American Indian (I), Female (F), Social and Economically Disadvantage (D)

Date: _____ Approved/Certified By: _____

Name

Title

Signature

SUBMIT WITH EACH PAY REQUEST & FINAL PAYMENT

STATE OF NORTH CAROLINA
 COUNTY SALES AND USE TAX REPORT
 SUMMARY TOTALS AND CERTIFICATION

CONTRACTOR: _____

Page 1 of _____

PROJECT: _____

FOR PERIOD: _____

	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL ALL COUNTIES
CONTRACTOR							
SUBCONTRACTOR(S)*							
COUNTY TOTAL							

* Attach subcontractor(s) report(s)
 ** Must balance with Detail Sheet(s)

I certify that the above figures do not include any tax paid on supplies, tools and equipment which were used to perform this contract and only includes those building materials, supplies, fixtures and equipment which actually became a part of or annexed to the building or structure. I certify that, to the best of my knowledge, the information provided here is true, correct, and complete.

Sworn to and subscribed before me,

This the _____ day of _____, 20____

 Signed

 Notary Public

My Commission Expires: _____

 Print or Type Name of Above

Seal

NOTE:
 This certified statement may be subject to audit.

STATE OF NORTH CAROLINA
SALES AND USE TAX REPORT DETAIL

CONTRACTOR: _____

Page 2 of _____

SUBCONTRACTOR _____

FOR PERIOD: _____

PROJECT: _____

PURCHASE DATE	VENDOR NAME	INVOICE NUMBER	TYPE OF PROPERTY	INVOICE TOTAL	COUNTY TAX PAID	COUNTY OF SALE *
				\$	\$	
				TOTAL:	\$	

* If this is an out-of-state vendor, the County of Sale should be the county to which the merchandise was shipped.

FORM OF PROPOSAL

NC Judicial Center – Toilet Improvements

Contract: _____

NC Administrative Office of the Courts

Bidder: _____

ID # NCAOCTR

Date: _____

The undersigned, as bidder, hereby declares that the only person or persons interested in this proposal as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this proposal or in the contract to be entered into; that this proposal is made without connection with any other person, company or parties making a bid or proposal; and that it is in all respects fair and in good faith without collusion or fraud. The bidder further declares that he has examined the site of the work and the contract documents relative thereto, and has read all special provisions furnished prior to the opening of bids; that he has satisfied himself relative to the work to be performed. The bidder further declares that he and his subcontractors have fully complied with NCGS 64, Article 2 in regards to E-Verification as required by Section 2.(c) of Session Law 2013-418, codified as N.C. Gen. Stat. § 143-129(j).

The Bidder proposes and agrees if this proposal is accepted to contract with the NC Administrative Office of the Courts in the form of contract specified below, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the construction of NC Judicial Center – Toilet Improvements in full in complete accordance with the plans, specifications and contract documents, to the full and entire satisfaction of the NC Administrative Office of the Courts with a definite understanding that no money will be allowed for extra work except as set forth in the General Conditions and the contract documents, for the sum of:

SINGLE PRIME CONTRACT:

Base Bid:

_____ Dollars(\$)

Mechanical Subcontractor:

Plumbing Subcontractor:

_____ Lic _____

_____ Lic _____

Electrical Subcontractor:

Fire Protection Subcontractor:

_____ Lic _____

_____ Lic _____

GS143-128(d) requires all single prime bidders to identify their subcontractors for the above subdivisions of work. A contractor whose bid is accepted shall not substitute any person as subcontractor in the place of the subcontractor listed in the original bid, except (i) if the listed subcontractor's bid is later determined by the contractor to be non-responsible or non-responsive or the listed subcontractor refuses to enter into a contract for the complete performance of the bid work, or (ii) with the approval of the awarding authority for good cause shown by the contractor.

ALTERNATES:

Should any of the alternates as described in the contract documents be accepted, the amount written below shall be the amount to be "added to" or "deducted from" the base bid. (Strike out "Add" or "Deduct" as appropriate.)

Alternate No. 1 Wet Wall Tile (T-1) as manufactured by Crossville, Empire Series

(Add) (Deduct) Dollars(\$)

Alternate No. 2 Bathroom Accent / Sink Wall Tile (T-2) as manufactured by Crossville, Ebb & Flow Linear Lines Series

(Add) (Deduct) Dollars(\$)

Alternate No. 3 Bathroom Floor Tile (T-3) as manufactured by Crossville, Empire Series.

(Add) (Deduct) Dollars(\$)

Alternate No. 4 Acoustical Ceiling Tile (ACT-1) as manufactured Armstrong, Ultima Series

(Add) (Deduct) Dollars(\$)

Alternate No. 5 Millwork - Plastic Laminate for Cabinets/Shelving (PLAM-1)
as manufactured by Wilsonart

(Add) (Deduct) Dollars(\$)

Alternate No. 6 Solid Surface for Counters (SSURF-1) as manufactured by Silestone

(Add) (Deduct) Dollars(\$)

Alternate No. 7 Cabinet Door Pulls as manufactured by Hafele, 117,05 Series

(Add) (Deduct) Dollars(\$)

Alternate No. 8 Restroom Partitions (BP-1) as manufactured by Scranton,
Eclipse High Density Plastic Material Series

(Add) (Deduct) Dollars(\$)

The bidder further proposes and agrees hereby to commence work under this contract on a date to be specified in a written order of the designer and shall fully complete all work thereunder within the time specified in the Supplementary General Conditions Article 23. Applicable liquidated damages amount is also stated in the Supplementary General Conditions Article 23.

MINORITY BUSINESS PARTICIPATION REQUIREMENTS

Provide with the bid - Under GS 143-128.2(c) the undersigned bidder shall identify **on its bid** (Identification of Minority Business Participation Form) the minority businesses that it will use on the project with the total dollar value of the bids that will be performed by the minority businesses. **Also** list the good faith efforts (Affidavit **A**) made to solicit minority participation in the bid effort.

NOTE: A contractor that performs all of the work with its own workforce may submit an Affidavit (**B**) to that effect in lieu of Affidavit (**A**) required above. The MB Participation Form must still be submitted even if there is zero participation.

After the bid opening - The Owner will consider all bids and alternates and determine the lowest responsible, responsive bidder. Upon notification of being the apparent low bidder, the bidder shall then file within 72 hours of the notification of being the apparent lowest bidder, the following:

An Affidavit (**C**) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the 10% goal established. This affidavit shall give rise to the presumption that the bidder has made the required good faith effort and Affidavit **D** is not necessary;

*** OR ***

If less than the 10% goal, Affidavit (**D**) of its good faith effort to meet the goal shall be provided. The document must include evidence of all good faith efforts that were implemented, including any advertisements, solicitations and other specific actions demonstrating recruitment and selection of minority businesses for participation in the contract.

Note: Bidders must always submit **with their bid** the Identification of Minority Business Participation Form listing all MB contractors, vendors and suppliers that will be used. If there is no MB participation, then enter none or zero on the form. Affidavit **A** **or** Affidavit **B**, as applicable, also must be submitted with the bid. Failure to file a required affidavit or documentation with the bid or after being notified apparent low bidder is grounds for rejection of the bid.

Proposal Signature Page

The undersigned further agrees that in the case of failure on his part to execute the said contract and the bonds within ten (10) consecutive calendar days after being given written notice of the award of contract, the certified check, cash or bid bond accompanying this bid shall be paid into the funds of the owner's account set aside for the project, as liquidated damages for such failure; otherwise the certified check, cash or bid bond accompanying this proposal shall be returned to the undersigned.

Respectfully submitted this day of _____

(Name of firm or corporation making bid)

WITNESS:

(Proprietorship or Partnership)

By: _____
Signature

Name: _____
Print or type

Title _____
(Owner/Partner/Pres./V.Pres)

Address _____

ATTEST:

By: _____

Title: _____
(Corp. Sec. or Asst. Sec. only)

License No. _____

Federal I.D. No. _____

Email Address: _____

(CORPORATE SEAL)

Addendum received and used in computing bid:

Addendum No. 1 _____ Addendum No. 3 _____ Addendum No. 5 _____ Addendum No. 6 _____

Addendum No. 2 _____ Addendum No. 4 _____ Addendum No. 6 _____ Addendum No. 7 _____

State of North Carolina AFFIDAVIT A – Listing of Good Faith Efforts

County of _____

(Name of Bidder)

Affidavit of _____

I have made a good faith effort to comply under the following areas checked:

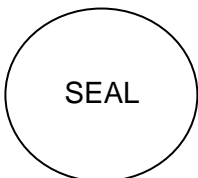
Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- 1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- 2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- 3 – (15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- 4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- 5 – (10 pts)** Attended prebid meetings scheduled by the public owner.
- 6 – (20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- 7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- 8 – (25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- 9 – (20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- 10 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____
Signature: _____
Title: _____



State of _____, County of _____
Subscribed and sworn to before me this _____ day of _____ 20____
Notary Public _____
My commission expires _____

State of North Carolina --AFFIDAVIT B-- Intent to Perform Contract with Own Workforce.

County of _____

Affidavit of _____

(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the _____

_____ contract.

(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

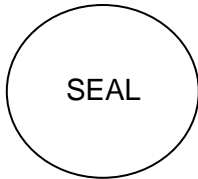
The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement. The Bidder agrees to make a Good Faith Effort to utilize minority suppliers where possible.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

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

Notary Public _____

My commission expires _____

State of North Carolina - AFFIDAVIT C - Portion of the Work to be Performed by HUB Certified/Minority Businesses

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the portion of the work to be executed by HUB certified/minority businesses as defined in GS143-128.2(g) and 128.4(a),(b),(e) is equal to or greater than 10% of the bidders total contract price, then the bidder must complete this affidavit.
 This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

Affidavit of _____ I do hereby certify that on the
 (Name of Bidder)

_____ (Project Name)
 Project ID# _____ Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. Attach additional sheets if required

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

*Minority categories: Black, African American (B), Hispanic (H), Asian American (A) American Indian (I), Female (F) Socially and Economically Disadvantaged (D)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

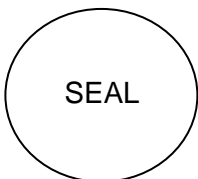
Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

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

Notary Public _____

My commission expires _____

State of North Carolina AFFIDAVIT D – Good Faith Efforts

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the goal of 10% participation by HUB Certified/ minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of _____ I do hereby certify that on the _____
 (Name of Bidder)

Project ID# _____ (Project Name) Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with HUB certified/ minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. (Attach additional sheets if required)

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Examples of documentation that may be required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

- A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.
- B. Copies of quotes or responses received from each firm responding to the solicitation.
- C. A telephone log of follow-up calls to each firm sent a solicitation.
- D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
- E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.
- F. Copy of pre-bid roster
- G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.
- H. Letter detailing reasons for rejection of minority business due to lack of qualification.
- I. Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

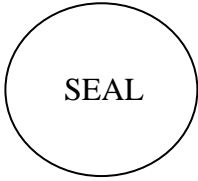
Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

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

Notary Public _____

My commission expires _____

FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS THAT _____
_____ as principal, and
_____, as surety, who is duly licensed to act as surety in North
Carolina, are held and firmly bound unto the State of North Carolina* through
_____ as obligee, in the penal sum of
_____ DOLLARS, lawful money of the United States of America, for the payment of which,
well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and
severally, firmly by these presents.

Signed, sealed and dated this ____ day of ____ 20__

WHEREAS, the said principal is herewith submitting proposal for
and the principal desires to file this bid bond in lieu of making
the cash deposit as required by G.S. 143-129.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION is such, that if the principal shall be
awarded the contract for which the bid is submitted and shall execute the contract and give bond for the faithful
performance thereof within ten days after the award of same to the principal, then this obligation shall be null and void; but
if the principal fails to so execute such contract and give performance bond as required by G.S. 143-129, the surety shall,
upon demand, forthwith pay to the obligee the amount set forth in the first paragraph hereof. Provided further, that the bid
may be withdrawn as provided by G.S. 143-129.1

_____(SEAL)

_____(SEAL)

_____(SEAL)

_____(SEAL)

_____(SEAL)

FORM OF CONSTRUCTION CONTRACT

(ALL PRIME CONTRACTS)

THIS AGREEMENT, made the _____ day of _____ in the year of 20__ by and between _____ hereinafter called the Party of the First Part and the State of North Carolina, through the _____ hereinafter called the Party of the Second Part.

WITNESSETH:

That the Party of the First Part and the Party of the Second Part for the consideration herein named agree as follows:

1. Scope of Work: The Party of the First Part shall furnish and deliver all of the materials, and perform all of the work in the manner and form as provided by the following enumerated plans, specifications and documents, which are attached hereto and made a part thereof as if fully contained herein: advertisement; Instructions to Bidders; General Conditions; Supplementary General Conditions; specifications; accepted proposal; contract; performance bond; payment bond; power of attorney; workmen's compensation; public liability; property damage and builder's risk insurance certificates; approval of attorney general; certificate by the Office of State Budget and Management, and drawings, titled:

Consisting of the following sheets:

Dated: _____ and the following addenda:

Addendum No _____ Dated: _____ Addendum No. _____ Dated: _____

Addendum No _____ Dated: _____ Addendum No. _____ Dated: _____

Addendum No _____ Dated: _____ Addendum No. _____ Dated: _____

Addendum No _____ Dated: _____ Addendum No. _____ Dated: _____

2. That the Party of the First Part shall commence work to be performed under this agreement on a date to be specified in a written order of the Party of the Second Part and shall fully complete all work hereunder within _____ consecutive calendar days from said date. For each day in excess thereof, liquidated damages shall be as stated in Supplementary General Conditions. The Party of the First Part, as one of the considerations for the awarding of this contract, shall furnish to the Party of the Second Part a construction schedule setting forth planned progress of the project broken down by

the various divisions or part of the work and by calendar days as outlined in Article 14 of the General Conditions of the Contract.

3. The Party of the Second Part hereby agrees to pay to the Party of the First Part for the faithful performance of this agreement, subject to additions and deductions as provided in the specifications or proposal, in lawful money of the United States as follows:

(\$ _____).

Summary of Contract Award:

Base Bid	\$
Alternate	\$
Alternate	\$
Alternate	\$
<hr/>	
Total Contract	\$

4. In accordance with Article 31 and Article 32 of the General Conditions of the Contract, the Party of the Second Part shall review, and if approved, process the Party of the First Party's pay request within 30 days upon receipt from the Designer. The Party of the Second Part, after reviewing and approving said pay request, shall make payments to the Party of the First Part on the basis of a duly certified and approved estimate of work performed during the preceding calendar month by the First Party, less five percent (5%) of the amount of such estimate which is to be retained by the Second Party until all work has been performed strictly in accordance with this agreement and until such work has been accepted by the Second Party. The Second Party may elect to waive retainage requirements after 50 percent of the work has been satisfactorily completed on schedule as referred to in Article 31 of the General Conditions.

5. Upon submission by the First Party of evidence satisfactory to the Second Party that all payrolls, material bills and other costs incurred by the First Party in connection with the construction of the work have been paid in full, final payment on account of this agreement shall be made within thirty (30) days after the completion by the First Party of all work covered by this agreement and the acceptance of such work by the Second Party.

6. It is further mutually agreed between the parties hereto that if at any time after the execution of this agreement and the surety bonds hereto attached for its faithful performance, the Second Party shall deem the surety or sureties upon such bonds to be unsatisfactory, or if, for any reason, such bonds cease to be adequate to cover the performance of the work, the First Party shall, at its expense, within five (5) days after the receipt of notice from the Second Party so to do, furnish an additional bond or bonds in such form and amount, and with such surety or sureties as shall be satisfactory to the Second Party. In such event no further payment to the First Party shall be deemed to be due under this agreement until such new or additional security for the faithful performance of the work shall be furnished in manner and form satisfactory to the Second Party.

7. The Party of the First Part attest that it and all of its subcontractors have fully complied with all requirements of NCGS 64 Article 2 in regards to E-Verification as required by Section 2.(c) of Session Law 2013-418, codified as N.C. Gen. Stat. § 143-129(j).

IN WITNESS WHEREOF, the Parties hereto have executed this agreement on the day and date first above written in _____ counterparts, each of which shall without proof or accounting for other counterparts, be deemed an original contract.

Witness:

Contractor: (Trade or Corporate Name)

(Proprietorship or Partnership)

By: _____

Title: _____
(Owner, Partner, or Corp. Pres. or Vice Pres. only)

Attest: (Corporation)

By: _____

Title: _____
(Corp. Sec. or Asst. Sec. only)

The State of North Carolina, through

(CORPORATE SEAL)

(Agency, Department or Institution)

Witness:

By: _____

Title: _____

FORM OF PERFORMANCE BOND

Date of Contract: _____

Date of Execution: _____
Name of Principal (Contractor) _____

Name of Surety: _____

Name of Contracting Body: _____

Amount of Bond: _____

Project

KNOW ALL MEN BY THESE PRESENTS, that we, the principal and surety above named, are held and firmly bound unto the above named contracting body, hereinafter called the contracting body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind, ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the contracting body, identified as shown above and hereto attached:

NOW, THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the contracting body, with or without notice to the surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in _____ counterparts.

Witness:

(Proprietorship or Partnership)

Attest: (Corporation)

By: _____

Title: _____
(Corp. Sec. or Asst. Sec. only)

(Corporate Seal)

Contractor: (Trade or Corporate Name)

By: _____

Title: _____
(Owner, Partner, or Corp. Pres. or Vice Pres. only)

(Surety Company)

By: _____

Title: _____
(Attorney in Fact)

Witness:

Countersigned:

(N.C. Licensed Resident Agent)

Name and Address-Surety Agency

Surety Company Name and N.C.
Regional or Branch Office Address

(Surety Corporate Seal)

FORM OF PAYMENT BOND

Date of Contract: _____
Date of Execution: _____
Name of Principal
(Contractor) _____
Name of Surety: _____
Name of Contracting
Body: _____
Amount of Bond: _____
Project _____

KNOW ALL MEN BY THESE PRESENTS, that we, the principal and surety above named, are held and firmly bound unto the above named contracting body, hereinafter called the contracting body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the contracting body identified as shown above and hereto attached:

NOW, THEREFORE, if the principal shall promptly make payment to all persons supplying labor/material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in _____ counterparts.

Witness:

(Proprietorship or Partnership)

Attest: (Corporation)

By: _____

Title: _____
(Corp. Sec. or Asst. Sec.. only)

(Corporate Seal)

Contractor: (Trade or Corporate Name)

By: _____

Title _____
(Owner, Partner, or Corp. Pres. or Vice Pres. only)

(Surety Company)

By: _____

Title: _____
(Attorney in Fact)

Witness:

Countersigned:

(N.C. Licensed Resident Agent)

Name and Address-Surety Agency

Surety Company Name and N.C.
Regional or Branch Office Address

(Surety Corporate Seal)

SECTION 012300 - ALTERNATES

PART 1 – GENERAL

RELATED DOCUMENTS

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

SUMMARY

This section includes administrative and procedural requirements for alternates.

DEFINITION

Alternate: An amount proposed by bidders and stated on the Form of Proposal for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

Alternates described in this Section are part of the Work only if enumerated in the Agreement. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

PROCEDURES

Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.

Execute accepted alternates under the same conditions as other work of the Contract.

A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

SCHEDULE OF ALTERNATES

1. Provide an alternate price to furnish Bathroom Wet Wall Tile (T-1) as manufactured by Crossville, Empire Series. If this alternate is not accepted by the Owner, the Contractor may provide Bathroom Wet Wall Tile (T-1) as produced by Crossville, Caesar Ceramic or Daltile, of equivalent quality and character.

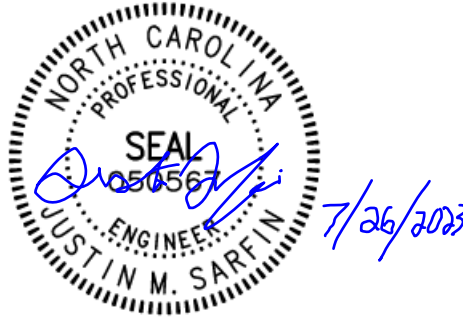
- 1 2. Provide an alternate price to furnish Bathroom Accent / Sink Wall Tile (T-2) as manufactured by Crossville,
2 Ebb & Flow Linear Lines Series. If this alternate is not accepted by the Owner, the Contractor may provide
3 Bathroom Accent / Sink Wall Tile (T-2) as produced by Crossville, Caesar Ceramic or Daltile, of equivalent
4 quality and character.
5
6 3. Provide an alternate price to furnish Bathroom Floor Tile (T-3) as manufactured by Crossville, Empire Se-
7 ries. If this alternate is not accepted by the Owner, the Contractor may provide Bathroom Floor Tile (T-3) as
8 produced by Crossville, Caesar Ceramic or Daltile, of equivalent quality and character.
9
10 4. Provide an alternate price to furnish Acoustical Ceiling Tile (ACT-1) as manufactured Armstrong, Ultima Se-
11 ries. If this alternate is not accepted by the Owner, the Contractor may provide Acoustical Ceiling Tile
12 (ACT-1) as produced by Armstrong, USG, or Certain Teed, of equivalent quality and character.
13
14 5. Provide an alternate price to furnish Millwork - Plastic Laminate for Cabinets/Shelving (PLAM-1) as manu-
15 factured by Wilsonart. If this alternate is not accepted by the Owner, the Contractor may provide Millwork -
16 Plastic Laminate for Cabinets/Shelving (PLAM-1) as produced by Wilsonart, Formica, or Laminart, of equiva-
17 lent quality and character.
18
19 6. Provide an alternate price to furnish Solid Surface for Counters (SSURF-1) as manufactured by Silestone.
20 If this alternate is not accepted by the Owner, the Contractor may provide Solid Surface for Counters
21 (SSURF-1) as produced by Silestone, Hanstone, or Caesarstone US, of equivalent quality and character.
22
23 7. Provide an alternate price to furnish Cabinet Door Pulls as manufactured by Hafele, 117,05 Series. If this
24 alternate is not accepted by the Owner, the Contractor may provide Cabinet Door Pulls as produced by
25 Hafele, Schaub and Company, or Richelieu Hardware, of equivalent quality and character.
26
27 8. Provide an alternate price to furnish Restroom Partitions (BP-1) as manufactured by Scranton, Eclipse High
28 Density Plastic Material Series. If this alternate is not accepted by the Owner, the Contractor may provide
29 Restroom Partitions (BP-1) as produced by Scranton, ASI Global Partitions, or Hadrian, of equivalent quality
30 and character.

31
32
33

END OF SECTION 012300

SECTION 019913 - GENERAL REQUIREMENTS FOR DIVISIONS 21-28 WORK

The "Engineer of Record" for the work defined by Division 01 Sections 019923, 019916 is Salas O'Brien, 1620 Midtown Place (27609), P.O. Box 19944 (27619), Raleigh, NC, (919) 832-8118. The term "engineer," "architect-engineer," "engineer-architect," "A-E," "E-A," etc., when used in these Sections shall reference Salas O'Brien.



The "Engineer of Record" for the work defined by Divisions 21-28 is Salas O'Brien., 1620 Midtown Place (27609), P.O. Box 19944 (27619), Raleigh, NC, (919) 832-8118. The term "engineer," "architect-engineer," "engineer-architect," "A-E," "E-A," etc., when used in Divisions 21-28 Drawings and Specifications shall reference Salas O'Brien.

PART 1 - GENERAL

RELATED DOCUMENTS

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

The requirements specified herein shall govern all Sections in Divisions 21-28, whether stated therein or not.

Where items specified in the other sections of this Division conflict with requirements of this Section, the former shall govern.

REVIEW OF CONTRACT DOCUMENTS

The Contract Documents may represent imperfect data and may contain errors, omissions, conflicts, inconsistencies, code violations and improper use of materials. Such deficiencies will be corrected by the A-E when identified. The Contractor shall carefully study and compare the individual Contract Documents with each other and report at once in writing to the A-E any deficiencies the Contractor may discover. The Contractor shall require each subcontractor to likewise study the documents and report at once any deficiencies discovered. The Contractor shall resolve all reported deficiencies with the A-E prior to starting any work. **Any work performed prior to receipt of instructions from the A-E will be done at the Contractor's risk.** If the Contractor performs any construction activity knowing it involves a recognized error, inconsistency, or omission in the Contract Documents without such notice to the A-E, the Contractor shall assume appropriate responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

1 The Contractor shall be responsible for maintaining habitable structures under this Contract rainproof, and for making
2 equipment and utility installations properly perform the intended function. If he is prevented from so doing by any
3 limitations of the drawings or specifications, the Contractor shall immediately notify the A-E in writing of such
4 limitations before proceeding with construction in the area where the problem or limitation exists.
5
6

7 **DEFINITIONS**
8

9 Mechanical Work: Work required by this Contract as defined by specification Division 21 (Fire Protection), Division
10 22 (Plumbing), and Division 23 (Heating, Ventilating, and Air-Conditioning).
11

12 Electrical Work: Work required by this Contract as defined by specification Divisions 26-28.
13

14 Labeled: Appliances, equipment, materials or products to which has been attached a label, symbol, or other
15 identifying mark of an organization acceptable to the North Carolina Building Code Council and concerned with
16 product evaluation, that maintains periodic inspection of production of labeled equipment or materials and by whose
17 labeling the manufacturer indicates compliance with identified standards or has been tested and found suitable for a
18 specified purpose.
19

20 Listed: Appliances, equipment, materials or products included in a list published by an organization acceptable to the
21 North Carolina Building Code Council and concerned with product evaluation, that maintains periodic inspection of
22 production of listed equipment or materials, and whose listing states either that the equipment or material meets
23 appropriate designated standards or has been tested and found suitable for a specified purpose.
24

25 Concealed: Work within or behind various construction elements or in crawl spaces or trenches that is not exposed
26 to view when the project is complete.
27

28 Exposed: Not "concealed" as defined above, or anything exposed to view when the project is complete.
29

30 Wiring: Cable, raceways, fittings, mechanical supports, wire, junction boxes, device boxes, outlet boxes, switches,
31 cutouts, and related items.
32

33
34 **CODES, LAWS, REGULATIONS, AND STANDARDS**
35

36 Work on and for the project shall conform to requirements of each applicable volume of the *North Carolina Building*
37 *Code*; shall comply with the regulations of the N.C. Department of Labor, including the latest revisions and
38 interpretations of the *Occupational Safety and Health Act of North Carolina*; and be in accordance with all other
39 codes, laws, rules and regulations that apply to this project.
40

41 "Confined spaces" and "permit-requiring confined spaces", as defined by U.S. Occupational Safety and Health
42 Administration (USOSHA) may exist in the work area or may be created by the construction of this Project. The
43 Contractor shall be responsible for identification of any permit-requiring confined spaces and for establishing all
44 required procedures for meeting the requirements of USOSHA relative to these spaces, including written confined
45 space entry program(s).
46

47 Codes, laws, regulations, and/or industry standards referenced in the Specification or on the Drawings shall be
48 considered to be part of the Project requirements. Applicable edition of the referenced volume is the edition that
49 is/was in effect at the time the construction permit was issued or at the time of approval of the Contract Documents by
50 the Authority Having Jurisdiction.
51

52
53 **INTENT AND WORKMANSHIP**
54

55 The words "furnish," "furnish and install," "install," and "provide" or words with similar meaning shall be interpreted,
56 unless otherwise specifically stated, to mean "furnish and install complete in-place and ready for service."
57

58 The work of all trades under this Contract shall be coordinated in such a manner as to obtain the best workmanship
59 possible.
60
61

1 Miscellaneous items and accessories that are not specifically shown on the drawings or specified herein, but which
2 are essential to produce a complete and properly operating installation, or usable structure or plant, providing the
3 indicated function, shall be furnished and installed without change in the Contract price. Such miscellaneous items
4 and accessories shall be of the same quality standards, including material, style, finish, strength, class, weight and
5 other applicable characteristics, as specific for the major component of which the miscellaneous item or accessory is
6 an essential part. The above requirement, however, is not intended to include major components not covered by or
7 inferable from the drawings and specifications.
8
9

10 **WELDER QUALIFICATION**

11
12 Where welding is required on vessels or piping with an ASME P- or S- stamp, qualify welders for welding procedures
13 complying with ASME *Boiler and Pressure Vessel Code*, Section IX. Submit *Welder's Performance Qualification*
14 *Record* required by the ASME *Boiler and Pressure Vessel Code*.
15

16 For piping and structural supports welding, qualify welders in accordance with AWS QC7 *Standard for AWS Certified*
17 *Welders* for welding procedures complying with ASME B31.1 or ASME B31.9, as applicable. Submit *Welder's*
18 *Performance Qualification Record* required by ASME B31.1 or B31.9 and a copy of the most recent *Maintenance of*
19 *Welder Certification* form submitted to AWS.
20

21 **In addition, submit each welder's assigned number, letter, or symbol used to identify the work of the welder.**
22 This symbol shall be stamped in or adjacent to each completed weld.
23

24 **QUALITY ASSURANCE**

25
26
27 The Contract Drawings indicate the extent and general arrangement of the Work. The Contractor shall coordinate the
28 Work under his Contract so as to avoid conflicts between his work and the work of other trades. He shall carefully
29 examine the Drawings and shall be responsible for the proper fitting of materials and equipment into the space
30 provided. If any departures from the Contract Drawings are deemed necessary by the Contractor, detail drawings of
31 such departures and the reasons therefore shall be submitted as soon as practicable to the A-E for his review. No
32 such departures shall be made without this review and written clarification or change order.
33

34 **If manufacturer recommended details or installation instructions differ from the contract drawings or**
35 **specifications, then the contractor shall notify the A-E immediately of any discrepancies.**
36

37 The Drawings and Specifications shall be considered supplementary, one to the other, so that materials and/or labor
38 indicated, called for, or implied by one and not the other shall be provided as though specifically called for in both.
39

40 Firestop Materials Codes and Standards: Comply with ASTM Standard E814 and applicable categories of UL's
41 current *Fire Resistance Directory*, Vol. I and II, for compliance with ANSI/UL Standard 1479.
42

43 Access Doors Fire-Resistance Ratings: Where fire-resistance rating is indicated for construction penetrated by
44 access units, provide Listed and Labeled units.
45
46

47 **OBSERVATION**

48
49 All work shall be done by skilled technicians, continuously supervised by the Contractor and subject to observation
50 and final acceptance by the A-E. Such final acceptance shall in no way relieve the Contractor from responsibility for
51 defects in either workmanship or material that may subsequently develop.
52
53

54 **SUBMITTALS**

55
56 Submittals shall demonstrate compliance with technical requirements by reference to each subsection of this
57 specification. Material and equipment schedules, catalog cuts, manufacturers' data and shop drawings, and field
58 working drawings as required by individual Sections shall be provided.
59
60

1 Shop drawings, technical data and other such submittals required by individual Sections of the Divisions listed above
2 shall be provided.

3
4 Equipment drawings, manufacturer's installation instructions as shipped with the equipment, field working and
5 location drawings, wiring diagrams, and coordination drawings shall be provided by the Contractor for items of
6 equipment, sleeves, foundations, curbs, wiring, ductwork, piping, etc., as necessary for information and coordination
7 of all trades. These drawings shall be provided sufficiently in advance of installation to avoid delays and removal and
8 reworking of installed work, and so as to provide information to other trades when and as required. No work shall be
9 done until these drawings have been coordinated by the Contractor.

10
11 Submittals shall be checked before submission by technically qualified employees of Contractor for accuracy,
12 completeness and compliance with Contract requirement. **All submittals shall be accompanied by the "Submittal
13 Cover Form" provided at the end of this Section, signed by Contractor.**

14
15 Contractor shall submit complete lists or schedules of all proposed sub-contractors and material suppliers, and of all
16 proposed construction materials and equipment. Materials and equipment lists shall be complete with trade names
17 and/or catalog numbers of each item. Processing of the second and subsequent Certificate for Payment will be
18 withheld until substantial portions of these lists have been submitted.

19
20 Products furnished shall be essentially the standard product of the manufacturer. Where two or more units of the
21 same class of equipment are required, these units shall be products of a single manufacturer.

22
23 Products proposed by the Contractor shall be new except where specifically noted otherwise. Contractor(s) shall
24 provide products only from manufacturers who have published data showing compliance with specified requirements
25 or who certify in writing to such compliance (including laboratory and/or in-place testing, if applicable). All electrical
26 products shall be both labeled and listed, as defined above. **Prior to purchase of major materials, equipment or
27 systems, submit manufacturer's data to the A-E for review as hereinafter specified.**

28
29 Products of the specified type and for the specified application offered by the Contractor(s) for use on this Project
30 shall comply with the following requirements:

31
32 Product shall have had satisfactory performance in applications of similar character to that specified for a
33 period of at least three (3) years.

34
35 Product shall be from an established national or regional manufacturer. The A-E's experience with the
36 manufacturer on prior projects relative to product performance, technical support, etc. may be taken into
37 account to establish suitability of the offered product for this Project.

38
39 Product shall be provided through an authorized representative of the manufacturer. The representative
40 shall be capable of providing technical support relative to the installation, operation, and maintenance of the
41 product. The A-E's experience with the representative on prior projects relative to product performance,
42 technical support, etc. may be taken into account to establish suitability of the offered product for this
43 Project.

44
45 Repair parts and service for the product shall be available within twenty-four (24) hours of notice.

46
47 **The manufacturer and his authorized representative shall furnish satisfactory evidence in support of these
48 conditions when requested. The A-E's decision relative to the suitability and acceptability of any product is
49 final and acceptance of this limitation is implicitly acknowledged by the contractor and the manufacturer
50 and/or his representative offering the product for use on this Project.**

51
52 Submittals shall demonstrate compliance with technical requirements by reference to each subsection of this
53 specification. Where a submitted item does not **comply fully** with each and every requirement of the specifications
54 the submittal shall clearly indicate such deviations by being marked "**NON-COMPLYING FEATURE.**" This indication
55 shall be applied to the submittals at the appropriate location in a color contrasting with the remainder of the submittal.
56 Additional information that might assist the Engineer in product evaluation may be included with the submittal. This
57 information should indicate how a specific non-complying feature is believed by the Contractor to meet the intent of
58 the specification.

1 **It is the Contractor's responsibility to demonstrate compliance with the specifications and to clearly**
2 **indicate any features that do not meet the specifications. It is not the Engineer's responsibility to**
3 **identify non-compliance.** Substantial non-compliance, as determined by the Engineer, is grounds for
4 rejection of the submittal. Discovery of non-complying features that have not been properly identified as
5 such on submittals may require, at any stage of construction, the removal and replacement of the non-
6 complying item(s).

7
8 The A-E will review shop drawings, manufacturer's data, and samples with reasonable promptness. This review is
9 only for general conformance with the design concept of the project and general compliance with the information
10 given in the Contract Documents. Corrections or comments made on the shop drawings during this review do not
11 relieve contractor from compliance with the requirements of the plans and specifications. Approval of a specific item
12 shall not include approval of an assembly of which the item is a component. Contractor is responsible for dimensions
13 to be confirmed and correlated at the jobsite; information that pertains solely to the fabrication processes or to the
14 means, methods, techniques, sequences and procedures of construction; coordination of his or her Work with that of
15 all other trades; and for performing all work in a safe and satisfactory manner. The Contractor is responsible for any
16 delay caused by his failure to observe submittals requirements and the time for completion of his Contract will not be
17 extended because of such delays.

18
19 The A-E's submittals review stamp categories shall be interpreted as follows:

20
21 Reviewed: Fabrication and installation or erection may be undertaken.

22
23 Exceptions indicated, revise and proceed: Fabrication and installation of erection may be undertaken.
24 However, Contractor shall comply with all notes or corrections indicated.

25
26 Exceptions indicated, revise and re-submit: Neither fabrication, installation, nor erection shall be undertaken.
27 Re-submit corrected copies for review. Corrections shall be limited to items marked, except that changes
28 required in order to coordinate the corrections indicated shall be made. All changes, other than those
29 indicated, shall be called specifically to the A-E's attention.

30
31 Rejected, re-submit: Neither fabrication, installation, nor erection shall be undertaken. Revise entire
32 submission to comply with information given in the Contract Documents and re-submit.

33
34 Submittals returned to the Contractor with the A-E's "reviewed" or "exceptions indicated, revise and proceed" stamp
35 need not be resubmitted, except that corrected copies of "exceptions indicated, revise and proceed" submittals shall
36 be furnished for record when requested.

37
38 Submittals returned to the Contractor with the A-E's "revise and re-submit" or "rejected, re-submit" stamp shall be
39 corrected to comply with Contract requirements and re-submitted to the A-E for review. The Contractor shall direct
40 specific attention, in writing or on re-submitted shop drawings, product data or samples, to revisions other than those
41 requested by the A-E on previous submittals.

42
43 Shop drawings of work that involves more than one subcontractor shall be coordinated by the Contractor and
44 submitted to A-E under one cover. No items shall be fabricated, nor any portion thereof shipped to site, prior to
45 receipt by the Contractor of all applicable submittals, including manufacturer's data, samples and shop drawings
46 bearing the A-E's "reviewed" or "exceptions indicated" stamp only.

47
48 Manufacturer's data submitted as required by the technical specifications sections or requested by A-E shall consist
49 of four (4) copies of certificates, schedules, catalog cuts, manufacturer's specifications and installation instructions for
50 each type of product or material. Include maintenance recommendations, fire ratings and other reports when
51 applicable to show compliance with the Specifications. When catalog cuts are submitted, the specific item to be
52 considered shall be identified. Items that are not so identified will be returned to the Contractor without action.

53
54 Firestop Systems: Submit data on products. Provide manufacturer's certification of UL classification(s)
55 required, including copies of UL systems listings and schedule defining each UL system proposed and the
56 applicable type of penetration.

57
58 Access Units: Submit manufacturer's technical data and installation instructions for each type of access
59 door assembly, including setting drawings, templates, instructions and directions for installation of
60 anchorage devices.

1 Contractor shall submit for review any samples required by the technical specification sections or that may be
2 requested by the A-E.

3
4 With each electrical testing and compliance submittal, Contractor shall submit evidence of compliance that each
5 manufactured item or component of electrically-operated equipment and that each fabricated assembly of electrically
6 operated equipment furnished complies with the testing requirements.

7
8
9 **FIRE RATINGS**

10
11 Fire rating of walls and floors, as indicated on the Drawings, are for reference only. Refer to Architectural Drawings
12 for exact construction and fire ratings.

13
14 Where fire resistive insulation or other coverings have been applied to a structural element to obtain a fire rating and
15 this insulation or covering is removed or otherwise disturbed, the Contractor shall be responsible for restoring the
16 material to a condition that matches the original fire protective ability.

17
18
19 **USE OF BRAND NAMES**

20
21 Brand names, where scheduled as "basis of design," are to be considered for information purposes and are not
22 intended to be a product specification.

23
24 Where the Contractor proposes to use an item of equipment other than that indicated as basis of design that
25 may require redesign of the structure, partitions, foundations, piping, wiring, or any other part of the
26 mechanical, electrical, or architectural layout, all such redesign and all new drawings and detailing required
27 shall be prepared by the Contractor at his own expense and submitted for review by the A-E.

28
29 Where such deviation requires a different quantity and arrangement of ductwork, piping, wiring, raceway, or
30 equipment from that specified or indicated on the Drawings, the Contractor shall furnish and install any such
31 ductwork, piping, structural supports, insulation, controllers, motors, starters, electrical wiring and raceway,
32 and any other additional equipment required by the system, at no additional cost.

33
34 Brand names, where used as a product specification, are intended to denote the standard of quality required for the
35 particular material or product.

36
37 Where the term "equal" or "equivalent" is present, such specification does not restrict the Contractor to a
38 specific brand and equivalent products by other manufacturers may be acceptable. The term "equal" or
39 "equivalent" shall be interpreted to mean a material or product that is similar and equal in type, quality, size,
40 capacity, composition, finish, color, and other performance characteristics to the material or product
41 specified by brand name, and that, **in the opinion of the A-E**, is suitable for the same use and capable of
42 performing the same function as the material or product specified. **Proposed equivalent items must be**
43 **reviewed by the A-E before they are purchased or incorporated into the work.**

44
45
46 **EQUIPMENT SUBSTITUTIONS AND CHANGES/EXTRA COSTS FOR CHANGES IN BUILDING SERVICES**

47
48 Where the Contractor proposes to use an item of equipment other than that specified or detailed on the Drawings,
49 requiring any redesign of the structure, partitions, foundations, piping, wiring, or any other part of the mechanical,
50 electrical, or architectural layout, all such redesign and all new drawings and detailing required shall be prepared by
51 the Contractor at his own expense and submitted for review by the A-E.

52
53 Where such approved deviation requires a different quantity and arrangement of ductwork, piping, wiring, raceway, or
54 equipment from that specified or indicated on the Drawings, the Contractor shall furnish and install any such
55 ductwork, piping, structural supports, insulation, controllers, motors, starters, electrical wiring and raceway, and any
56 other additional equipment required by the system, at no additional cost.

1 It is the responsibility of the Contractor to notify the A-E in all cases where the requirements of proposed equipment
2 differ from the requirements specified, shown, or implied on the Drawings or within the Specifications. **Failure of the**
3 **Contractor to notify the A-E shall not relieve the Contractor of the responsibility of providing compatible**
4 **equipment at no additional cost as described above.**
5
6

7 **OPERATION AND MAINTENANCE DATA**
8

9 For each Division of the Work, provide four (4) copies of Operating Manuals, Maintenance Manuals, and Test
10 Reports, bound in suitable covers, to the A-E at least two (2) weeks **prior** to the final inspection of the project.
11

12 Each manual shall include a cover sheet listing the following:
13

14 Project name and location.

15 Division of Work covered by the manual.

16 Contractor data, including name, address, phone and fax numbers, and service contact information (24-hour
17 number, email address, etc.)
18

19 Date of project completion.
20

21
22 Each manual shall include a table of contents.
23

24 Operating manual: Provide all relevant information needed for day-to-day operation and management of the building
25 systems. Include the following for each system:
26

27 System Description: Identify the areas of the building the system serves, the locations of performance
28 checkpoints, the expected performance readings at the design load conditions and, where applicable, at
29 part-load conditions. The system's operation during the day, night, and weekend, as well as seasonal start-
30 up and shutdown, safety devices and their function, control devices and their function, pollution control
31 devices, etc., also shall be described. The function of the controls for individual systems shall be described
32 alongside the description of the system function.
33

34 Operating Routines and Procedures: Identify activities associated with the normal operation of systems and
35 equipment. Operating checklists and operating logs shall be provided for each system and all performance
36 standards shall be identified.
37

38 Seasonal Start-Up and Shutdown: List seasonal start-up and shutdown procedures, including any
39 "mothballing" procedures required.
40

41 Special Procedures: Special procedures related to environmental control, health and safety, productive
42 work environment, etc., shall be codified.
43

44 Troubleshooting Procedures: This section shall include questionnaires and diagnostics to allow users to
45 isolate probable causes of operating problems in an efficient manner.
46

47 Maintenance manual: The maintenance manual shall be divided into two parts:
48

49 Part I shall contain information related to the equipment data sheets, nameplate data, operating data, etc.
50 Include the original purchase order number; date of purchase; name, address, and phone number of vendor;
51 and warranty information.
52

53 Part II shall support a maintenance program. The manual shall contain information prepared by the
54 equipment manufacturers, but shall be supplemented by information provided by the Contractor. Each item
55 of equipment shall be identified and an individual "Equipment Maintenance Sheet" shall be prepared for
56 each, with the following information:
57

58 Description each system and system component, consisting of easily read schematic drawings
59 showing all components, identified to match Part I data, that requires maintenance.
60

- 1 Recommended preventative and predictive maintenance procedures and their recommended
- 2 frequency of application for each system component.
- 3
- 4 Recommended list of spare parts with part numbers and place(s) they can be obtained.
- 5
- 6 Copy of manufacturer's Installation instructions for each component.
- 7
- 8 Any other information requested by the A/E to support the operation and maintenance of the
- 9 equipment.

10
11 Test reports: Provide copies of the test protocols used in the construction and commissioning of the systems.
12 Arrange data so as to allow the results of ensuing tests to be easily added.
13

14
15 **PART 2 - PRODUCTS**

16
17
18 **FIRESTOPPING SYSTEMS**

19
20 Firestop systems shall be used in locations including, but not limited to, the following:

- 21
- 22
- 23 Penetrations through fire resistance rated floor assemblies and roof assemblies (where required by code)
- 24 including both empty openings and openings containing penetrants.
- 25
- 26 Penetrations through fire resistance rated wall assemblies including both empty openings and openings
- 27 containing penetrants.
- 28
- 29 Membrane penetrations in fire resistance rated wall assemblies where items penetrate one side of the
- 30 barrier.
- 31
- 32 Membrane penetrations in fire resistance rated ceiling assemblies.

33
34 Systems or devices must be listed in the UL Fire Resistance Directory and must conform to construction type,
35 penetrant type, annular space requirements and fire rating involved in each separate instance. System must be
36 symmetrical for wall applications.

37
38 Systems or devices must be asbestos-free and all products must be from a single manufacturer.

39
40 Products must withstand the passage of cold smoke, either as an inherent property of the system or by the use of a
41 separate product included as part of the UL system or device, and designed to perform this function.

42
43 Cracks, Voids, or Holes Up to 4" Diameter: Putty or caulking, one-piece intumescent elastomer, non-corrosive to
44 metal, compatible with synthetic cable jackets, Listed, and capable of expanding 10 times when exposed to flame or
45 heat.

46
47 Openings 4" or Greater: Sealing system capable of passing 3-hour fire test in accordance with ASTM E-814,
48 consisting of wall wrap or liner, partitions, and end caps capable of expanding when exposed to temperatures of 250
49 to 350 deg. F (121 to 177 deg. C), Listed.

50
51 Wall Boxes:

- 52
- 53 Metallic boxes used in fire-rated walls or floors must be listed in the UL Fire Resistance Directory under
- 54 category CEYY.
- 55

1 Listed single and double gang metallic device and outlet boxes with metallic or nonmetallic cover plates may
2 be used in bearing and nonbearing wood stud and steel stud walls with ratings not exceeding 2 hours. The
3 metallic outlet or switch boxes shall be securely fastened to the studs and the opening in the wallboard
4 facing shall be cut so that the clearance between the box and the wallboard does not exceed 1/8 in. The
5 surface area of individual metallic outlet or switch boxes shall not exceed 16 sq. in. The aggregate surface
6 area of the boxes shall not exceed 100 sq. in. per 100 sq. ft. of wall surface.

7
8 Metallic boxes located on opposite sides of walls or partitions shall be separated by a minimum horizontal
9 distance of 24 in. This minimum separation distance between metallic boxes may be reduced when "Wall
10 Opening Protective Materials" listed in the UL Fire Resistance Directory under category CLIV are installed
11 according to the requirements of the Classification.

12
13 Metallic boxes shall not be installed on opposite sides of walls or partitions of staggered stud construction
14 unless "Wall Opening Protective Materials" are installed with the metallic boxes in accordance with
15 Classification requirements for the protective materials.

16
17
18 **WALL AND FLOOR ACCESS DOORS**

19
20 Where floors, walls and ceilings must be penetrated for access to engineering work, provide types of access doors
21 indicated, including floor doors if any. Furnish sizes indicated or, where not otherwise indicated, furnish 24" x 24"
22 panels. Furnish manufacturer's complete units, of type recommended for application in indicated substrate
23 construction, in each case, complete with anchorages and hardware.

24
25 Except as otherwise indicated, fabricate wall/ceiling door units of welded steel construction with welds ground
26 smooth, 16-gage frames and 14-gage flush panel doors, 175 deg. swing with concealed spring hinges, flush
27 screw-driver-operated cam locks, factory-applied rust-inhibitive prime-coat paint finish.

28
29 Provide rated access doors where installed in fire resistance rated floor and wall assemblies to meet fire rating.

30
31
32 **PART 3 – EXECUTION**

33
34
35 **GENERAL**

36
37 Comply with NFPA 241, *Standard for Safeguarding Construction, Alterations, and Demolition Operations*; ANSI A10
38 Series standards for *Safety Requirements for Construction and Demolition*; and Chapter 14 of the *North Carolina*
39 *State Building Code: Fire Code*.

40
41
42 **FIRE PROTECTION DURING CONSTRUCTION**

43
44 Building contents and all elements of new and/or existing construction must be thoroughly protected from
45 construction procedures that produce sparks, flames, or excessive heat. Such procedures include, but are not limited
46 to, welding, soldering, flame-cutting, using grinders or metal cutting saws, and heating of work spaces. Contractor
47 shall maintain fire watch and/or portable fire-suppression devices, as required, during these operations.

48
49 The Contractor shall develop, provide, and post a written plan in compliance with NFPA 241 and Chapter 14 of the
50 *North Carolina State Building Code: Fire Code*.

51
52 Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs
53 with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures
54 required to prevent fires and how to deal with them if they occur.

55
56 Provide and maintain portable, UL rated fire extinguishers with class and extinguishing agent as required by locations
57 and classes of fire exposures. Comply with NFPA 10 *Standard for Portable Fire Extinguishers*. Locate fire
58 extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each
59 floor or area at or near each usable stairwell.

1 **COOPERATION WITH OTHER TRADES**

2
3 The Contractor shall give full cooperation to other trades and shall furnish any and all information necessary to permit
4 the work of other trades. Information to be provided by the Contractor includes, but is not limited to templates,
5 patterns, setting plans, and shop details as may be necessary for the proper installation of work and for the purpose
6 of coordinating adjacent work. Information required by other trades shall be provided in a timely manner and shall be
7 sufficient to allow the work of such other trades to proceed with the least possible interference or delay.
8

9 Where the work of the Contractor will be installed in close proximity to, or may interfere with work of other trades, the
10 Contractor shall assist in working out space conditions to make a satisfactory adjustment. **If the Contractor installs
11 his work before coordination with other trades, he shall make the necessary changes in his work to correct
12 the condition without extra charge.**
13

14
15 **FIRESTOPPING**

16
17 Installer should be experienced in installing or applying similar systems, plus: be acceptable to or licensed by
18 manufacturer, state or local authority where applicable; have at least five years experience; and have successfully
19 completed at least five comparable projects using this system.
20

21 Firestop systems or devices installation must meet requirements of ASTM E-814, UL 1479 or UL 2079 tested
22 assemblies that provide a fire rating equal to that of construction being penetrated.
23

24 Install only after substrate penetrations and supporting brackets have been installed. Do not install firestopping when
25 ambient or substrate temperatures are outside limits permitted by manufacturers or when substrates are wet. Where
26 floor openings without penetrating items are more than 4 inches wide and subject to traffic or loading, install
27 firestopping materials capable of supporting same loading as floor. Protect materials on surfaces subject to traffic.
28

29
30 **SMOKE-RESISTIVE SYSTEMS**

31
32 The space around items penetrating non-fire rated walls and floors shall be filled with an approved material to limit
33 the free passage of smoke, heat and flame in locations including, but not limited to, the following:
34

35 Penetrations through non-rated floors including both empty openings and openings containing penetrants.
36

37 Penetrations through non-rated smoke partitions and wall assemblies including both empty openings and
38 openings containing penetrants.
39

40
41 **WALL AND FLOOR ACCESS DOORS**

42
43 Comply with manufacturer's instructions for installation of access doors, floor doors, and removable access plates.
44

45 Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to
46 adjacent finish surfaces.
47

48 Adjust hardware and panels after installation for proper operation.
49

50 Remove or replace panels or frames that are warped, bowed, or otherwise damaged.
51

52
53 **PATCHING**

54
55 Repair, patching, and finishing of walls, floors, and/or ceilings affected by demolition, cutting after installation of new
56 work, etc. shall be done by technicians skilled in the applicable trades and shall match surrounding or adjoining
57 materials in composition, texture, color, and finish.
58
59

1 **CONTRACTOR AS-BUILT DRAWINGS**

2
3 Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and
4 revised drawings as modifications are issued.

5
6 Mark record prints to show the actual installation where installation varies from that shown originally. Require
7 individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity,
8 to provide information for preparation of corresponding marked-up record prints.

9
10 Give particular attention to information on concealed elements that would be difficult to identify or measure
11 and record later.

12
13 Accurately record information in an acceptable drawing technique.

14
15 Record data as soon as possible after obtaining it.

16
17 Record and check the markup before enclosing concealed installations.

18
19 Types of items requiring marking include, but are not limited to, the following:

20
21 Dimensional changes.

22
23 Revisions to details.

24
25 Revisions to electrical circuitry.

26
27
28 Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar
29 identification, where applicable.

30
31 Submit Contractor As-built Drawings to A/E for review **at least two (2) weeks prior to Project final inspection.**

32
33
34 **END SECTION 019913**

SUBMITTAL COVER FORM

PROJECT: Toilet Renovations
NC Office of the Courts – Judicial Center

PROJECT NO.: SO#2023-02594

TO: SALAS O'BRIEN
1620 Midtown Place
Raleigh, NC 27609

FROM: _____

_____ CONTRACTOR _____ SUBCONTRACTOR

We submit for your consideration the following product for the above project:

SPECIFICATION SECTION	SPECIFICATION PARAGRAPH	DESCRIPTION
_____	_____	_____

TYPE OF SUBMITTAL:

- _____ Specified Brand Product
- _____ Proposed Equivalent Product to Specified Brand
- _____ Product Meeting Performance Specification (No Brand Specified)

We warrant the following:

- a. We have personally investigated the proposed product, and determined that it is equal in all respects to that specified and/or performance specification requirements;
- b. We will provide the specified guarantee for this product;
- c. We will coordinate installation of this product into the work, making such changes as may be required for the work to be complete in all respects;
- d. We have clearly indicated by marking as "Non-Complying Feature" each and every requirement of the Specifications that this product does not meet;
- e. And, we waive all claims for additional costs related to this product which subsequently become apparent.

Attached hereto are complete technical data, including applicable laboratory reports, to demonstrate compliance with project requirements.

SUBMITTED BY:

SIGNATURE

DATE

SUBMITTAL REVIEW

**(SAMPLE FORM - ORIGINAL WITH COMMENTS WILL BE ATTACHED TO
SUBMITTAL BY A/E)**

PROJECT: _____

PROJECT #: _____

SUBMITTAL ID#: _____

SPECIFICATION PARAGRAPH: _____

DESCRIPTION: _____

Submittal has been reviewed only for conformance with design intent of the contract documents. See Section 019913 "GENERAL REQUIREMENTS FOR ENGINEERED WORK" for complete definition of Submittal Review.

- Reviewed
- Exceptions Noted - Revise & Proceed
- Exceptions Noted - Revise & Resubmit
- Rejected

DATE: _____

BY: _____

REVIEW COMMENTS:

THESE COMMENTS SHALL NOT BE REMOVED FROM THIS DOCUMENT

SECTION 019916 - DIVISIONS 21-28 WORK IN EXISTING BUILDINGS

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

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

The requirements specified herein shall govern all Sections in Divisions 21-28, whether stated therein or not.

Where items specified in the other sections of this Division conflict with requirements of this Section, the former shall govern.

SUBMITTALS

Submittals shall demonstrate compliance with technical requirements by reference to each subsection of this specification. Where a submitted item does not **comply fully** with each and every requirement of the Specifications, the submittal shall clearly indicate such deviations. Identification requirements for non-complying features of items are very specific. See Section 019913 for exact requirements.

DEFINITIONS

Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.

Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

MATERIALS OWNERSHIP

Unless otherwise indicated, demolition waste becomes property of Contractor. Materials removed during demolition shall be accumulated in the demolition area for examination by the Owner. The Owner may choose to retain selected items. Items not selected to be retained by the Owner become the property of the Contractor and shall be removed from the site in a timely manner. All disposal fees and/or permits shall be the responsibility of the Contractor.

QUALITY ASSURANCE

Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved Section 608 certification program.

1 **FIELD CONDITIONS**

2
3 Existing facilities shall remain in use during all phases of construction under this Contract. **All and any of existing**
4 **building safeties such as exit signage, exit lights, fire alarm, fire sprinkler etc., must remain operational**
5 **CONTINUOUSLY in order to retain building occupancy status. All required exits and exit signs must be kept**
6 **available and free of obstruction at all times.** The Contractor shall cooperate with the Owner in every way
7 possible to keep interruption of, and interference with, normal functions, activities, and operations to a minimum.
8

9 Where construction or attendant work interrupts normal functions in any area, a schedule of work shall be submitted
10 for approval of the Owner and after approval, strictly followed. Modification to existing work shall be done as
11 required. All work shall be performed in such a manner as to prevent any interruption of any service or utility. Where
12 it is necessary to interrupt service for demolition, cut-in, or changeover, the work shall be scheduled well in advance
13 of the interruption and the interruption approved by the Owner. As required by the Owner, such work shall be done
14 during night, weekends, holidays, or other off peak period as approved.
15

16 Existing piping, ductwork, raceway and wiring, etc., shall be modified as indicated on the Drawings and/or as required
17 by new and modified construction. Existing piping, ductwork, raceway and wiring, etc., shall be modified as required
18 and put in first class operating condition. No equipment shall be disconnected without approval of the Owner's
19 Representative. Temporary relocation of equipment and temporary piping, ductwork, wiring and raceway, etc.,
20 required for continued operation of the facility shall be provided as required.
21

22
23 **ASBESTOS WARNING**

24
25 Asbestos and asbestos containing materials are often encountered during the process of renovations or in the
26 performance of site work in or in the vicinity of existing structures. Under no circumstances will the Contractor disturb
27 asbestos or asbestos containing material.
28

29 Suspect Materials - Contractor to Notify: It is the Contractor's responsibility to notify the Owner and the A/E
30 immediately should suspect materials be encountered during construction activities. In the event suspect asbestos or
31 asbestos containing materials are encountered, the Contractor shall immediately cease all work in the area and
32 secure the involved area to prevent inadvertent contamination or exposure. The Owner or the Owner's agent will
33 conduct testing of suspect materials and notify the Contractor in writing when work in the affected area may resume.
34

35 Contractor Responsible for Contamination: The Contractor is enjoined to use extreme caution in the performance of
36 construction activities in the vicinity of asbestos or asbestos containing materials. The Contractor shall bear the total
37 and complete expense, including expenses incurred for decontamination, fines, penalties and incidental expense due
38 to loss of use of the facility resulting from any improper work involving asbestos or asbestos containing materials.
39

40
41 **LEAD BASED PAINT WARNING**

42
43 Lead based paint and/or other lead containing materials are often encountered during the process of renovations or
44 in the performance of site work in or in the vicinity of existing structures. The Contractor may be required to work with
45 these materials during the normal course of the construction process.
46

47 OSHA Compliance is Contractor's Responsibility: It is the Contractor's responsibility to comply with all OSHA
48 requirements during the construction process. Specific attention is drawn to OSHA Standard 1926.62, Subpart D,
49 titled "LEAD" (29 CFR 1910) during work with all lead-containing materials.
50
51

1 Testing by Contractor: The Contractor is hereby notified that lead based paint testing may be necessary to comply
2 with OSHA requirements.

3
4 **The determination of the need for testing and the cost associated with such testing as necessary to comply**
5 **with OSHA requirements is a construction activity and shall be provided by the Contactor at no additional**
6 **cost to the Owner.**

7
8 Contractor Responsible for Contamination: The Contractor is enjoined to **use extreme caution** in the performance of
9 construction activities in the vicinity of lead-based paint, lead-containing paint, or lead-containing materials. The
10 Contractor shall bear the total and complete expense, including expenses incurred for decontamination, fines,
11 penalties and incidental expense due to loss of use of the facility resulting from any improper work involving lead or
12 lead containing materials.

13
14
15 **PART 2 - PRODUCTS (Not Used)**

16
17
18 **PART 3 - EXECUTION**

19
20
21 **PERFORMANCE REQUIREMENTS**

22
23 Comply with governing EPA notification regulations before beginning selective demolition.

24
25 Comply with hauling and disposal regulations of authorities having jurisdiction.

26
27
28 **EXAMINATION AND PREPARATION**

29
30 Verify that utilities have been disconnected and capped, valved off, or otherwise secured before starting demolition.

31
32 Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition
33 required.

34
35 When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are
36 encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to the A/E.

37
38 Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent
39 buildings and facilities to remain. As necessary, provide dust barriers, noise control, etc. to minimize impact of
40 demolition on adjacent occupied areas.

41
42 Provide protection to ensure safe passage of people around demolition area and to and from occupied portions of
43 building.

44
45 Provide temporary weather protection, during interval between demolition of existing construction on exterior surfaces
46 and new construction, to prevent water leakage and damage to structure and interior areas.

47
48 Provide heating, cooling, dehumidification, and ventilation as necessary to protect the existing building materials and
49 finishes during the demolition period.

50
51 Where existing plumbing, fire protection, HVAC, or electrical services in demolition areas must be shutdown,
52 temporary plumbing, fire protection, heating, cooling, dehumidification, ventilation, lighting, and electrical power shall
53 be provided as needed to maintain use of adjacent occupied areas that are negatively impacted by the shutdown.

54
55 Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective
56 demolition operations.

57
58 Cover and protect furniture, furnishings, and equipment that have not been removed.
59

1 Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent
2 movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled
3 movement or collapse of construction being demolished.
4

5
6 **MECHANICAL DEMOLITION**
7

8 Remove or relocate all mechanical elements (devices, fixtures, controls, etc.) from walls or floors indicated as being
9 demolished.
10

11 Thermostats and sensors containing mercury shall be disposed in accordance with EPA Resource Conservation and
12 Recovery Act (RCRA). Contractor shall refer to EPA web site for handling procedures for disposal and spill
13 management of projects containing mercury.
14

15 Extend or relocate any existing piping and or ductwork serving existing equipment to remain or other items where
16 such circuits are disrupted due to demolition.

17 Remove all abandoned piping back to the point of supply or back to the point where other remaining piping is
18 connected. For existing piping imbedded existing walls or floors that are not to be demolished, remove piping to
19 behind finish surface, cap, and patch wall or floor as specified hereinafter.
20

21 Existing HVAC systems serving both occupied areas and construction areas shall be modified as required to isolate
22 the construction area. Ducts shall be sealed by closing dampers, disconnecting ducts and sealing openings with 6-
23 mil polyvinyl sheeting, etc.
24

25 HVAC equipment in construction areas that is required to be reused shall be de-energized and protected from
26 construction dust and debris with 6-mil polyvinyl sheeting during construction. HVAC systems that are modified
27 during renovation shall be sealed until modifications are made and then resealed until start-up is required. After
28 unsealing of equipment, coils and drain pans of air-handling equipment shall be cleaned.
29

30 Recover and recycle refrigerants from existing equipment to be demolished. All demolition work of existing systems
31 containing refrigerant must be conducted in accordance with Section 608 of EPA Clean Air Act under supervision of
32 an EPA certified technician. Provide documentation with types, quantities and dates for the engineers and owners
33 record.
34

35 Control or monitoring systems that protect equipment and/or occupants must be maintained until associated
36 equipment is removed.
37

38
39 **ELECTRICAL DEMOLITION**
40

41 Coordinate all electrical outages with the Owner to facilitate reworking of existing system. No service, feeder, or
42 branch circuit may be de-energized unless specific approval has been obtained from the Owner's representative.
43

44 Dispose of Removed Equipment and Material: Materials removed and not indicated by Drawings to be reinstalled,
45 stored, or retained by the Owner, shall be removed from the site in a timely manner at the Contractor's expense.
46

47 The Owner may choose to retain selected items or equipment. The Contractor shall remove and deliver
48 such items and/or equipment to a location on site as requested by the Owner.
49

50 Thoroughly inspect electrical systems in reworked areas and bring to the attention of the A-E all defective or
51 unserviceable material not scheduled for removal or replacement.
52

53 Remove all abandoned wiring, both exposed and concealed.
54

55 Remove all abandoned raceway and any related items, both exposed and concealed. Where existing raceway is
56 concealed in concrete or masonry, remove wiring as required above and abandon in place. Cut abandoned raceway
57 off ½" into wall, ceiling, or floor to allow patching to completely cover cut off end of raceway.
58

59 Repair surfaces and finishes to match existing surrounding surfaces or finish in all areas where items are removed.
60 After repairs are made no evidence of previous use of surfaces shall be visible.

1 Provide touch-up painting as required where new items are installed adjacent to existing items to remain.

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Clean new, damaged, and/or disturbed areas and apply primer, intermediate, and finish coats at each location.

Surface preparation and timing of application of successive coats of paint shall be in accordance with paint manufacturer's instructions.

Use zinc-rich paint to repair damage to galvanized finishes. Follow written instructions of paint manufacturer.

Repair paint finishes for other items, surfaces, or equipment as necessary. Follow written instructions of paint manufacturer.

Provide blank cover plates to match device plates used in the adjoining areas where outlet, device, junction, or other boxes are to remain,

Perform the electrical demolition as described below:

Remove all electrical raceway, cable, wiring, devices, junction boxes, fittings, and related items from all locations indicated on the Drawings as being renovated. Existing raceway, junction boxes, fittings, and similar items may only be reused for the present project where explicitly indicated on the Drawings, provided:

The existing item is in good condition and is suitable for reuse.

The existing items meets the requirements of the Specifications for similar items which might be provided new in other locations on the project. Additional support and/or fire stopping may be required to meet this condition.

The existing item is located in the same position as required in the new configuration as shown on the Drawings.

Extend or relocate all existing circuits and related items serving existing utilization or other equipment where such circuits or items are disrupted due to demolition activities of any division of the Contract Documents. Relocate all existing junction boxes or similar items that will be rendered inaccessible by new construction furnished under any division of the Contract Documents. Provide any and all temporary electrical supply (supplies) as needed to meet this requirement.

Remove all abandoned circuits back to the point of supply or back to the point where other remaining loads are connected. Label any unused overcurrent devices as "SPARE". Circuits supplying equipment which is removed or demolished by any division of the Contract Documents is considered as "abandoned" for purposes of this requirement.

Revise existing panel directories to reflect modifications made as a part of the project. All directory revisions shall be typed.

LIGHT FIXTURE DISPOSAL

Lighting fixtures shall be expected to contain ballasts containing Polychlorinated Biphenyls (PCB's). The Contractor shall dispose of these ballasts by collecting them in metal drums, and shall transport these drums to an approved disposal site. The Contractor's responsibility shall be to properly collect the ballasts and turn them over to a hazmat disposal facility.

1 On all fixtures to be demolished the Contractor shall open the wiring compartments of the lighting fixture and
2 determine if the lighting fixture contains ballast(s) with Polychlorinated Biphenyls (PCB's.) Non PCB-containing
3 ballasts will have printed on their labels "NO PCB's". If the ballast label is missing, illegible, or not explicitly labeled
4 "NO PCBs," the ballast shall be considered to contain PCBs. Ballasts explicitly stating "NO PCBs" shall be disposed
5 of by the Contractor as a part of the normal demolition of material in the project. All other ballasts (missing labels,
6 illegible labels, or those ballasts not explicitly marked "NO PCBs") shall have their wires cut close to the ballasts and
7 be removed from the lighting fixtures.

8
9 In addition, Contractor shall expect that all lamps contain mercury. The Contractor shall dispose of these lamps by
10 collecting them in a manner that keeps the lamps intact and turn them over to a properly permitted light recycler.

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12
13 **END OF SECTION 019916**

SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Plastic-laminate-clad architectural cabinets.
 2. Cabinet hardware and accessories.
 3. Miscellaneous materials.

1.2 ACTION SUBMITTALS

- A. Product Data Submittals: For each product.
- B. Shop Drawings:
1. Include plans, elevations, sections, and attachment details.
- C. Samples for Verification: For the following:
1. Plastic Laminates: 8 by 10 inches, for each type, color, pattern, and surface finish required.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.4 FIELD CONDITIONS

- A. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.
- B. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
- B. Architectural Woodwork Standards Grade: Premium.
- C. Type of Construction: Frameless.
- D. Door and Drawer-Front Style: Flush overlay.
- E. High-Pressure Decorative Laminate: ISO 4586-3, grades as indicated or if not indicated, as required by quality standard.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [Formica Corporation](#).
 - b. [Laminart LLC](#).
 - c. [Wilsonart LLC](#).
- F. Exposed Surfaces:
 - 1. Plastic-Laminate Grade: VGS.
 - 2. Edges: Grade VGS.
 - 3. Pattern Direction: As indicated.
- G. Semiexposed Surfaces:
 - 1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, ISO 4586-3.
 - a. Edges of Plastic-Laminate Shelves: PVC edge banding, 3.0 mm thick, matching laminate in color, pattern, and finish.
 - b. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, ISO 4586-3, grade to match exposed surface.
 - 2. Drawer Sides and Backs: Thermally fused laminate panels with PVC or polyester edge banding.
 - 3. Drawer Bottoms: Thermally fused laminate panels.
- H. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, ISO 4583-3, grade to match exposed surface.
- I. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.
- J. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 1. As indicated on the finish schedule.

2.2 CABINET HARDWARE AND ACCESSORIES

- A. Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, B01602, [100] [135] [170] degrees of opening[, self-closing].
- B. Wire Pulls: Back mounted, solid metal, 5 inches long, 2-1/2 inches deep, and 5/16 inch in diameter.
- C. Catches: Magnetic catches, ANSI/BHMA A156.9, B03141.
- D. Adjustable Shelf Standards and Supports: ANSI/BHMA A156.9, B04071; with shelf rests, B04081.
- E. Shelf Rests: ANSI/BHMA A156.9, B04013; metal.
- F. Drawer Slides: ANSI/BHMA A156.9.
 1. Standard Duty (Grade 1 and Grade 2): Side mount.
 2. General-purpose drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide 75 lb load capacity.
- G. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.
- H. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.
 1. Satin Stainless Steel: ANSI/BHMA 630.
- I. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.

2.3 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesive for Bonding Plastic Laminate: Type II water-resistant type as selected by fabricator to comply with requirements.
 1. Adhesive for Bonding Edges: Hot-melt adhesive.

2.4 FABRICATION

- A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.
- B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

- A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 064116

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Nonstaining silicone joint sealants.

1.2 ACTION SUBMITTALS

- A. Product Data:
1. Nonstaining silicone joint sealants.

1.3 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain joint sealants from single manufacturer for each sealant type.

2.2 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested in accordance with ASTM C1248.
- B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Adfast.
 - b. [Pecora Corporation](#).
 - c. Sika Corporation - Building Components.
 - d. [Tremco Incorporated](#).

2.4 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Adfast.
 - b. [Alcot Plastics Ltd.](#)
 - c. [Construction Foam Products; a division of Nomaco, Inc.](#)
 - d. [Master Builders Solutions; brand of MBCC Group](#).
- B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
- B. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Silvered flat glass mirrors.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Mirrors: Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.
- B. Shop Drawings: Include mirror elevations, edge details, and attachment details.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Protect mirrors in accordance with mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.4 FIELD CONDITIONS

- A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.
- B. Source Limitations for Mirror Accessories: Obtain mirror-glazing accessories from single source.

2.2 SILVERED FLAT GLASS MIRRORS

- A. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. [Avalon Glass and Mirror Company.](#)
 2. [Binswanger Glass Company, Inc.; a division of Vitro Architectural Glass.](#)
 3. [D & W Incorporated.](#)
 4. [Donisi Mirror Company.](#)
 5. Dreamwalls by Gardner Glass Products.
 6. [Dulles Glass & Mirror.](#)
 7. [Gardner Glass, Inc.](#)
 8. [Gilded Mirrors, Inc.](#)
 9. [Glasswerks LA, Inc.](#)
 10. [Guardian Glass LLC.](#)
 11. [Head West.](#)
 12. [Independent Mirror Industries, Inc.](#)
 13. [Lenoir Mirror Company.](#)
 14. [National Glass Industries, Inc.](#)
 15. [Stroupe Mirror Co., Inc.](#)
 16. [Sunshine Mirror.](#)
 17. [Trulite Glass & Aluminum Solutions, LLC.](#)
 18. [Virginia Mirror Company, Inc.](#)
 19. [Walker Glass Co., Ltd.](#)
- B. Mirrors, General: ASTM C1503.
- C. Tempered Glass Mirrors: Mirror Glazing Quality for blemish requirements and complying with ASTM C1048 for Kind FT, Condition A, tempered float glass before silver coating is applied; clear.
1. Nominal Thickness: 6.0 mm.
- D. Safety Glazing Products: For tempered mirrors, provide products that comply with 16 CFR 1201, Category II.

2.3 MISCELLANEOUS MATERIALS

- A. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- B. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.
1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [C.R. Laurence Co., Inc.; CRH Americas, Inc.](#)

- b. [Franklin International.](#)
- c. [Liquid Nails; PPG Industries, Inc.](#)
- d. [OSI Sealants; Henkel Corporation.](#)
- e. [Palmer Products Corporation.](#)
- f. [Pecora Corporation.](#)
- g. [Royal Adhesives & Sealants; H.B. Fuller Company.](#)
- h. [Sommer & Maca Industries, Inc.](#)

- C. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.4 FABRICATION

- A. Shop fabricate mirrors to greatest extent possible.
- B. Mirror Edge Treatment: Flat polished.
 - 1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
- B. Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.
- C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced National Glass Association (NGA) publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

1. NGA Publications: "Laminated Glazing Reference Manual," "Glazing Manual" and "Installation Techniques Designed to Prolong the Life of Flat Glass Mirrors."
- B. Install mirrors with mastic.
 1. Install mastic as follows:
 - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.

3.4 CLEANING AND PROTECTION

- A. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B. Do not permit edges of mirrors to be exposed to standing water.
- C. Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- D. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer and NGA's publication "Proper Procedures for Cleaning Flat Glass Mirrors."

END OF SECTION 088300

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing systems.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Framing systems.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Notify manufacturer of damaged materials received prior to installation.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing."

PART 2 - PRODUCTS

2.1 FRAMING SYSTEMS

- A. Framing Members, General: Comply with AISI S220 and ASTM C645, Section 10 for conditions indicated.
1. Steel Sheet Components: Comply with AISI S220 and ASTM C645, Section 10 requirements for metal unless otherwise indicated
 2. Protective Coating: Comply with AISI S220; ASTM A653/A653M, G40; or coating with equivalent corrosion resistance. Galvannealed products are unacceptable.
 - a. Coating demonstrates equivalent corrosion resistance with an evaluation report acceptable to authorities having jurisdiction.
- B. Studs and Track: AISI S220 and ASTM C645, Section 10.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ClarkDietrich.
 - b. MBA Building Supplies.
 - c. MRI Steel Framing, LLC.
 - d. Phillips Manufacturing Co.
 - e. SCAFCO Steel Stud Company; Stone Group of Companies.
 2. Minimum Base-Steel Thickness: As indicated on Drawings.
 3. Depth: As indicated on Drawings.
- C. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-steel thickness, with minimum 1/2-inch-wide flanges.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ClarkDietrich.
 - b. MBA Building Supplies.
 - c. MRI Steel Framing, LLC.
 - d. Marino\WARE.
 - e. SCAFCO Steel Stud Company; Stone Group of Companies.
 - f. Steel Construction Systems; Stone Group of Companies.
 2. Depth: 1-1/2 inches.
 3. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.

2.2 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.3 INSTALLATION OF FRAMING SYSTEMS

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Install studs so flanges within framing system point in same direction.
- C. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
- D. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.4 FIELD QUALITY CONTROL

- A. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Gypsum board, Type X.
2. Gypsum ceiling board.
3. Interior trim.
4. Joint treatment materials.
5. Acoustical sealant.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain each type of gypsum panel and joint finishing material from single source with resources to provide products of consistent quality in appearance and physical properties.

2.2 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. CertainTeed; SAINT-GOBAIN.
 - c. Georgia-Pacific Gypsum LLC.
 - d. Gold Bond Building Products, LLC provided by National Gypsum Company.
 - e. USG Corporation.
2. Thickness: 5/8 inch.

- B. Gypsum Ceiling Board: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. American Gypsum.
 - b. CertainTeed; SAINT-GOBAIN.
 - c. Georgia-Pacific Gypsum LLC.
 - d. Gold Bond Building Products, LLC provided by National Gypsum Company.
2. Thickness: 1/2 inch.
3. Long Edges: Tapered.

2.3 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.

2.4 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

2.5 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
 - 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- C. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A. Comply with ASTM C840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- G. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Type X: Vertical surfaces unless otherwise indicated.
 - 2. Ceiling Type: Ceiling surfaces.
- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.4 INSTALLATION OF TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints in accordance with ASTM C840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners.
 - 2. Bullnose Bead: Use at outside corners.

3.5 FINISHING OF GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and in accordance with ASTM C840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

3.6 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Porcelain tile.
 2. Setting material.
 3. Grout materials.

1.2 ACTION SUBMITTALS

- A. Product Data:
1. Porcelain tile.
 2. Setting material.
 3. Grout materials.
- B. Samples for Verification:
1. Full-size units of each type and composition of tile and for each color and finish required.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.4 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in "Referenced Standards" Article in the Evaluations and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Tile: Obtain tile of each type from single source or producer.
 - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

2.3 PORCELAIN TILE

- A. Porcelain Tile Type: See Finish Schedule .
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide one of the three product options indicated on Drawings.
 - 2. Face Size: As indicated on drawings.
 - 3. Tile Color, Glaze, and Pattern: As indicated on drawings.
 - 4. Grout Color: As selected by Architect from manufacturer's full range.

2.4 SETTING MATERIALS

- A. Standard Dry-Set Mortar (Thinset): ANSI A118.1.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Laticrete International, Inc.
 - b. MAPEI Corporation.
 - c. Parex USA, Inc.
 - 2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to other requirements in ANSI A118.1.

2.5 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. Standard Cement Grout: ANSI A118.6.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [Laticrete International, Inc.](#)
 - b. [MAPEI Corporation.](#)
 - c. Parex USA, Inc.

2.6 MISCELLANEOUS MATERIALS

- A. Vapor-Retarder Membrane: Polyethylene sheeting, ASTM D4397, 4.0 mils thick.
- B. Metal Flooring Transitions: Profile designed specifically for flooring applications; height to match tile and setting-bed thickness.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Blanke Corporation.
 - b. Dural USA, Inc.
 - c. Schluter Systems L.P.
- C. Metal Edge Trim: Profile designed for wall terminations and edge protection.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Blanke Corporation.
 - b. Dural USA, Inc.
 - c. Schluter Systems L.P.
- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- E. Grout Sealer: Grout manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove coatings, including curing compounds or other coatings, that are incompatible with tile-setting materials.
- B. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- D. Substrate Flatness:
1. For tile shorter than 15 inches, confirm that structure or substrate is limited to variation of 1/4 inch in 10 ft. from the required plane, and no more than 1/16 inch in 12 inches when measured from tile surface high points.
 2. For large format tile, tile with at least one edge 15 inches or longer, confirm that structure or substrate is limited to 1/8 inch in 10 ft. from the required plane, and no more than 1/16 inch in 24 inches when measured from tile surface high points.

3.3 INSTALLATION OF CERAMIC TILE SYSTEM

- A. Mix mortars and grouts to comply with "Referenced Standards" Article in the Evaluations and mortar and grout manufacturers' written instructions.
 - 1. Add materials, water, and additives in accurate proportions.
 - 2. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.
- B. Install tile in accordance with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of ANSI A108 series that are referenced in TCNA installation methods and specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors consisting of tiles 8 by 8 inches or larger.
 - b. Tile floors consisting of rib-backed tiles.
 - 2. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
 - 3. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
 - 4. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
 - 5. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
 - 6. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - a. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - b. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- C. Movement Joints: Provide movement joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated on Drawings. Form joints during installation of setting materials, mortar beds, and tile. Keep joints free of dirt, debris, and setting materials prior to filling with sealants. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- D. Metal Flooring Transitions: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

- E. Metal Wall Trim: Install at locations indicated on Drawings.
- F. Grout Sealer: Apply grout sealer to grout joints in accordance with manufacturer's written instructions. As soon as sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile in accordance with tile and grout manufacturer's written instructions. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.5 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

END OF SECTION 093013

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Acoustical panels.
 2. Metal suspension system.

1.2 ACTION SUBMITTALS

- A. Product Data:
1. Acoustical panels.
 2. Metal suspension system.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Source Limitations for Ceiling System: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A in accordance with ASTM E1264.
 - 2. Smoke-Developed Index: 50 or less.

2.3 ACOUSTICAL PANELS

- A. **Basis-of-Design Product:** Subject to compliance with requirements, provide product indicated on Drawings or comparable product.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels in accordance with ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Classification: Provide panels as follows:
 - 1. Type and Form, Type IV Form 2: Mineral base with membrane-faced overlay; Form 2.
 - 2. Pattern: E (lightly textured).
- D. Color: White.
- E. Light Reflectance (LR): Not less than 0.87.
- F. Ceiling Attenuation Class (CAC): Not less than 35.
- G. Noise Reduction Coefficient (NRC): Not less than 0.80.
- H. Articulation Class (AC): Not less than 170.
- I. Edge/Joint Detail: Beveled Tegalur.
- J. Thickness:
 - 1. 7/8 inch.
- K. Modular Size: 24 by 24 inches.
- L. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested in accordance with ASTM D3273, ASTM D3274, or ASTM G21 and evaluated in accordance with ASTM D3274 or ASTM G21.

2.4 METAL SUSPENSION SYSTEM

- A. **Basis-of-Design Product:** Subject to compliance with requirements, provide product indicated on Drawings or comparable product.

- B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories in accordance with ASTM C635/C635M and designated by type, structural classification, and finish indicated.
- C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
 - 1. Structural Classification: Intermediate-duty system.
 - 2. End Condition of Cross Runners: butt-edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Cold-rolled steel.
 - 5. Cap Finish: Painted white.

2.5 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
 - 1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing in accordance with ASTM E1190, conducted by a qualified testing and inspecting agency.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
 - 2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch- diameter wire.

2.6 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION OF ACOUSTICAL PANEL CEILINGS

- A. Install acoustical panel ceilings in accordance with ASTM C636/C636M and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 - 6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 - 7. Do not attach hangers to steel deck tabs.
 - 8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 9. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 - 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
 1. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 2. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 099124 - INTERIOR PAINTING (MPI STANDARDS)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on interior substrates.

1.2 ACTION SUBMITTALS

- 1. Submit Labeled Samples on rigid backing, 8 inches square.
- B. Product List: Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.4 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. Behr Paint Company; Behr Process Corporation.
 - 2. Benjamin Moore & Co.
 - 3. Pratt & Lambert; a subsidiary of The Sherwin-Williams Company.
 - 4. Valspar; a brand of The Sherwin-Williams Company.
 - 5. Sherwin-Williams Company (The).

- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Interior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
- B. Colors: As indicated in a color schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- C. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

3.3 INSTALLATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

- A. Gypsum Board Substrates:
 - 1. Institutional Low-Odor/VOC Latex System, MPI INT 9.2M:
 - a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 3), MPI #145.

END OF SECTION 099124

SECTION 102113.19 - PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-plastic toilet compartments.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Solid-plastic toilet compartments:

- a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachment details.
2. Show locations of centerlines of toilet fixtures.

C. Samples for Verification: Actual sample of finished products for each type of toilet compartment, hardware, and accessory.

1. Size: Manufacturer's standard size.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For toilet compartments.

1.4 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements, and coordinate before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire Performance: Tested in accordance with, and pass the acceptance criteria of, NFPA 286.

- B. Structural Performance: Where grab bars are mounted on toilet compartments, design panels to comply with the following requirements:
 - 1. Panels are able to withstand a concentrated load on grab bar of at least 250 lbf applied at any direction and at any point, without deformation of panel.
- C. Regulatory Requirements: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1 for toilet compartments designated as accessible.

2.2 SOLID-PLASTIC TOILET COMPARTMENTS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide one of the three products indicated on Drawings.
- B. Toilet-Enclosure Style: Overhead braced. Measurement from floor to partitions and standard doors shall be 6" and 9" at accessible stall doors.
- C. Urinal-Screen Style: Wall hung.
- D. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) material, not less than 1 inch thick, seamless, with eased edges, and with homogenous color throughout thickness of material.
 - 1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
 - 2. Heat-Sink Strip: Manufacturer's continuous, extruded-aluminum or stainless steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
 - 3. Color: One color in each room as indicated on the drawing schedule.
- E. Urinal-Screen Construction: Matching panel construction.
- F. Pilaster Shoes: Manufacturer's standard design; solid plastic or stainless steel.
 - 1. Plastic Color: Matching pilaster.
- G. Pilaster Sleeves (Caps): Manufacturer's standard design; solid plastic or stainless steel.
 - 1. Plastic Color: Matching pilaster.
- H. Brackets (Fittings):
 - 1. Full-Height (Continuous) Type: Manufacturer's standard design; extruded aluminum.

2.3 HARDWARE AND ACCESSORIES

- A. Door Hardware and Accessories: Manufacturer's operating hardware and accessories.
 - 1. Hinges:

- a. Manufacturer's integral hinge for solid-plastic doors, allowing emergency access by lifting door.
 - 1) Material, Integral Hinge: Nylon gravity cam unit with stainless steel pins/screws.
 2. Latch and Keeper: Manufacturer's surface-mounted latch unit, designed for emergency access, and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at toilet enclosures designated as accessible.
 - a. Material: Manufacturer's standard with occupancy indicators.
 3. Coat Hook: Manufacturer's combination hook and rubber-tipped bumper, sized to prevent inswinging door from hitting compartment-mounted accessories.
 - a. Material: Manufacturer's standard.
 4. Door Bumper: Manufacturer's rubber-tipped bumper at outswinging doors.
 - a. Material: Manufacturer's standard.
 5. Door Pull: Manufacturer's unit at outswinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at toilet enclosures designated as accessible.
 - a. Material: Manufacturer's standard.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.4 FABRICATION

- A. Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide, inswinging doors for standard toilet enclosures and 36-inch-wide, outswinging doors with a minimum 32-inch-wide, clear opening for toilet enclosures designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
 - 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 - 1. Maximum Clearances:
 - a. Pilasters and Panels or Screens: 1/2 inch.
 - b. Panels or Screens and Walls: 1 inch.
 - 2. Full-Height (Continuous) Brackets: Secure panels or screens to walls and to pilasters with full-height brackets.
 - a. Locate bracket fasteners, so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels and adjust, so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware in accordance with hardware manufacturer's written instructions for proper operation. Set hinges on inswinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors to return doors to fully closed position.

END OF SECTION 102113.19

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Public-use washroom accessories.
- B. Related Requirements:
 - 1. Section 088300 "Mirrors" for frameless mirrors.

1.2 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.3 ACTION SUBMITTALS

- A. Product Data Submittals: For each product.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design accessories and fasteners to comply with the following requirements:

1. Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

- A. Source Limitations: Obtain each type of public-use washroom accessory from single source from single manufacturer.

- B. Toilet Tissue (Roll) Dispenser:

1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. [ASI-American Specialties, Inc.](#)
- b. [Bobrick Washroom Equipment, Inc.](#)
- c. [Bradley Corporation.](#)

2. Description: Double-roll dispenser.
3. Mounting: Surface mounted.
4. Operation: Noncontrol delivery with standard spindle.
5. Capacity: Designed for 4-1/2- or 5-inch- diameter tissue rolls.
6. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

- C. Paper Towel Dispenser:

1. **Basis-of-Design Product:** Subject to compliance with requirements, provide Tork Elevation PeakServe Hand Towel dispenser or comparable product by one of the following:

- a. [ASI-American Specialties, Inc.](#)
- b. [Bobrick Washroom Equipment, Inc.](#)
- c. [Bradley Corporation.](#)

2. Mounting: Surface mounted.

- D. Waste Receptacle:

1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. [ASI-American Specialties, Inc.](#)
- b. [Bobrick Washroom Equipment, Inc.](#)
- c. [Bradley Corporation.](#)

2. Mounting: Semirecessed.
3. Minimum Capacity: 12 gallon.
4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
5. Liner: Reusable vinyl liner.

6. Lockset: Tumbler type for waste receptacle.
- E. Automatic Soap Dispenser: See Plumbing drawings and specifications.
- F. Grab Bar:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 2. Mounting: Flanges with concealed fasteners.
 3. Material: Stainless steel, 0.05 inch thick.
 - a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin).
 4. OD: 1-1/4 inches.
 5. Configuration and Length: As indicated on Drawings.
- G. Sanitary-Napkin Disposal Unit:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 2. Mounting: Surface mounted.
 3. Door or Cover: Self-closing, disposal-opening cover.
 4. Receptacle: Removable.
 5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
- H. Seat-Cover Dispenser:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 2. Mounting: Surface mounted.
 3. Minimum Capacity: 250 seat covers.
 4. Exposed Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
 5. Lockset: Tumbler type.

2.3 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories in accordance with manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
 - 1. Remove temporary labels and protective coatings.
- B. Grab Bars: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Clean and polish exposed surfaces in accordance with manufacturer's written instructions.

END OF SECTION 102800

SECTION 123661.16 - SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid surface material countertops.
2. Solid surface material backsplashes.
3. Solid surface material end splashes.

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

1. Show locations and details of joints.
2. Show direction of directional pattern, if any.

C. Samples for Verification: For the following products:

1. Countertop material, 6 inches square.

1.3 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements before countertop fabrication is complete.

1.4 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

A. Solid Surface Material: Homogeneous-filled plastic resin complying with ISFA 2-01.

1. **Basis-of-Design Product:** Subject to compliance with requirements, provide one of the three products indicated on Drawings.
2. Type: Provide Standard type unless Special Purpose type is indicated.

3. Colors and Patterns: As indicated on drawings.

2.2 FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
 1. Grade: Premium.
- B. Configuration:
 1. Front: Straight, slightly eased at top with apron as configured in the drawings.
 2. Backsplash: Straight, slightly eased at corner.
 3. End Splash: Matching backsplash.
- C. Countertops:

Retain one of two subparagraphs below and revise to suit Project. Availability of 3/4-inch- (19-mm-) thick, solid surface material is limited.

1. 3/4-inch- thick, solid surface material with front edge built up with same material.
- D. Backsplashes: 3/4-inch- thick, solid surface material.
 - E. Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
 - F. Joints:
 1. Fabricate countertops without joints.
 - G. Cutouts and Holes:
 1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
 - a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.
 2. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

2.3 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.
- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

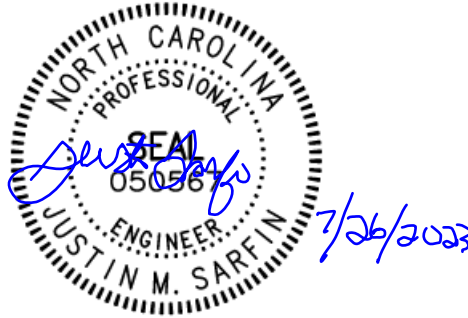
- A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.
- B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- C. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- D. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.
- E. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- F. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.16

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SECTION 210210 – FIRE SUPPRESSION SUMMARY OF WORK

Engineer of Record for fire suppression work is Justin M. Sarfin, PE, Salas O'Brien, 1620 Midtown Place (27609), P. O. Box 19944, Raleigh, NC 27619. Fire suppression work shall be defined by drawings numbered with the prefix "FP", the general provisions of the Contract including General Conditions and Supplementary Conditions, Division 1 Specifications sections, and Division 21 Technical Specifications listed below. In addition, fire suppression work may be defined by reference to other documents from any of the above-named sources as well as by project addenda.



DIVISION 21 - FIRE SUPPRESSION

Section	Title
210210	Fire Suppression Summary of Work
210510	Fire Suppression Basic Requirements
210517	Sleeves and Sleeve Seals for Fire Suppression Piping
210521	Fire Suppression Piping Specialties
210529	Fire Suppression Piping Hangers and Supports
210553	Fire Suppression Painting and Identification
211000	Sprinkler and Standpipe Fire Suppression Systems

23
24
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END OF SECTION 210210

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SECTION 210510 – FIRE SUPPRESSION BASIC REQUIREMENTS

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

The requirements specified herein shall govern all Sections in Division 21, whether stated therein or not.

Where items specified in the various sections of this Division conflict with requirements of this Section, the former shall govern.

SUBMITTALS

Specific submittal requirements are defined in each section of this Division.

Welders' and Brazers' Qualifications: Operators who are to do the welding and/or brazing must be properly qualified to do satisfactory work. **Proof of an operator's qualifications shall be either the Contractor's record of suitable tests passed within the preceding six months while in the employ of the Contractor, or tests made before the start of work.** Submit qualification data for each operator prior to their starting work. Any workman considered by the A-E as not having the skill necessary for the work shall be required to pass an appropriate qualification test or shall be at once barred from further welding and/or brazing on the project.

EQUIPMENT SELECTION

The pump heads scheduled are for estimating purposes and are based on the individual equipment losses as scheduled. If the Contractor proposes using equipment, including control valves, that will increase the pump heads and/or fan static pressures, any required pump or fan changes, along with associated power wiring changes, shall be at the Contractor's expense.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END SECTION 210510

1 **SECTION 210517 - SLEEVES AND SLEEVE SEALS FOR FIRE SUPPRESSION PIPING**

2
3 **PART 1 - GENERAL**

4
5
6 **RELATED DOCUMENTS**

7
8 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01
9 Specification Sections, apply to this Section.

10
11
12 **SUBMITTALS**

13
14 General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of
15 this specification. Where a submitted item does not **comply fully** with each and every requirement of the Specifica-
16 tions, the submittal shall clearly indicate such deviations. Identification requirements for non-complying features of
17 items are very specific. See Section 019913 for exact requirements.

18
19 Manufacturer's Data: Submit manufacturer's technical product data, including installation instructions for each type of
20 sleeve and sleeve seal product. Submit expansion compensation schedule showing Manufacturer's figure number,
21 size, location, and features for each required expansion compensation product.

22
23 **PART 2 - PRODUCTS**

24
25
26
27 **SLEEVES**

28
29 Cast-Iron Pipe: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends
30 and integral waterstop unless otherwise indicated.

31
32 Galvanized-Steel Pipe: ASTM A 53, Schedule 40, with plain ends and welded steel collar; zinc coated.

33
34 Galvanized Sheet Metal: Factory-fabricated of G90 galvanized sheet metal with lock-type longitudinal seam, mini-
35 mum 18 ga.

36
37
38 **SLEEVE-SEAL SYSTEMS**

39
40 Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and
41 sleeve.

42
43 Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required
44 for pipe material and size of pipe.

45
46 Pressure Plates: Stainless steel.

47
48 Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

49
50
51 **GROUT**

52
53 Standard: ASTM C 1107, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

54
55 Characteristics: Nonshrink; recommended for interior and exterior applications.

56
57 Design Mix: 5000-psi, 28-day compressive strength.

58
59 Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

SLEEVE AND SLEEVE-SEAL APPLICATIONS

Use sleeves and sleeve seals for the following piping-penetration applications:

Penetration Application	Sleeve Type	Sleeve-Seal Required
Exterior walls above grade	Cast Iron	Yes
Exterior walls below grade	Cast Iron	Yes
Concrete slab on grade	Cast Iron	Yes
Concrete slab above grade	Galvanized Steel Pipe	No
Interior partitions	Galvanized Steel Pipe or Galvanized Sheet Metal Sleeve	No

SLEEVE INSTALLATION

Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

Sleeves are not required for core-drilled holes. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

Cut sleeves to length for mounting flush with both surfaces.

Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.

Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

Install sleeves for pipes passing through interior partitions. Cut sleeves to length for mounting flush with both surfaces and install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.

For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.

Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 019913.

SLEEVE SEAL SYSTEM INSTALLATION

Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.

Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

1 **SLEEVE-SEAL-FITTING INSTALLATION**

2

3 Install sleeve-seal fittings in new walls and slabs as they are constructed.

4

5 Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop
6 flange to be centered in concrete slab or wall.

7

8 Secure nailing flanges to concrete forms.

9

10 Using grout, seal the space around outside of sleeve-seal fittings.

11

12

13 **END OF SECTION 210517**

1 **SECTION 210521 – FIRE SUPPRESSION PIPING SPECIALTIES**

2
3 **PART 1 - GENERAL**

4
5
6 **RELATED DOCUMENTS**

7
8 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1
9 Specification sections, apply to work of this section.

10
11
12 **SUBMITTALS**

13
14 General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of
15 this specification. Where a submitted item does not **comply fully** with each and every requirement of the
16 Specifications, the submittal shall clearly indicate such deviations. Identification requirements for non-complying
17 features of items are very specific. See Section 019913 for exact requirements.

18
19 Manufacturer's Data: Submit manufacturer's technical product data, including installation instructions, and
20 dimensioned drawings for each type of manufactured piping specialty.

21
22 **PART 2 - PRODUCTS**

23
24 **PIPE ESCUTCHEONS AND FLOOR PLATES**

25
26
27
28 Escutcheons: Provide pipe escutcheons with polished chrome finish as specified herein with inside diameter closely
29 fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated. Select outside diameter of
30 escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any.

31
32 Pipe Escutcheons for Moist Areas: For waterproof floors and in areas where water and condensation can
33 be expected to accumulate, provide brass escutcheons, one piece type with setscrew or split casting type
34 with concealed hinge and setscrew.

35
36 Pipe Escutcheons for Dry Areas: Provide stamped steel escutcheons, one piece type with spring clip
37 fasteners or split, hinged type with spring clip fasteners.

38
39 Floor Plates: Provide floor plates as specified herein with inside diameter closely fitting pipe outside diameter, or
40 outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe
41 penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any. Floor plates shall be one-piece type for
42 new piping and split-casing type for existing piping.

43
44 **DIELECTRIC FITTINGS**

45
46
47 Dielectric Unions: Steel female pipe thread and copper solder joint ends conforming to dimensional, strength, and
48 pressure requirements of ASME B 16.39, Class 1. Steel parts shall be galvanized or plated. Union shall have a
49 water-impervious insulation barrier capable of limiting galvanic current to one percent of the short-circuit current in a
50 corresponding bimetallic joint. When dry, it shall also be able to withstand a 600-volt breakdown test.

51
52 Dielectric Flanges: Factory-fabricated companion-flange assembly rated for 150 psig or 300-psig as required by
53 system operating pressure. Include flanges, full-face or ring-type neoprene or phenolic gasket, phenolic or
54 polyethylene bold sleeves, phenolic washers, and steel bolts, backing washers, and nuts.

PART 3 - EXECUTION

INSTALLATION OF PIPING SPECIALTIES

Pipe Escutcheons and Floor Plates:

Install pipe escutcheons on each pipe penetration through floors, walls, partitions, and ceilings where penetration is exposed to view, and on exterior of building. Secure escutcheon to pipe or insulation so escutcheon covers penetration hole, and is flush with adjoining surface.

Install floor plates on each pipe penetration through floors in unfinished areas, service and equipment areas, etc.

Dielectric Unions: Install at each piping joint between ferrous and non-ferrous piping. Comply with manufacturer's installation instructions.

ADJUSTING AND CLEANING

Adjust faces of meters and gages to proper angle for best visibility.

Clean windows of meters and gages and factory-finished surfaces. Replace cracked or broken windows, repair any scratched or marred surfaces with manufacturer's touch-up paint.

END OF SECTION 210521

1 **SECTION 210529 – FIRE SUPPRESSION PIPING HANGERS AND SUPPORTS**

2
3 **PART 1 - GENERAL**

4
5
6 **RELATED DOCUMENTS**

7
8 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1
9 Specification sections, apply to work of this section.

10
11
12 **QUALITY ASSURANCE**

13
14 Testing Laboratory and FM Compliance: Provide products that are UL Listed or FM approved where required.

15
16 Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry, Inc. Standard Compliance: Comply
17 with MSS SP-58 "Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and
18 Installation" for pipe hangers and supports.

19
20 NFPA Compliance: Comply with the requirements of the following, as applicable:

21
22 NFPA 13, *Chapter 9 – Hanging, Bracing and Restraint of System Piping*

23
24
25 **SUBMITTALS**

26
27 General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of
28 this specification. Where a submitted item does not **comply fully** with each and every requirement of the
29 Specifications, the submittal shall clearly indicate such deviations. Identification requirements for non-complying
30 features of items are very specific. See Section 019913 for exact requirements.

31
32 Manufacturer's Data: Submit manufacturer's technical product data, including installation instructions for each type of
33 support and anchor. Provide spacing chart meeting NFPA 13 requirements

34
35
36 **PART 2 - PRODUCTS**

37
38
39 **GENERAL**

40
41 Hangers and supports for fire suppression piping and equipment shall withstand five times the weight of the weight of
42 the water filled pipe plus 250 lb at each point of piping support stresses within limits and under conditions indicated
43 according to ASCE/SEI 7.

44
45 Design supports for multiple pipes, including floor stands, to be capable of supporting combined weight of
46 supported systems and system contents.

47
48 Design equipment supports capable of supporting combined operating weight of supported equipment and
49 connected systems and components.

50
51 Structural support elements shall be fabricated from standard structural shapes complying with ASTM A 36 and/or
52 from preformed channel struts.

53
54 Preformed channel struts shall be sized to meet section moduli requirements of NFPA 13. Strut shall be made from
55 steel meeting the minimum mechanical properties of ASTM A653 SS, Grade 33, G90 galvanized. Fittings shall be
56 manufactured from steel meeting the minimum requirements of ASTM A907 SS, Grade 33. All fittings and hardware
57 shall be zinc plated in accordance with ASTM B633, SC3 for fittings and SC1 for threaded hardware. Channel
58 members shall be "Unistrut", Allied Support Systems "Power Strut", or Cooper B-Line Systems, Inc. "Strut System",
59 specifically sized in accordance with the criteria hereinbefore specified.

1 Building attachments for hangers and supports shall be as indicated on the Drawings. Where attachments are not
2 indicated, they shall be as follows:
3

Attachment To	Attachment Method(s)
Concrete	Bolt to channel-type concrete inserts or utilize expansion anchors. Size concrete housekeeping pads so expansion anchors will be a minimum of 10 bolt diameters from the edge of the concrete base. Drill at locations and to depths that avoid reinforcing bars.
Solid Concrete Masonry Unit Walls	Use expansion anchors.
Hollow Walls	Bolt to slotted steel channels fastened to wall with expansion anchors.
Wood Structural Members	Install bolts through members.
Steel	Bolt hangers to MSS Type 19, 21, or 23 clamps on flanges of beams or on upper truss chords of bar joists. To avoid stressing building steel structural elements, provide additional steel support members that span at least two beams or bar joists as required or as shown on the Drawings. Attach additional steel support members via welding in accordance with AWS standards.

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HORIZONTAL PIPING HANGERS AND SUPPORTS

Except as otherwise indicated, provide factory-fabricated adjustable steel clevis or swirl ring hangers complying with MSS SP-58, Type 1. Select size of hangers and supports to exactly fit pipe size for bare piping.

For exterior and wet/damp locations, hangers and rods are to be hot dipped galvanized.

Outdoors: Hangers and struts located outdoors shall be hot dip galvanized after fabrication in accordance with ASTM A123. All hanger hardware shall be hot dip galvanized or stainless steel. Zinc plated hardware is not acceptable for outdoor or corrosive use.

Corrosive Area Finishes: Hangers and struts located in corrosive areas shall be type 304 stainless steel with stainless steel hardware.

VERTICAL PIPING CLAMPS

Provide factory-fabricated riser clamps complying with MSS Type 8 to support vertical piping systems. Select size of vertical piping clamps to exactly fit pipe size of bare pipe.

PART 3 - INSTALLATION

Install piping supports with maximum spacing and all-thread hanger rods sized in accordance with NFPA 13.

END OF SECTION 210529

1 **SECTION 210553 – FIRE SUPPRESSION PAINTING AND IDENTIFICATION**

2
3 **PART 1 - GENERAL**

4
5
6 **RELATED DOCUMENTS**

7
8 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1
9 Specification sections, apply to work of this section.

10
11
12 **SUBMITTALS**

13
14 General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of
15 this specification. Where a submitted item does not **comply fully** with each and every requirement of the
16 Specifications, the submittal shall clearly indicate such deviations. Identification requirements for non-complying
17 features of items are very specific. See Section 019913 for exact requirements.

18
19 Manufacturer's Data: Submit manufacturer's technical product data and installation instructions.

20
21
22 **PART 2 - PRODUCTS**

23
24
25 **PAINT FOR FERROUS SURFACES**

26
27 Primer: 1 coat of fast drying, low VOC acrylic modified medium oil alkyd universal primer

28
29 Finish Paint: 2 coats of fast drying, low VOC alkyd gloss enamel

30
31
32 **PLASTIC LABELS FOR EQUIPMENT**

33
34 General: Provide engraving stock melamine plastic laminate, complying with FS L-P-387, minimum 2-1/2" X 3/4",
35 1/16" thick, engraved with engraver's standard letter style of black with white letter color, minimum 1/4" high, and
36 punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

37
38 Fasteners: Self-tapping stainless steel screws.

39
40 Content for Equipment: Equipment's designation as show on Drawings or Owner's unique equipment number and
41 additional information required by other Sections of Division 21. Contractor shall determine requirements prior to
42 fabricating labels.

43
44
45 **PIPE LABELS**

46
47 Snap-On Type: Provide manufacturer's standard pre-printed, semi-rigid snap-on, color-coded pipe markers,
48 complying with ANSI A13.1, except as hereinafter specified. Provide full-band pipe markers, extending 360 degrees
49 around pipe at each location that attach without fasteners or adhesives.

50
51 Content: Provide minimum 1-1/4" high lettering to identify piping service using the same designations and
52 abbreviations used on the Drawings. Include arrow indicating flow direction(s). Steam lines shall indicate pressure.

PART 3 - EXECUTION

PAINTING

Equipment specified in other sections of Division 21 to be provided with factory-applied finish painting shall not be field-painted. All finish painted equipment shall be touched up where factory paint is chipped, scratched, or otherwise damaged.

All equipment not factory finish painted shall be furnished in prime coat. All prime coated equipment shall be touched up where prime coats are chipped, scratched, or otherwise damaged. All prime coated equipment shall be thoroughly cleaned and left ready for finish painting.

All welds on piping shall be painted with one coat of primer. Miscellaneous black steel items such as hangers and rods, machinery supports, breechings and stacks, etc., that are not shop primed, shall be field painted with one coat of primer. All metal surfaces shall be thoroughly cleaned of rust and dirt and shall be degreased before application of primer.

Equipment and steel piping located in mechanical equipment rooms and spaces where equipment and piping is exposed to view shall be finish painted as specified above. **DO NOT PAINT CPVC PIPING.** Where indicated or specified, existing equipment, piping, etc., shall be cleaned and painted along with new work.

Exposed To View Non-Mechanical Spaces: Architect/Owner to select colors for finish painting.

Exposed To View Mechanical Spaces: If the Owner has an existing color schedule, the Contractor shall utilize these colors for all finish painting. Otherwise, finish colors shall be as follows:

Item	Label/Paint Color	Text Color	Identification
Piping	Bright Red	White	FS
Equipment	Bright Red	White	Refer to drawings
All Other	ANSI A13.1-2007		

PIPING IDENTIFICATION

Provide pipe labels as follows wherever piping is exposed to view in finished spaces, in equipment rooms, in accessible maintenance spaces (shafts, tunnels, plenums), or concealed above lay-in ceilings. Label piping installed outdoors that is exposed to view.

Near each valve and control device.

Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch where there could be question of flow pattern.

Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures. At access doors, manholes and similar access points which permit view of concealed piping.

Near major equipment items and other points of origination and termination.

Spaced at maximum spacing of 25' along each piping run.

END OF SECTION 210553

1 **SECTION 211000 – SPRINKLER AND STANDPIPE FIRE SUPPRESSION SYSTEMS**

2
3 **PART 1 - GENERAL**

4
5
6 **RELATED DOCUMENTS**

7
8 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1
9 Specification sections, apply to this section.

10
11
12 **QUALITY ASSURANCE**

13
14 Installer Qualifications: Installation and alterations of fire suppression piping, equipment, specialties, and
15 accessories, and repair and servicing of equipment shall be performed only by a qualified installer. The term qualified
16 means experienced in such work (experienced shall mean having a minimum of 5 previous projects similar in size
17 and scope to this project), familiar with all precautions required, and has complied with all the requirements of the
18 authority having jurisdiction. Upon request, submit evidence of such qualifications to A/E.

19
20 Where CPVC sprinkler piping is required, submit evidence of CPVC fire sprinkler pipe installation training by an
21 authorized product representative. Training shall have been completed within the preceding two years.

22
23 NFPA Compliance: Comply with the requirements of the following, as applicable:

24 NFPA 13, *Standard for the Installation of Sprinkler Systems*

25 NFPA 25, *Inspection, Testing and Maintenance of Water-Based Fire Suppression Systems*

26
27 NFPA 72, *National Fire Alarm Code*

28
29
30 Testing Laboratory and FM Compliance: Fire suppression system materials and components shall be Listed and
31 Labeled, and Factory Mutual approved for the application anticipated.

32
33
34
35 **SUBMITTALS**

36
37 General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of
38 this specification. Where a submitted item does not **comply fully** with each and every requirement of the
39 Specifications, the submittal shall clearly indicate such deviations. Identification requirements for non-complying
40 features of items are very specific. See Section 019913 for exact requirements.

41
42 Manufacturer's Data: Include each type sprinkler head, valve, piping specialty, fire suppression specialty, fire
43 department connection, hose and rack, and hose cabinet specified.

44
45 Shop Drawings: Submit drawings which have been prepared in accordance with NFPA 13 identified as "Working
46 Plans," **including hydraulic calculations** for sprinkler systems, which have been approved by the authority having
47 jurisdiction.

48
49 Provide a summary list for spare sprinklers per NFPA 13 requirements and include with submittal.

50
51 State of North Carolina Shop Drawings Review: The A/E has responsibility for the review and the approval of fire
52 suppression system shop drawings and shall determine compliance with applicable codes and standards and the
53 project contract documentation.

1 **DESIGN CRITERIA AND PERFORMANCE REQUIREMENTS**

2
3 Fire Protection design drawings issued by the A/E shall be considered as preliminary design documents that
4 establish the performance requirements and design criteria for fire suppression sprinkler and/or standpipe systems.
5 **Responsibility for design of fire suppression sprinkler, including comprehensive engineering analysis by a**
6 **qualified professional engineer or a NICET Certified Level III technician, using performance requirements and**
7 **design criteria hereinafter specified, is delegated to the Contractor.** When prepared in accordance with
8 approved design standards by a professional engineer, documents shall be sealed and signed. Since NICET does
9 not authorize seals or stamps for Technicians, documents prepared in accordance with approved design standards
10 shall bear the signature, date, NICET certification title and number of the Technician taking responsibility for the work.

11
12 Piping System and Component Working Pressure: Standard pressure sprinkler system components, listed for at
13 least 175 psig.

14
15 Sprinkler Occupancy Hazard Classifications:

16 Restrooms: Light Hazard.

17
18
19 Minimum Density for Automatic-Sprinkler Piping Design:

20 Light-Hazard Occupancy: 0.10 gpm/ft² over 1500-sq. ft. area

21
22 Special Occupancy Hazard: As determined by Authority Having Jurisdiction.

23 Area of operation reduction shall be permitted in accordance with NFPA 13, where approved by Authority
24 Having Jurisdiction.

25
26
27
28 Maximum Suppression Area per Sprinkler:

29 Light-Hazard Occupancy: 225 sq. ft.

30
31 Other Areas: According to NFPA 13 recommendations, unless otherwise indicated.

32
33
34
35 **PART 2 - PRODUCTS**

36
37
38 **PIPE AND FITTINGS**

39
40 Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or Class) indicated for each service.
41 Where type, grade or class is not indicated, provide proper selection as determined by Installer for installation
42 requirements, and comply with governing regulations and industry standards.

43
44 Provide factory-fabricated fittings of type, materials, grade, class and pressure rating indicated for each service and
45 pipe size. Provide sizes and types matching pipe, tube, valve or equipment connection in each case. Where not
46 otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe
47 manufacturer's recommendations where applicable.

48
49 *Pipe and fittings shall be listed for use as fire sprinkler piping.*

50
51
52 **STEEL PIPE AND FITTINGS**

53 All steel standpipe and sprinkler pipe shall include FM-approved MIC inhibiting coating.

54 Steel pipe shall comply with ASTM A53, Type E, Grade B for 4" and larger and ASTM A53, Type F, Grade A for 3"
55 and smaller, black for wet pipe systems and galvanized for dry pipe, deluge, and preaction system pipe must be
56 galvanized, as well as any fittings exposed to ambient air conditions.

1 Provide Schedule 40 steel pipe, sizes 2" NPS and smaller. Provide no less than Schedule 10 steel pipe, sizes 2-1/2"
2 NPS and larger. Schedule 10 steel pipe is permitted to be used **only** with listed rolled or swaged groove joints.

3 **Schedule 5 pipe in any size is prohibited.**

4
5 All fittings must be listed or approved for the specific pipe and type of system they are used on. For gasketed fittings,
6 install only with the lubricant with which manufacturer obtained listing.

7
8 The following joining methods are acceptable to the extent permitted by listings, except threading is accepted for use
9 only on Schedule 40 and heavier pipe and **cut grooves are prohibited:**

10
11 Threading

12
13 Shop Welding

14
15 Roll or Swage Groove with Gasket Fitting

16
17 **Plain end, hooker, press-on, key type, or slip fittings are prohibited.**

18
19 Grooved mechanical pipe couplings and fittings for use with rolled or swaged groove carbon steel pipe as
20 hereinbefore specified shall be rated for water service up to 175 psig. All grooved products, fittings and couplings,
21 must be of the same manufacturer and shall be listed for fire suppression service and shall be UL/FM approved.

22 **Joints shall be rigid type.**

23
24 Couplings: Malleable iron, ASTM A47 or ductile iron, ASTM A536, fabricated in two or more parts, securely
25 held together by two or more track-head, square, or oval-neck bolts, ASTM A449 and A183.

26
27 Gaskets: Rubber product recommended by the coupling manufacturer for the intended service.

28
29 Fittings: Malleable iron, ASTM A47; ductile iron, ASTM A536; or steel, ASTM A53 or A106, designed to
30 accept grooved mechanical couplings.

31
32
33 **AUTOMATIC SPRINKLERS**

34
35 Sprinkler Heads: Glass bulb or fusible link type, style as indicated or required by the application. Unless otherwise
36 indicated, provide heads with nominal 1/2 inch discharge orifice, for "Ordinary" temperature range. Heads shall be
37 rated and listed for "quick response".

38
39 Heads installed in high humidity locations (bathrooms, natatoriums, etc.) shall have corrosion resistant
40 coating.

41
42 Provide escutcheon plate for each ceiling or wall head.

43
44 Sprinkler Head Finishes: Match existing the existing sprinkler head's response time, style, and finish.

45
46
47 **PART 3 - EXECUTION**

48
49
50 **PIPING APPLICATIONS**

51
52 Piping shall be steel.

53
54
55 **PIPING INSTALLATION**

56
57 Drawings (plans, schematics, and diagrams) indicate the general location and arrangement of piping systems. So far
58 as practical, install piping as indicated.

1 Deviations from approved "Working Plans" for sprinkler piping, require written approval of the authority having
2 jurisdiction. Written approval shall be on file with the A/E prior to deviating from the approved "Working Plans".
3

4 Use approved fittings to make all changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
5

6 Install unions in pipes 2 inch and smaller, adjacent to each valve. Unions are not required on flanged devices or in
7 piping installations using grooved mechanical couplings.
8

9 In addition to the requirements specified in Section 210529, comply with the requirements of NFPA 13 and NFPA 14.
10 Hanger and support spacing and locations for piping joined with grooved mechanical couplings shall be in
11 accordance with the grooved mechanical coupling manufacturer's written instructions for rigid systems.
12

13 STEEL PIPE INSTALLATION

14
15
16 Threaded Joints: Conform to ANSI B1.20.1, tapered pipe threads for field cut threads. Join pipe, fittings, and valves
17 as follows:
18

19 Note the internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to
20 determine how far pipe should be threaded into joint.
21

22 Align threads at point of assembly.
23

24 Apply appropriate tape or thread compound to the external pipe threads.
25

26 Assemble joint to appropriate thread depth. When using a wrench on valves place the wrench on the valve
27 end into which the pipe is being threaded.
28

29 Do not use pipe with threads which are stripped, chipped, corroded, or otherwise damaged. If a weld opens
30 during cutting or threading operations, that portion of pipe shall not be used.
31

32 Flanged Joints: Align flanges surfaces parallel. Assemble joints by sequencing bolt tightening to make initial contact
33 of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts
34 gradually and uniformly to appropriate torque specified by the bolt manufacturer.
35

36 Mechanical Grooved Joints: Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and
37 grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
38

39 End Treatment: After cutting pipe lengths, remove burrs and fins from pipe ends.
40
41

42 SPRINKLER HEAD INSTALLATION

43
44 Use proper tools to prevent damage during installations.
45

46 Wet pipe sprinkler head connections shall be made only from the top of supply piping to eliminate potential sediment
47 clogging.
48

49 Use return bends or swing joints to ceiling pendent sprinklers to facilitate centering of sprinklers in ceiling tiles. ***The***
50 ***use of corrugated or braided flexible sprinkler connectors is prohibited.***
51

52 FIELD QUALITY CONTROL

53
54
55 Flush, test, and inspect underground water supply piping in accordance with Section 211115.
56

57 Flush, test, and inspect sprinkler piping systems in accordance with NFPA 13.
58

59 Flush, test, and inspect standpipe systems in accordance with NFPA 14.
60

1 Replace piping system components which do not pass the test procedures specified, and retest repaired portion of
2 the system.

3
4

5 **INSTALLATION, TEST, AND CERTIFICATION**

6
7

8 Any such devices that are behind access doors or panels must also have their location made
9 known by an appropriate placard on the means of access.

10
11

12 The contractor shall thoroughly inspect the completed system to assure compliance with this document, project plans
13 and specs, and applicable Codes and Standards. This shall include an operational test of each waterflow alarm
14 switch and all system supervisory devices (valve tamper, hi-low air pressure, pump status, etc) **in coordination with
15 the fire alarm system subcontractor.**

16
17

18 Pressure tests shall be done with all sprinkler heads installed. System shall be tested in accordance with NFPA 13 or
19 NFPA 14, as applicable. Any leak shall be repaired by remaking of leaking joint and the system shall be retested until
20 no leaks occur.

21
22

23 Where an existing sprinkler system is being expanded or renovated, the contractor shall be responsible for the
24 integrity of all new piping plus existing piping within three feet of new or renovation work.

25
26

27 Prior to the final inspection by the AHJ and/or the owner's representative, complete and submit three (3) copies each
28 of the NFPA-required certificates for aboveground and underground piping.

29
30

31 **EXTRA MATERIALS**

32
33

34 Furnish to Owner two (2) valve wrenches for each type of sprinkler head installed.

35
36

37 Furnish extra sprinkler heads of each style included in the project, per the following table. Furnish each style with its
38 own sprinkler head cabinet and special wrenches as specified in this Section.

39
40

41
42

43	Less than 20 sprinklers	2
44	21 to 100 sprinklers	4
45	101 to 299 sprinklers	8
46	300 to 1000 sprinklers	12
	Over 1000	24

47
48

49 **OWNER INSTRUCTION AND TRAINING**

50
51

52 Provide Owner instruction and training in accordance with Section 019926.

53
54

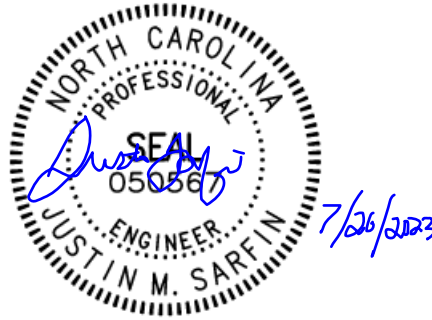
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57 **END OF SECTION 211000**

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SECTION 220210 – PLUMBING SUMMARY OF WORK

Engineer of Record for plumbing work is Justin M. Sarfin, PE, Salas O'Brien, 1620 Midtown Place (27609), P. O. Box 19944, Raleigh, NC 27619. Plumbing work shall be defined by drawings numbered with the prefix "P", the general provisions of the Contract including General Conditions and Supplementary Conditions, Division 1 Specifications sections, and Division 22 Technical Specifications listed below. In addition, plumbing work may be defined by reference to other documents from any of the above-named sources as well as by project addenda.



DIVISION 22 - PLUMBING

Section	Title
220210	Plumbing Summary of Work
220510	Plumbing Basic Requirements
220517	Sleeves and Sleeve Seals for Plumbing Piping
220529	Plumbing Hangers and Supports
220553	Plumbing Painting and Identification
220700	Plumbing Insulation
221116	Domestic Water Distribution Piping
221316	Sanitary Waste and Vent Piping
224000	Plumbing Fixtures

23
24
25

END OF SECTION 220210

SECTION 220510 – PLUMBING BASIC REQUIREMENTS

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

The requirements specified herein shall govern all Sections in Division 22, whether stated therein or not.

Where items specified in the various sections of this Division conflict with requirements of this Section, the former shall govern.

SUBMITTALS

Specific submittal requirements are defined in each section of this Division.

Welders' and Brazers' Qualifications: Operators who are to do the welding and/or brazing must be properly qualified to do satisfactory work. **Proof of an operator's qualifications shall be either the Contractor's record of suitable tests passed within the preceding six months while in the employ of the Contractor, or tests made before the start of work.** Submit qualification data for each operator prior to their starting work. Any workman considered by the A-E as not having the skill necessary for the work shall be required to pass an appropriate qualification test or shall be at once barred from further welding and/or brazing on the project.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

PIPING WELDING/BRAZING/SOLDERING

High Pressure Piping (15 Psig or Above): High pressure carbon steel piping systems shall be fabricated, assembled and welded/brazed/soldered in accordance with ASME B31.3, and Power Piping Codes PFI ES 1, PFI ES 3, PFI ES 7, PFI ES 21, PFI ES 31, PFI ES 35, and PFI TB1 of the Piping Fabrication Institute's companion code requirements.

Low Pressure Piping (Below 15 Psig):

Low pressure carbon steel piping systems shall be fabricated, assembled and welded/brazed/soldered in accordance with the ASME B31.9.

Copper piping systems shall be fabricated, assembled and brazed/soldered in accordance with ASTM B828.

END SECTION 220510

1 **SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING**

2
3 **PART 1 - GENERAL**

4
5
6 **RELATED DOCUMENTS**

7
8 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01
9 Specification Sections, apply to this Section.

10
11
12 **SUBMITTALS**

13
14 General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of
15 this specification. Where a submitted item does not **comply fully** with each and every requirement of the Specifica-
16 tions, the submittal shall clearly indicate such deviations. Identification requirements for non-complying features of
17 items are very specific. See Section 019913 for exact requirements.

18
19 Manufacturer's Data: Submit manufacturer's technical product data, including installation instructions for each type of
20 sleeve and sleeve seal product. Submit expansion compensation schedule showing Manufacturer's figure number,
21 size, location, and features for each required expansion compensation product.

22
23
24 **PART 2 - PRODUCTS**

25
26
27 **SLEEVES**

28
29 Cast-Iron Pipe: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends
30 and integral waterstop unless otherwise indicated.

31
32 Galvanized-Steel Pipe: ASTM A 53, Schedule 40, with plain ends and welded steel collar; zinc coated.

33
34 Galvanized Sheet Metal: Factory-fabricated of G90 galvanized sheet metal with lock-type longitudinal seam, mini-
35 mum 18 ga.

36
37
38 **SLEEVE-SEAL SYSTEMS**

39
40 Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and
41 sleeve.

42
43 Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required
44 for pipe material and size of pipe.

45
46 Pressure Plates: Stainless steel.

47
48 Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

49
50
51 **GROUT**

52
53 Standard: ASTM C 1107, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

54
55 Characteristics: Nonshrink; recommended for interior and exterior applications.

56
57 Design Mix: 5000-psi, 28-day compressive strength.

58
59 Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

SLEEVE AND SLEEVE-SEAL APPLICATIONS

Use sleeves and sleeve seals for the following piping-penetration applications:

Penetration Application	Sleeve Type	Sleeve-Seal Required
Exterior walls above grade	Cast Iron	Yes
Exterior walls below grade	Cast Iron	Yes
Concrete slab on grade	Cast Iron	Yes
Concrete slab above grade	Galvanized Steel Pipe	No
Interior partitions, fire-rated	Galvanized Steel Pipe	No
Interior partitions, non-fire-rated	Galvanized Steel Pipe or Galvanized Sheet Metal	No

SLEEVE INSTALLATION

Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

Sleeves are not required for core-drilled holes. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

Cut sleeves to length for mounting flush with both surfaces.

Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.

Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

Install sleeves for pipes passing through interior partitions. Cut sleeves to length for mounting flush with both surfaces and install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.

For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.

Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 019913.

SLEEVE-SEAL-SYSTEM INSTALLATION

Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.

Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

1 **SLEEVE-SEAL-FITTING INSTALLATION**

2

3 Install sleeve-seal fittings in new walls and slabs as they are constructed.

4

5 Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop
6 flange to be centered in concrete slab or wall.

7

Secure nailing flanges to concrete forms.

8

9 Using grout, seal the space around outside of sleeve-seal fittings.

10

11

12 **END OF SECTION 220517**

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SECTION 220529 – PLUMBING HANGERS AND SUPPORTS

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

QUALITY ASSURANCE

Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry, Inc. Standard Compliance: Comply with MSS SP-58 *Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation* for pipe hangers and supports.

ASTM Compliance: Structural steel elements utilized for piping or equipment support shall comply with ASTM A 36.

SUBMITTALS

General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of this specification. Where a submitted item does not **comply fully** with each and every requirement of the Specifications, the submittal shall clearly indicate such deviations. Identification requirements for non-complying features of items are very specific. See Section 019913 for exact requirements.

Manufacturer's Data: Submit manufacturer's technical product data, including installation instructions for each type of support and anchor.

PART 2 - PRODUCTS

GENERAL

Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

Design supports for multiple pipes, including floor stands, to be capable of supporting combined weight of supported systems and system contents.

Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

Structural support elements shall be fabricated from standard structural shapes complying with ASTM A 36 and/or from preformed channel struts.

Preformed channel struts shall be 1-5/8 inches wide by height required to meet load capacities and designs indicated on the drawings. Strut shall be made from steel meeting the minimum mechanical properties of ASTM A653 SS, Grade 33, G90 galvanized. Fittings shall be manufactured from steel meeting the minimum requirements of ASTM A907 SS, Grade 33. All fittings and hardware shall be zinc plated in accordance with ASTM B633, SC3 for fittings and SC1 for threaded hardware. Channel members shall be "Unistrut", Allied Support Systems "Power Strut", or Cooper B-Line Systems, Inc. "Strut System", specifically sized in accordance with the criteria hereinbefore specified.

Building attachments for hangers and supports shall be as indicated on the Drawings. Where attachments are not indicated, they shall be as follows:

Attachment To	Attachment Method(s)
Concrete	Bolt to channel-type concrete inserts or utilize expansion anchors. Size concrete housekeeping pads so expansion anchors will be a minimum of 10 bolt diameters from the edge of the concrete base. Drill at locations and to depths that avoid reinforcing bars.
Solid Concrete Masonry Unit Walls	Use expansion anchors.
Hollow Walls	Bolt to slotted steel channels fastened to wall with expansion anchors.
Wood Structural Members	Install bolts through members.
Steel	Bolt hangers to MSS Type 19, 21, or 23 clamps on flanges of beams or on upper truss chords of bar joists. To avoid stressing building steel structural elements, provide additional steel support members that span at least two beams or bar joists as required or as shown on the Drawings. Attach additional steel support members via welding in accordance with AWS standards.

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PIPE HANGERS AND SUPPORTS

Horizontal Pipe Hangers: Except as otherwise indicated, provide factory-fabricated horizontal-piping hangers complying with MSS SP-58, of the following MSS types listed, to suit horizontal-piping systems:

For exterior and wet/damp locations, hangers and rods are to be hot dipped galvanized.

Adjustable Steel Clevis Hangers: MSS Type 1.

Copper Pipe Hangers: Copper-plated or -coated steel.

Insulation Protection: Provide MSS Type 40 insulation shield at each pipe support.

Trapeze Pipe Hangers: Trapeze hangers shall be field-fabricated from structural steel members or from preformed channel members and suspended by all-thread hanger rods; weld steel, as required, in accordance with AWS standards. Each pipe on a trapeze hanger shall be individually supported as follows:

Adjustable Pipe Saddle: MSS Type 36 with adjustable support Classification Types 2 and 3 piping.

Adjustable Pipe Roller: MSS Type 41 with adjustable supports for Classification Type 1 piping.

Copper Pipe Saddle: Copper-plated or -coated steel.

Insulation Protection: Provide MSS Type 40 insulation shield at each pipe support.

Vertical Piping: Provide factory-fabricated riser clamps complying with MSS Type 8 to support vertical piping systems. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.

Pipe Stands: Where indicated on the drawing, support piping with shop- or field-fabricated assemblies made of Sch. 40 black steel pipe and corrosion-resistant components. Stands shall consist of floor plate with anchors, vertical column, and pipe or equipment support element for the required application.

PART 3 - EXECUTION

INSTALLATION OF HANGERS AND SUPPORTS

Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping and to exactly fit around piping insulation for insulated piping.

Arrange for grouping of parallel runs of horizontal suspended piping to be supported together on trapeze type hangers where possible. Install supports with maximum span and all-thread hanger rods in accordance with the following:

Nominal Pipe Size (in.)	Max. Span for Copper Tubing (ft.)	Max. Span for Steel Pipe (ft.)	Min. All-Thread Hanger Rod Size (in.)
<1	5	7	3/8
1 to 1-1/4	6	7	3/8
1-1/2	8	9	3/8
2	8	10	3/8
2 -1/2	9	10	1/2
3	10	12	1/2
4	10	12	5/8
6	10	12	3/4
8-12	10	12	7/8

Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe.

Rigid plastic piping (ABS, PVC, CPVC, etc.) shall be suspended with adjustable band pipe hangers, MSS Type 10, with factory-fabricated, welded-in support shield. Maximum hanger spacing shall be 50% of the maximum span allowed for steel piping.

Where piping of various types and/or sizes is supported together by a trapeze hanger, space hangers based on the lowest maximum span allowed or install intermediate supports for pipe requiring more frequent support.

Hangers and supports for piping shall be attached to the building structure; **attachment to other piping, ductwork, or equipment is prohibited. The use of wire or perforated strap hangers is prohibited.**

Except as allowed for uninsulated piping 2" NPS and smaller, piping installed on roofs shall be supported by pipe supports anchored to roof rails. Install and anchor pipe rails to the roof deck before roofing insulation and membrane are installed.

END OF SECTION 220529

SECTION 220553 - PLUMBING PAINTING AND IDENTIFICATION

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

SUBMITTALS

General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of this specification. Where a submitted item does not **comply fully** with each and every requirement of the Specifications, the submittal shall clearly indicate such deviations. Identification requirements for non-complying features of items are very specific. See Section 019913 for exact requirements.

Manufacturer's Data: Submit manufacturer's technical product data and installation instructions.

PART 2 - PRODUCTS

PAINT FOR PLUMBING

Ferrous Surfaces:

- 1 coat of fast drying, low VOC acrylic modified medium oil alkyd universal primer
- 2 coats of fast drying, low VOC alkyd gloss enamel

Fabric Covering Insulation:

- 1 coat glue sizing
- 1 coat primer/sealer
- 1 coat fast drying, low VOC alkyd gloss enamel

PLASTIC LABELS FOR EQUIPMENT

General: Provide engraving stock melamine plastic laminate, complying with FS L-P-387, minimum 2-1/2" X 3/4", 1/16" thick, engraved with engraver's standard letter style of black with white letter color, minimum 1/4" high, and punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

Fasteners: Self-tapping stainless steel screws.

Content for Equipment: Equipment's designation as show on Drawings or Owner's unique equipment number. Contractor shall determine requirements prior to fabricating labels.

PIPE LABELS

Snap-On Type: Provide manufacturer's standard pre-printed, semi-rigid snap-on, color-coded pipe markers, complying with ANSI A13.1, except as hereinafter specified. Provide full-band pipe markers, extending 360 degrees around pipe at each location that attach without fasteners or adhesives.

Content: Provide minimum 1-1/4" high lettering to identify piping service using the same designations and abbreviations used on the Drawings. Include arrow indicating flow direction(s). Steam lines shall indicate pressure.

1 **VALVE TAGS**

2
3 Brass Valve Tags: Provide 0.032" thick polished brass valve tags, minimum 1-1/2" diameter, with stamp-engraved
4 piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for
5 fastener.

6
7 Valve Tag Fasteners: Provide solid brass chain (wire link or beaded type), or solid brass S-hooks of the sizes
8 required for proper attachment of tags to valves, and manufactured specifically for that purpose.

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11 **PART 3 - EXECUTION**

12
13
14 **PAINTING**

15
16 Equipment specified in other sections of Division 22 to be provided with factory-applied finish painting shall not be
17 field-painted. All finish painted equipment shall be touched up where factory paint is chipped, scratched, or otherwise
18 damaged.

19
20 All equipment not factory finish painted shall be furnished in prime coat. All prime coated equipment shall be touched
21 up where prime coats are chipped, scratched, or otherwise damaged. All prime coated equipment shall be
22 thoroughly cleaned and left ready for finish painting.

23
24 **All welds on both insulated and non-insulated piping shall be painted with one coat of primer.** Miscellaneous
25 black steel items such as hangers and rods, machinery supports, breechings and stacks, etc., that are not shop
26 primed, shall be field painted with one coat of primer. All metal surfaces shall be thoroughly cleaned of rust and dirt
27 and shall be degreased before application of primer.

28
29 Where cast iron accessories or galvanized pipe, duct, or equipment surfaces are to receive finish painting, the item
30 shall be properly cleaned of mill residue before priming. Use primer specific to the application.

31
32 **Where copper pipe is exposed in kitchens of health care facilities, piping is to be painted with an oil-based**
33 **primer coat and two finished coats. Surfaces shall be thoroughly cleaned of flux and dirt and shall be**
34 **degreased before application of primer. Finish coat is to be silver in color.**

35
36 Finish painting of equipment, piping, ducts, plenums, casings, breechings, stacks, insulation, etc., located in
37 mechanical equipment rooms and spaces where equipment, piping, etc. is exposed to view shall be provided. Where
38 indicated or specified, existing equipment, piping, duct, etc., shall be cleaned and painted along with new work.

39
40 Equipment, vents, etc. where installed on metal roofs shall be finished/painted to match roof color.

41
42 Exposed To View Non-Mechanical Spaces: Architect/Owner to select colors for finish painting.

43
44 Note: Where positive pressure gas piping systems operate at pressures other than standard gauge pressure per
45 NFPA 99, pipe label shall include operating pressure.

46

Item	Label/Paint Color	Text Color	Identification
Piping: Domestic Cold Water	Green	White	DCW
Domestic Hot Water	Green	White	DHW
Domestic Hot Water Return	Green	White	DHWR
All Other	ANSI A13, NFPA 99		

47
48
49 **PLUMBING IDENTIFICATION**

50
51 Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including
52 valve tags, install identification after completion of covering and painting. Install identification prior to installation of
53 acoustical ceilings and similar removable concealment.

1 **PIPING IDENTIFICATION**
2

3 Provide pipe labels as follows wherever piping is exposed to view in finished spaces, in equipment rooms, in
4 accessible maintenance spaces (shafts, tunnels, plenums), or concealed above lay-in ceilings. Label piping installed
5 outdoors that is exposed to view.
6

7 Near each valve and control device.
8

9 Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch where
10 there could be question of flow pattern.
11

12 Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.
13

14 At access doors, manholes and similar access points which permit view of concealed piping.
15

16 Near major equipment items and other points of origination and termination.
17

18 Spaced at maximum spacing of 25' along each piping run.
19
20

21 **VALVE IDENTIFICATION**
22

23 Provide valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within
24 factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibs, and shut-off
25 valves at plumbing fixtures, and similar rough-in connections of end-use fixtures and units.
26

27 List each tagged valve in valve schedule for each piping system. Mount valve tag schedule in a frame with a glass
28 cover in the primary mechanical room and include schedule(s) as part of the operating and maintenance data defined
29 in Section 019913.
30

31 **CEILING IDENTIFICATION**
32

33 For equipment located above an acoustical lay-in ceiling, provide a clear adhesive label on the ceiling grid directly
34 below the equipment. The label shall indicate in black text the equipment designation.
35
36

37 Provide green colored adhesive 3/4" diameter vinyl "buttons" on the ceiling grid where valves, access doors, etc. are
38 located above.
39

40 **END OF SECTION 220553**
41

SECTION 220700 - PLUMBING INSULATION

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

QUALITY ASSURANCE

Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics and adhesives) with flame-spread index of 25 or less, and smoke-developed index of 50 or less, as tested by ASTM E 84 (NFPA 225) method.

Exception: Outdoor mechanical insulation may have flame spread index of 75 and smoke developed index of 150.

SUBMITTALS

General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of this specification. Where a submitted item does not **comply fully** with each and every requirement of the Specifications, the submittal shall clearly indicate such deviations. Identification requirements for non-complying features of items are very specific. See Section 019913 for exact requirements.

Manufacturer's Data: Submit manufacturer's technical product data and installation instructions for each type of mechanical insulation. Submit schedule showing manufacturer's product number, k-value, thickness, and furnished accessories for each mechanical system requiring insulation.

Samples: Submit, if requested by A-E, manufacturer's sample of each piping insulation type required, and of each duct and equipment insulation type required. Affix label to sample completely describing product.

PART 2 - PRODUCTS

PIPING INSULATION MATERIALS

Mineral Fiber Insulation:

Insulation shall be made of fibers manufactured from glass, rock, or slag, processed from the molten state, with or without a binder.

Insulation shall be heavy density pre-formed sectional type for pipe and in accordance with ASTM C 547, Class I, factory-jacketed.

Insulation Protection: Provide MSS Type 40 insulation shield for Classification Types 1A, 2, and 3 piping at each pipe support.

Jackets for Piping Insulation: Insulation jackets shall be all-service vapor retarder type as follows:

Piping Operating at Temperatures Above Ambient: Jacket shall be "ASJ" type, consisting of white, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.

Piping Operating at Temperatures Below Ambient: Jacket shall be one of the following:

- 1 FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with
- 2 ASTM C 1136, Type II.
- 3
- 4 FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with
- 5 ASTM C 1136, Type II.
- 6
- 7 Exception: Piping insulated with cellular glass may have ASJ jacket.
- 8

9 Covering for Piping Insulation Exposed to View:

10
11 Encase all indoor straight piping insulation with glossy, 20-mil high impact UV- resistant PVC jacket meeting
12 requirements of ASTM D 1784, Class 16353-C. **Jackets shall have integral colors as required by**
13 **Section 220553.**

14
15 Encase all indoor pipe fittings insulation with one-piece pre-molded 20-mil UV-inhibited PVC fitting
16 covers complying with ASTM C450 for dimensions and fastened as per manufacturer's
17 recommendations. **Jackets shall have integral colors as required by Section 220553.**

18
19
20 **PART 3 - EXECUTION**

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22
23 **PIPING SYSTEMS INSULATION APPLICATIONS**

24
25 Piping systems shall be classified in accordance with MSS SP-58, as follows, and be insulated as hereinafter
26 specified:

27

Classification	Temperature Range (deg F)
Type 1: Hot Systems	Type 1A: 100-200
Type 2: Ambient Systems	71-99
Type 3: Cold Systems	Type 3A: 32-70

28
29 Classification Type 1A Piping: Insulate the following plumbing piping systems:

30
31 Potable hot water piping.

32
33 Potable hot water recirculating piping.

34
35 Insulate with mineral fiber, 1-1/2 " thick for pipe sizes up to and including 1-1/4", 2" thick for pipe sizes 1-1/2"
36 and larger.

37
38 **Exception:** Omit insulation on chrome-plated exposed piping (except for handicapped fixtures), air
39 chambers, unions, strainers, check valves, balance cocks, flow regulators, drain lines from water coolers,
40 drainage piping located in crawl spaces or tunnels, buried piping, fire protection piping, and pre- insulated
41 equipment.

42
43 Classification Type 3A Piping: Insulate the following plumbing piping systems:

44
45 Potable cold-water piping.

46
47 Insulate with mineral fiber, 1" thick for pipe sizes up to and including 2", 1-1/2" thick for pipe sizes 2-1/2"
48 and larger.

49
50 **Exception:** Omit insulation on chrome-plated exposed piping (except for handicapped fixtures), air
51 chambers, unions, strainers, check valves, balance cocks, flow regulators, drain lines from water coolers,
52 drainage piping located in crawl spaces or tunnels, buried piping, fire protection piping, and pre- insulated
53 equipment.

1 **GENERAL PIPING INSULATION INSTALLATION REQUIREMENTS**

2
3 Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids
4 throughout the length of piping including fittings, valves, and specialties.

5
6 Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe
7 system as specified in insulation system schedules.

8
9 **For Classification Type 3A piping, do not insulate valves, strainers, unions, and other accessories.**

10
11 Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not
12 corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

13
14 Install insulation with longitudinal seams at top and bottom of horizontal runs.

15
16 Install multiple layers of insulation with longitudinal and end seams staggered.

17
18 Do not weld pins, clips, or other insulation attachment devices to piping, fittings, and specialties.

19
20 Keep insulation materials dry during application and finishing.

21
22 Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by
23 insulation material manufacturer.

24
25 Install insulation with least number of joints practical.

26
27 Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and
28 other projections with vapor-barrier mastic.

29
30 Install insulation continuously through hangers and around anchor attachments:

31
32 At pipe hangers and supports, protect the insulation from compression by installing cellular glass piping
33 insulation for the length of the insulation shield specified above.

34
35 Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with
36 adhesive or sealing compound recommended by insulation material manufacturer.

37
38 Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to
39 protect jacket from tear or puncture by hanger, support, and shield.

40
41 For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of
42 attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to
43 structure with vapor-barrier mastic.

44
45 Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film
46 thicknesses.

47
48 Install insulation with factory-applied jackets as follows:

49
50 Draw jacket tight and smooth.

51
52 Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket.

53
54 Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.

55
56 Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom
57 of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along
58 edge at 2 inches o.c.

59
60

- 1 For below-ambient services, apply vapor-barrier mastic over staples.
2
3 Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to
4 maintain vapor seal.
5
6 Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to
7 pipe flanges and fittings.
8
9 Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
10
11 Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal
12 movement.
13
14 Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4
15 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
16

PIPING INSULATION INSTALLATION AT PENETRATIONS

17
18
19
20 Roof Penetrations: Install insulation continuously through roof penetrations.

21
22 Seal penetrations with flashing sealant.

23
24 For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint
25 sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications
26 tightly joined to indoor insulation ends. Seal joint with joint sealant.
27

28 Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.

29
30 Seal jacket to roof flashing with flashing sealant.
31

32 Interior Wall, Partition, and Floor Penetrations: Install insulation continuously through walls, partitions, and floors.
33 Seal penetrations through fire-rated assemblies complying with requirements of Section 019913 for firestopping and
34 fire-resistive joint sealers.
35

INSTALLATION OF MINERAL FIBER PIPING INSULATION

36
37
38
39 Insulation Installation on Straight Pipes and Tubes:

40
41 Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without
42 deforming insulation materials.
43

44 Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier
45 mastic and joint sealant.
46

47 For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched
48 staples at 6 inches o.c.
49

50 For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs.
51 Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal
52 with vapor-barrier mastic and flashing sealant.
53

54 Insulation Installation on Pipe Flanges:

55
56 Install preformed pipe insulation to outer diameter of pipe flange.
57

58 Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe
59 insulation.
60

1 Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe
2 segments with mineral-fiber blanket insulation.
3 Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch (25 mm),
4 and seal joints with flashing sealant.
5

6 Insulation Installation on Pipe Fittings and Elbows:

7
8 Install preformed sections of same material as straight segments of pipe insulation when available.
9
10 When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to
11 a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.
12

13 Insulation Installation on Valves and Pipe Specialties:

14
15 Install preformed sections of same material as straight segments of pipe insulation when available.
16
17 When preformed sections are not available, install mitered sections of pipe insulation to valve body.
18
19 Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
20
21 Install insulation to flanges as specified for flange insulation application.
22

23
24 **FLEXIBLE ELASTOMERIC INSULATION INSTALLATION**

25
26 Apply 100 percent coverage of adhesive to surface with manufacturer's recommended adhesive.
27
28 Seal longitudinal seams and end joints.
29

30
31 **FIELD-APPLIED INSULATION JACKET INSTALLATION**

32
33 Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.
34
35 Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
36
37 Embed glass cloth between two 0.062-inch- thick coats of lagging adhesive.
38
39 Completely encapsulate insulation with coating, leaving no exposed insulation.
40

41 Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints;
42 for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with
43 manufacturer's recommended adhesive. Apply two continuous beads of adhesive to seams and joints, one bead
44 under lap and the finish bead along seam and joint edge.
45

46 Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap
47 longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation
48 manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.
49

50
51 **EXISTING INSULATION REPAIR**

52
53 Repair damaged sections of existing mechanical insulation damaged during this construction period. Use insulation
54 of same thickness as existing insulation, install new jacket lapping and sealed over existing.
55

56
57 **END OF SECTION 220700**

2SECTION 221116 –DOMESTIC WATER DISTRIBUTION PIPING

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

SCOPE

Domestic water distribution piping and components inside the building, extending to 10' beyond the walls of the building, shall be provided under this section.

QUALITY ASSURANCE

MSS Compliance: Valves shall comply with Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS) standards as referenced hereinafter. Mark valves in accordance with MSS SP-25.

ANSI Compliance: For face-to-face and end-to-end dimensions of flanged-end valve bodies, comply with ANSI B16.10 "Face-to-Face and End-to-End Dimensions of Ferrous Valves."

ASME Compliance: Fabricate and stamp pressure-temperature relief valves to comply with ASME Boiler and Pressure Vessel Code.

Welding: Qualify welding procedures, welders and operators in accordance with ASME B31.1, or ASME B31.9, as applicable, for shop and project site welding of piping work.

Soldering/Brazing: Procedures shall conform to ANSI B9.1.

NSF Labels: Non-metallic water piping shall comply with NSF 61 and NSF P171 CI-R standards.

Piping Identification: Each length of pipe and pipe fitting, trap, etc. installed as part of a plumbing system shall bear the identification of the manufacturer and the applicable standard to which it was manufactured.

SUBMITTALS

General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of this Specification. Where a submitted item does not **comply fully** with each and every requirement of the Specifications, the submittal shall clearly indicate such deviations. Identification requirements for non-complying features of items are very specific. See Section 019913 for exact requirements.

Manufacturer's Data: Submit manufacturer's technical product data and installation instructions for water piping materials and products.

PART 2 - PRODUCTS

BASIC PIPE AND PIPE FITTINGS

Piping Materials: Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or Class) indicated for each service. Where type, grade or class is not indicated, provide proper selection as determined by Installer for installation requirements, and comply with governing regulations and industry standards.

1 Pipe/Tube Fittings: Provide factory-fabricated fittings of type, materials, grade, class and pressure rating indicated for
2 each service and pipe size. Provide sizes and types matching pipe, tube, valve or equipment connection in each
3 case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and
4 with pipe manufacturer's recommendations where applicable.
5
6

7 **COPPER TUBE AND FITTINGS**

8
9 Copper Tube: ASTM B 88, Type L as specified for each service, hard-drawn temper, except as otherwise indicated.
10

11 Copper Braze/Solder-Joint Fittings: Cast copper per ANSI B16.18 or wrought copper per ANSI B16.22, with "type" to
12 match adjacent piping.
13

14 Brass Pipe Flanges: ANSI B16.1, cast brass, with heavy head machine bolts or cap screws, ASTM A193-B7 steel
15 alloy, with hex full nuts, Type 304 stainless steel per ASTM A194-Gr. 2H. Gasket shall be 1/8" natural rubber, 35-45
16 Durometer hardness.
17

18 Copper-Tube Unions: Provide unions with cast copper alloy body with ball-and-socket, metal-to-metal seating
19 surfaces complying with MSS SP--123.
20
21

22 **MISCELLANEOUS PIPING MATERIALS**

23
24 Welding Materials: Except as otherwise indicated, provide welding materials to comply with Section II, Part C, ASME
25 Boiler and Pressure Vessel Code for welding materials.
26

27 Soldering Materials: Except as otherwise indicated, provide soldering materials as follows:
28

29 Tin-Antimony Solder: ASTM B 32, Grade 95TA
30

31 Silver-Lead Solder: ASTM B 32, Grade 96TS (Shall not be used on potable water systems.)
32

33 Brazing Filler Metals: AWS A5.8, BCuP Series.
34

35 Gaskets for Flanged Joints: ANSI B16.21, full-faced for cast-iron flanges, raised-face for steel flanges, unless
36 otherwise indicated.
37

38 Piping Connectors for Dissimilar Non-Pressure Pipe: Elastomeric annular ring insert, or elastomeric flexible coupling
39 secured at each end with stainless steel clamps, sized for exact fit to pipe ends and subject to approval by plumbing
40 code.
41
42

43 **VALVES**

44
45 Sizes: Unless otherwise indicated, provide valves of same size as upstream pipe size.
46

47 Operators: Provide handwheels, fastened to valve stem, for valves other than quarter-turn. Provide lever handle for
48 quarter-turn valves 6" and smaller, other than plug valves. Provide valve stem extensions for valves installed in
49 insulated piping.
50

51 Valves 2" and smaller: Provide with screw or solder ends to match piping.
52

53 Ball Valves: Valves shall be rated 150 psi SWP and 600 psi non-shock WOG and will have 2 piece cast
54 bronze bodies, TFE seats, full port, separate packnut with adjustable stem packing, stainless steel anti-
55 blowout stems and stainless steel ball, and be manufactured to comply with MSS SP-110.
56

57 Globe/Angle Valves: Valves shall be Class 125 and manufactured in accordance with MSS SP-80; body
58 and bonnet are to be of bronze ASTM B-62. Stems shall be of dezincification-resistant silicon bronze ASTM
59 B-371 or low-zinc alloy B-99, non-asbestos packing, TFE seat disc and malleable or ductile iron handwheel.
60

1 Check Valves: Valves shall be Y-pattern swing-type manufactured in accordance with MSS SP-80, Class
2 125, bronze ASTM B-62 body with TFE seat disc.

3
4 Balance Cocks: Class 125, bronze body, bronze plug, screw driver operated, straight or angle pattern.
5
6

7 **SPECIAL VALVES AND HYDRANTS**

8
9 Hose Bibbs: Bronze body, renewable composition disc, tee handle, 3/4" NPT inlet, 3/4" hose outlet.
10

11 **PIPE ESCUTCHEONS AND FLOOR PLATES**

12
13
14 Escutcheons: Provide steel pipe escutcheons with polished chrome finish as specified herein with inside diameter
15 closely fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated. Select outside diameter of
16 escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any.
17

18 For waterproof floors and in areas where water and condensation can be expected to accumulate, provide
19 brass escutcheons, one piece type with setscrew or SP-lit casting type with concealed hinge and setscrew.
20

21 In dry areas, provide stamped steel escutcheons, one piece type with spring clip fasteners or split, hinged
22 type with spring clip fasteners.
23

24 Floor Plates: Provide floor plates as specified herein with inside diameter closely fitting pipe outside diameter, or
25 outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe
26 penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any. Floor plates shall be one-piece type for
27 new piping and split-casing type for existing piping.
28

29 **DIELECTRIC UNIONS**

30
31
32 Steel female pipe thread and copper solder joint ends conforming to dimensional, strength, and pressure
33 requirements of ASME/ANSI B 16.39, Class 1. Steel parts shall be galvanized or plated. Union shall have a water-
34 impervious insulation barrier capable of limiting galvanic current to one percent of the short-circuit current in a
35 corresponding bimetallic joint. When dry, it shall also be able to withstand a 600-volt breakdown test.
36

37 **WATER HAMMER ARRESTERS**

38
39
40 Provide bellows type water hammer arresters, stainless steel casing and bellows, pressure rated for 250 psi, tested
41 and certified in accordance with PDI Standard WH-201.
42

43 **THERMOMETERS**

44
45
46 General: Provide thermometers of materials, capacities, and ranges indicated, designed and constructed for use in
47 service indicated.
48

49 Case: Die cast aluminum finished in baked epoxy enamel, glass front, SP-ring secured, 9" long.
50

51 Adjustable Joint: Die cast aluminum, finished to match case, 180 deg. adjustment in vertical plane, 360
52 deg. adjustment in horizontal plane, with locking device.
53

54 Tube and Capillary: Magnifying lens, 1% scale range accuracy, shock mounted. Mercury thermometers will not be
55 allowed.
56

57 Scale: Satin faced, non-reflective aluminum, permanently etched markings.

58 Stem: Copper-plated steel, or brass, for separable socket, length to suit installation.
59
60

1 Range: 30 - 240 deg. F with 2 deg. F scale divisions.

2
3 Thermometer Wells: Provide thermometer wells constructed of brass or stainless steel, pressure rated to match
4 piping system design pressure. Provide 2" extension for insulated piping. Provide cap nut with chain fastened
5 permanently to thermometer well.

6
7
8 **PRESSURE GAGES**

9
10 General: Provide pressure gages of materials, capacities, and ranges indicated, designed and constructed for use in
11 service indicated.

12
13 Type: General use, .05% accuracy, ANSI B40.1 grade A, phosphor bronze bourdon type, bottom connection.

14
15 Case: Drawn steel or brass, glass lens, 4-1/2" diameter, glycerine filled.

16
17 Connector: Brass with 1/4" male NPT. Provide protective siphon when used for steam service.

18
19 Scale: White coated aluminum, with permanently etched markings.

20
21 Range: 0 - 100 psi

22
23 Gage Cocks: Provide pressure gage cocks between pressure gages and gage tee. Construct gage cock of brass
24 with 1/4" female NPT on each end, and "T" handle brass plug. Include siphon fabricated from 1/4" straight coil
25 constructed of brass tubing with 1/4" male NPT on each end and snubber, 1/4" brass bushing with corrosion resistant
26 porous metal disc, through which pressure fluid is filtered. Select disc material for fluid served and pressure rating.

27
28
29 **INSERTION TEST PLUGS ("Pete's Plugs")**

30
31 Provide insertion test plugs pressure rated for 500 psi and 200 deg. F as indicated on the drawings. Construct of
32 brass and finish in nickel-plate equip with 1/2" NPS fitting, with self-sealing valve core type neoprene gasketed orifice
33 suitable for inserting 1/8" O.D. probe assembly from dial type insertion pressure gage or thermometer. Equip orifice
34 with gasketed screw cap and chain. Provide extension, length equal to insulation thickness, for insulated piping.

35
36
37 **PART 3 - EXECUTION**

38
39 **PIPING APPLICATIONS**

40
41 Above grade piping:

42
43 Piping 4" and smaller shall be Type L copper tubing with wrought copper fittings. Copper pipe 1-1/4" and
44 smaller shall be soldered. Copper pipe 1-1/2" and larger shall be brazed.

45
46
47 **PIPING INSTALLATION**

48
49 Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping.
50 Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design
51 considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

52
53 Install copper tubing according to CDA's *Copper Tube Handbook*.

54
55 Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each
56 domestic water-service entrance.

57
58 Install shutoff valve immediately upstream of each dielectric fitting.

- 1 Install domestic water piping level with 0.25 percent (approximately 1/32" per foot) slope downward toward drain, and
- 2 plumb.
- 3
- 4 Install piping concealed from view and protected from physical contact by building occupants unless otherwise
- 5 indicated and except in equipment rooms and service areas.
- 6
- 7 Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to
- 8 building walls.
- 9
- 10 Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other
- 11 services occupying that space.
- 12
- 13 Install piping to permit valve servicing.
- 14
- 15 Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system
- 16 pressure rating used in applications below unless otherwise indicated.
- 17
- 18 Install piping free of sags and bends.
- 19
- 20 Install fittings for changes in direction and branch connections.
- 21
- 22 Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- 23
- 24 Install pressure gages on suction and discharge piping for each plumbing pump and on inlet and outlet piping from
- 25 each water heater.
- 26
- 27 Install escutcheons for piping penetrations of walls, ceilings, and floors.
- 28
- 29 Construct piping joints as follows:
- 30
- 31 Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- 32
- 33 Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- 34
- 35 For brazed joints for copper tubing, comply with CDA's *Copper Tube Handbook*, "Brazed Joints" chapter.
- 36
- 37 For soldered joints for copper tubing, apply ASTM B 813, water-flushable flux to end of tube. Join copper
- 38 tube and fittings according to ASTM B 828 or CDA's *Copper Tube Handbook*.
- 39
- 40 Press copper fittings shall be installed as follows:
- 41
- 42 Install press fittings in strict accordance with the manufacturer's instructions.
- 43
- 44 Before installation, inspect each fitting to ensure O-rings and stainless steel grip rings, as
- 45 applicable, are in place and free from damage.
- 46
- 47 Copper tubing shall be cut square with a wheeled copper tubing cutter or equivalent cutting tool.
- 48 Take care to not deform tube ends.
- 49
- 50 Tubing shall be wiped clean and any burrs are reamed with a deburring or reaming tool.
- 51
- 52 Insert tubing into the fitting and each joint pressed using a tool approved by the manufacturer.
- 53
- 54 For welded joints on galvanized steel piping, grind-off factory galvanizing for 2" either side of joint, complying
- 55 with OSHA and environmental requirements to contain zinc oxide particles. After welding, coat both inside
- 56 and outside of weld with two coats of cold galvanizing paint, lapping factory galvanizing at least 2" on each
- 57 side.
- 58
- 59 For flanged Joints, select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness
- 60 suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- 61

1 **VALVE INSTALLATION**
2

3 Except as otherwise indicated, comply with the following requirements:
4

5 Install valves where required for proper operation of piping and equipment, **including valves in branch**
6 **lines to isolate sections of piping.** Locate valves so as to be accessible and so that separate support can
7 be provided when necessary.
8

9 Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed
10 downward from horizontal plane.
11

12 **Where piping is insulated, valves shall be equipped with stem extensions.** On piping operating at below
13 ambient temperature, provide a protective sleeve for stem extensions that allows operation of the valve without
14 breaking the vapor seal or disturbing the insulation.
15

16 Swing check valves shall be installed in horizontal position, oriented with the direction of flow, with hinge pin
17 horizontally perpendicular to center line of pipe or vertically with upward flow direction.
18

19
20 **INSTALLATION OF PIPING SPECIALTIES**
21

22 Pipe Escutcheons: Install pipe escutcheons on each pipe penetration through floors, walls, partitions, and ceilings
23 where penetration is exposed to view, and on exterior of building. Secure escutcheon to pipe or insulation so
24 escutcheon covers penetration hole, and is flush with adjoining surface.
25

26 Dielectric Unions: Install at each piping joint between ferrous and non-ferrous piping. Comply with manufacturer's
27 installation instructions.
28

29 Water Hammer Arresters: Install in upright position, in locations and of sizes in accordance with PDI Standard
30 WH-201, and elsewhere as indicated.
31

32
33 **FIELD QUALITY CONTROL**
34

35 Inspection:
36

37 Do not enclose, cover, or put into operation water distribution piping system until it has been inspected and
38 approved by the authority having jurisdiction.
39

40 Notify the authority having jurisdiction at least 24 hours prior to the time such inspection must be made.
41 Perform tests specified below in the presence of the authority.
42

43 Rough-in Inspection: Arrange for inspection of the piping system before concealed or closed-in
44 after system is roughed-in, and prior to setting fixtures.
45

46 Final Inspection: Arrange for a final inspection by the authority having jurisdiction to observe the
47 tests specified below and to insure compliance with the requirements of the plumbing code.
48

49 Whenever the authority having jurisdiction finds that the piping system will not pass the test or inspection,
50 make the required corrections and arrange for reinspection by the plumbing official.
51

52 Piping System Tests:
53

54 Conduct hydrostatic and leakage tests of water systems in accordance with Article 312 of the *North Carolina*
55 *State Building Code: Plumbing Code.* Test for leaks and defects all new water distribution piping systems
56 and parts of existing systems, which have been altered, extended or repaired. If testing is performed in
57 segments, submit a separate report for each test, complete with a diagram of the portion of the system
58 tested.
59
60

1 Leave uncovered and unconcealed all new, altered, extended, or replaced water distribution piping until it
2 has been tested and approved. Expose all such work for testing, that has been covered or concealed before
3 it has been tested and approved.
4

5 Cap and subject the piping system to a static water pressure of 50 psig above the operating pressure or 100
6 psig whichever is greater without exceeding the pressure rating of the piping system materials. Isolate the
7 test source and allow to stand for a period of 4 hours. Leaks and loss in test pressure constitute defects that
8 must be repaired.
9

10 Repair all leaks and defects using new materials and retest system or portion thereof until satisfactory
11 results are obtained.
12

13 Prepare reports for all tests and required corrective action.
14
15

16 **ADJUSTING AND CLEANING**
17

18 Purge all new potable water piping systems and parts of existing systems that have been altered, extended, or
19 repaired prior to use.
20

21 Use the purging and disinfecting procedure prescribed by the authority having jurisdiction, or in case a method is not
22 prescribed by that authority, the procedure described in either AWWA C601 or AWWA D105, or as described below:
23

24 Flush the piping system with clean, potable water until dirty water does not appear at the points of outlet for
25 at least 10 minutes. Flush with water flowing at design flow rate. During flushing, protect fixtures with
26 aerators as follows:
27

28 Remove aerators before flushing. After flushing, clean aerators by rinsing with clean water before
29 replacement.
30

31 Fill the system or part thereof, with a water/chlorine solution containing at least 50 parts per million of
32 available chlorine. Chlorinating agent shall be as selected by the Contractor and reviewed by the A/E.
33 Acceptable chlorinating agents are calcium hypochlorite and sodium hypochlorite
34

35 Do not place chlorine tablets or powder in the piping. Placing chlorine tablets or powder in
36 the piping is not an acceptable method of disinfection. Provide equipment and feed system for chlorinating
37 agent that is appropriate to the chlorinating agent and the piping to be disinfected.
38

39 Isolate (valve off) the system, or part thereof, and allow to stand for 24 hours.
40

41 Drain the system, or part thereof, of the chlorinated solution, and refill with a water/chlorine solution
42 containing at least 200 parts per million of available chlorine and isolate and allow to stand for 3 hours.
43

44 Following the allowed standing time, flush the system with clean potable water until the chlorine level in the
45 water coming from the system does not exceed the chlorine level in the water source/supply.
46

47 After disinfection, submit samples of potable water to an independent water quality testing laboratory,
48 certified for water quality testing by the state in which the Project is located, to conduct a bacteriological and
49 post-chlorination tests to demonstrate compliance with the Maximum Containment Level (MCLs) of the Safe
50 Drinking Water Act, as follows:
51

52 Total chlorine concentration not exceeding 1.0 ppm.
53

54 The absence of any coliform bacteria (0 bacteria per 100 mL sample).
55

56 Less than 200 non-coliform bacteria per 100 mL sample.
57

58 Exception: If any measure exceeds its respective MCL, test to verify that the measured
59 concentration does not exceed the level of the Project upstream water supply/source and
60 advise A/E of issue(s) with Project water supply/source.

1 In the event that testing indicates drinking water quality standards are not met, the water distribution
2 systems shall undergo repeated disinfection, as specified above, until tests indicate compliance.
3
4 Form a protective layer on the brass in the system by turning the cold water on at all faucets in the system at one
5 time to a "slow trickle" rate for 72 hours, continuous.
6

7
8 **OWNER INSTRUCTION AND TRAINING**

9
10 Provide Owner instruction and training in accordance with Section 019926.

11
12
13 **END OF SECTION 221116**

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SECTION 221316 – SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

SCOPE

The work defined by this section includes sanitary drain, waste, and vent piping and, as applicable, gray water recycling drain, waste, and vent piping beginning at each plumbing fixture connection within the building. Vents shall extend through the roof, while drain and waste piping shall extend 10' beyond the walls of the building.

Roof drains will be provided under Division 7. Connections to roof drains and drainage piping from the roof drains, extending to 10' beyond the walls of the building shall be provided under Section 221416.

QUALITY ASSURANCE

ANSI Compliance: Comply with applicable ANSI standards pertaining to materials, products, and installation or soil and waste systems.

ASSE Compliance: Comply with applicable ASSE standards pertaining to materials, products, and installation of soil and waste systems.

PDI Compliance: Comply with applicable PDI standards pertaining to products and installation of soil and waste systems.

Piping Identification: Each length of pipe and pipe fitting, trap, etc. installed as part of a plumbing system shall bear the identification of the manufacturer and the applicable standard to which it was manufactured.

SUBMITTALS

General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of this specification. Where a submitted item does not **comply fully** with each and every requirement of the Specifications, the submittal shall clearly indicate such deviations. Identification requirements for non-complying features of items are very specific. See Section 019913 for exact requirements.

Manufacturer's Data: Submit manufacturer's technical product data for soil waste systems materials and products.

Inspection Reports: Submit copies of field inspection reports required by Part 3.

PART 2 - PRODUCTS

SANITARY PIPES AND PIPE FITTINGS

Piping Materials: Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or Class) indicated for each service. Where type, grade or class is not indicated, provide proper selection as determined by Installer for installation requirements, and comply with governing regulations and industry standards.

1 Pipe/Tube Fittings: Provide factory-fabricated fittings of type, materials, grade, class and pressure rating indicated for
2 each service and pipe size. Provide sizes and types matching pipe, tube, valve or equipment connection in each
3 case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and
4 with pipe manufacturer's recommendations where applicable.

5
6 Above Ground Piping:

7
8 Pipe Size 1 1/2" and Smaller: Copper DWV tube and drainage fittings, ASTM B 306 drawn temper tube,
9 ASME B16.29, wrought copper solder-joint fittings.

10
11 Pipe Size 2" and Larger: Hubless cast-iron soil pipe and fittings, Service class. Conform to CISPI Standard
12 301/ASTM A 888, Service class, with heavy duty neoprene rubber/stainless steel couplings conforming to
13 CISPI 310/ASTM C1540. For pipe sizes 1-1/2" through 4", couplings shall have a minimum four (4) bands
14 and for pipe sizes 5" through 15", provide minimum six (6) bands.

15
16 Below Ground Piping:

17
18 Pipe Size 15" and Smaller: Cast-iron hub-and-spigot soil pipe and fittings, Service class. Joints may be
19 sealed with lead and oakum or with neoprene gaskets complying with CISPI Standard 310/ASTM C 564.

20
21 Lead/Oakum Joint Materials: Provide ASTM B 29 lead with oakum or hemp fiber caulking.

22
23
24 **PIPING SPECIALTIES**

25
26 Drains: Provide drains as indicated on the Drawings, as follows:

27
28 Bodies shall be cast iron with wall thickness not less than 1/4" and with tops of nickel-bronze, chrome plated
29 bronze, or cast iron, as indicated on Drawings or as herein specified. Castings shall be gray cast iron or
30 ductile iron and shall be smooth and well cleaned inside and out, with all fins and roughness removed, and
31 provided with the manufacturer's standard protective coating or other protective coating indicated or
32 specified.

33
34 All drains installed above grade and in connection with waterproofed floors shall be equipped with a
35 clamping device. When drains are installed with metal waterproofing, the metal shall be clamped, caulked,
36 or soldered watertight to the drain.

37
38 All drains shall be provided with traps either integral with drain body or separate, except where otherwise
39 indicated or specified.

40
41 Cleanouts and Access Covers: Provide as follows; equivalent products manufactured by Josam or Zurn will be
42 acceptable:

43
44 Cleanouts in Floors: J. R. Smith No. 4100 caulking ferrule with satin finish, nickel-bronze, scoriated access
45 cover in finished area and bronze scoriated top in storage and similar unfinished areas.

46
47 Cleanouts in Walls: J. R. Smith No. 4020 ferrule with No. 4710 satin finish chrome plated brass or stainless
48 steel round access cover secured to plug by a countersunk brass screw in finished areas and satin finish
49 brass cover in unfinished storage and similar habitable unfinished areas.

50
51 Cleanout Plugs: Cast-bronze or brass, threads complying with ANSI B2.1, countersunk head.

52
53 Flashing Flanges: Cast-iron watertight stack or wall sleeve with membrane flashing ring. Provide underdeck clamp
54 and sleeve length as required.

1 Vent Flashing Sleeves: Cast-iron caulking type roof coupling for cast-iron stacks, cast-iron threaded type roof
2 coupling for steel stacks, and cast-bronze stack flashing sleeve for copper tubing.

3
4
5 **PART 3 - EXECUTION**

6
7
8 **INSTALLATION OF DRAIN, WASTE, AND VENT PIPING**

9
10 Lay underground building drains beginning at low point of systems, true to grades and alignment indicated with
11 unbroken continuity of invert. Place bell ends of piping facing upstream. Install required gaskets in accordance with
12 manufacturer's recommendations for use of lubricants, cements, and other special installation requirements. Clean
13 interior of piping of dirt and other superfluous material as work progresses. Maintain swab or drag in line and pull
14 past each joint as it is completed. Place plugs in ends of uncompleted piping at end of day or whenever work stops.

15
16 Install soil and vent piping pitched to drain at minimum slope of 1/4" per foot (2%) for piping 2-1/2" and smaller, and
17 1/8" per foot (1%) for piping 3" and larger.

18
19 Make changes in direction for drainage and vent piping using appropriate 45-degree wyes, half-wyes, or long sweep
20 quarter, sixth, eighth, or sixteenth bends. Sanitary tees or short quarter bends may be used on vertical stacks of
21 drainage lines where the change in direction of flow is from horizontal to vertical, except use long-turn tees where two
22 fixtures are installed back to back and have a common drain. Straight tees, elbows, and crosses may be used on
23 vent lines.

24
25 No change in direction of flow greater than 90 degrees shall be made.

26
27 Where different sizes of drainage pipes and fittings are connected, use proper size, standard increasers and
28 reducers. Reduction of the size of drainage piping in the direction of flow is prohibited.

29
30 Fabricate steel pipe nipples from same pipe as used for connected pipe. Use Schedule 80 pipe for nipple fabrication
31 where unthreaded length is less than 1-1/2" or where pipe size is less than 1-1/2" NPS. **Do not thread nipples full
32 length, "close" nipples are prohibited.**

33
34 Install cleanouts in above ground piping and building drain piping as indicated or required and at each change in
35 direction of piping greater than 45 deg.; at minimum intervals of 50' for piping 4" and smaller and 80' for larger piping;
36 and at base of each vertical soil or waste stack. Install floor and wall cleanout covers for concealed piping, select
37 type to match adjacent building finish. Install cleanouts at the base of all waste risers.

38
39 Install flashing flange and clamping device with each stack and cleanout passing through waterproof membranes.

40
41 Install vent flashing sleeves on stacks passing through roof, secure over stack flashing in accordance with
42 manufacturer's instructions.

43
44 Where waste piping passes through fire rated walls, partitions, ceilings, or floors, maintain the fire rated integrity in
45 accordance with Section 019913.

46
47
48 **INSTALLATION OF FLOOR DRAINS**

49
50 Install floor drains in accordance with manufacturer's written instructions and in locations indicated so as to drain the
51 entire floor or that portion of the floor allocated to it.

52
53 Coordinate flashing work with work of waterproofing and adjoining substrate work.

54
55 Coordinate with soil and waste piping as necessary to interface floor drains with drainage piping systems.

56
57 Install floor drains at low points of surface areas to be drained, or as indicated. Set tops of drains flush with finished
58 floor.

1 Install drain flashing collar or flange so that no leakage occurs between drain and adjoining flooring. Maintain
2 integrity of waterproof membranes, where penetrated.

3
4 Position drains so that they are accessible and easy to maintain.

5
6 Protect drains after installation to avoid clogging with construction materials and debris, and to prevent damage from
7 traffic and construction work.

8
9
10 **INSTALLATION OF TRAP PRIMERS**

11
12 Install trap primers as indicated, and in accordance with manufacturer's installation instructions. Pitch piping toward
13 drain trap, minimum of 1/8" per foot (1%). Adjust trap primer for proper flow.

14
15
16 **FIELD QUALITY CONTROL**

17
18 Inspections by the Authority Having Jurisdiction:

19
20 Do not enclose, cover, or put into operation drainage and vent piping system until it has been inspected and
21 approved by the authority having jurisdiction.

22
23 During the progress of the installation, notify the authority having jurisdiction, at least 24 hours prior to the
24 time such inspection must be made. Perform tests specified below in the presence of the plumbing official.

25
26 Rough-in Inspection: Arrange for inspection of the piping system before concealed or closed-in
27 after system is roughed-in, and prior to setting fixtures.

28
29 Final Inspection: Arrange for a final inspection to observe the tests specified below and to insure
30 compliance with the requirements of the plumbing code.

31
32 Whenever the piping system fails to pass the test or inspection, make the required corrections, and arrange
33 for it to be reinspected by the authority.

34
35 Submit copies of written inspection reports, signed by the authority having jurisdiction, immediately following
36 testing to the A/E for review.

37
38 Hydrostatic and Leakage Tests:

39
40 Conduct hydrostatic and leakage tests soil and waste systems in accordance with Article 312 of the North
41 Carolina State Building Code: Plumbing Code.

42
43 When leakage or pressure drop exceeds the allowable amount specified, make repairs/ corrections and
44 retest. Correct visible leaks regardless of leakage test results.

45
46 Submit written reports of all hydrostatic and/or leakage tests immediately following testing to the A/E for
47 review.

48
49
50 **OWNER INSTRUCTION AND TRAINING**

51
52 Provide Owner instruction and training in accordance with Section 019926.

53
54
55 **END OF SECTION 221316**

SECTION 224000 - PLUMBING FIXTURES

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

QUALITY ASSURANCE

Where indicated by "ADA/H-C" compliance requirement, plumbing fixtures and their installation shall comply with the *Americans with Disabilities Act Architectural Guidelines (ADAAG)*.

Comply with the following applicable standards and other requirements specified for water coolers:

ASHRAE Standard 18

ARI Standard 1010

UL Standard 399

Comply with the following applicable standards and other requirements specified for plumbing fixtures:

Vitreous-China Fixtures: ASME A112.19.2M.

Water-Closet, Flush Valve, Tank Trim: ASME A112.19.5.

Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:

Backflow Protection Devices for Faucets with Side Spray: ASME A112.18.3M.

Backflow Protection Devices for Faucets with Hose-Thread Outlet: ASME A112.18.3M.

Diverter Valves for Faucets with Hose Spray: ASSE 1025.

Faucets and Stops: ASME A112.18.1, NSF/ANSI 61.

Integral, Atmospheric Vacuum Breakers: ASSE 1001.

Sensor-Actuated Faucets and Electrical Devices: UL 1951.

Comply with the following applicable standards and other requirements specified for bathtub/shower faucets:

Combination, Pressure-Equalizing and Thermostatic-Control Antiscald Faucets: ASSE 1016.

Deck-Mounted Bath/Shower Transfer Valves: ASME 18.7.

High-Temperature-Limit Controls for Thermal-Shock-Preventing Devices: ASTM F 445.

Manual-Control Antiscald Faucets: ASTM F 444.

Pressure-Equalizing-Control Antiscald Faucets: ASTM F 444 and ASSE 1016.

Sensor-Actuated Faucets and Electrical Devices: UL 1951.

Thermostatic-Control Antiscald Faucets: ASTM F 444 and ASSE 1016.

1 Comply with the following applicable standards and other requirements specified for the following plumbing fixture
2 elements:

3
4 Atmospheric Vacuum Breakers: ASSE 1001.

5
6 Brass and Copper Supplies: ASME A112.18.1.

7
8 Flexible Water Connectors: ASME A112.18.6.

9
10 Floor Drains: ASME A112.6.3.

11
12 Flushometers, Sensor-Operation: ASSE 1037 and UL 1951.

13
14 Grab Bars: ASTM F 446.

15
16 Plastic Toilet Seats: ANSI Z124.5.

17
18 Supply and Drain Protective Shielding Guards: ICC A117.1.

19
20
21 **SUBMITTALS**

22
23 General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of
24 this specification. Where a submitted item does not comply fully with each and every requirement of the
25 Specifications, the submittal shall clearly indicate such deviations. Identification requirements for non-complying
26 features of items are very specific. See Section 019913 for exact requirements.

27
28 Manufacturers Data: Submit Manufacturers Data and Installation instructions for each fixture, faucet, specialties,
29 accessories, and trim specified; clearly indicate rated capacities of selected models of water coolers.

30
31 Color Charts: Submit manufacturer's standard color charts for cabinet finishes and fixture colors.

32
33
34 **DELIVERY, STORAGE, AND HANDLING**

35
36 Store fixtures where environmental conditions are uniformly maintained within the manufacturer's recommended
37 temperatures to prevent damage.

38
39 Store fixtures and trim in the manufacturer's original shipping containers. Do not stack containers or store in such a
40 manner that may cause damage to the fixture or trim.

41
42
43 **EXTRA STOCK**

44
45 Furnish special wrenches and other devices necessary for servicing plumbing fixtures and trim to Owner with receipt
46 in a quantity of one device for each ten fixtures.

47
48 Furnish faucet repair kits complete with all necessary washers, springs, pins, retainers, packings, O-rings, sleeves,
49 and seats in a quantity of one kit for every forty faucets.

50
51
52 **PART 2 - PRODUCTS**

53
54
55 **FIXTURES**

56
57 Fixtures shall be provided as scheduled on the Drawings. Outfits shall be complete and shall include fixture and all
58 required appurtenances, trim and fittings to provide a complete matched installation.

1 Acceptable Manufacturers: Subject to compliance with requirements, provide plumbing fixtures of one of the
2 following:

3
4 Plumbing Fixtures: Earthenware vitreous china or enameled cast iron shall be Zurn; American Standard;
5 U.S. Plumbing Products Kohler Co.; Eljer; Crane; Sloan Valve Co. or Toto USA.

6
7 Fixture Seats: Beneke Corporation Bemis Seats; Forbes-Wright Industries, Inc. Church Products; or
8 Olsonite Corporation.

9
10 Hand Wash Fountains: Bradley Corporation; Acorn Mfg. Co.; or Metcraft

11
12 Water Coolers: Elkay Mfg. Co.; Halsey Taylor Div., Household International Co.; Haws Drinking Faucet Co.;
13 or Oasis

14
15 Thermostatic Mixing Valves: Armstrong; Bradley; Leonard; Powers; or Symmons.

16
17 Sink and Lavatory Faucets: Zurn Commercial; Moen Commercial; Chicago Faucets; Delta Commercial (Tek
18 Institutional); Sloan Valve Co.; Symmons Industries, Inc.; or T&S Brass and Bronze works, Inc.

19
20 Flush Valves: Sloan Valve Co.; Delta Commercial (Tek Institutional); Toto USA; Delany Products or Zurn
21 Industries, Inc.

22
23 Fixture Carriers: Josam Mfg. Co.; Wade Division/Tyler Pipe; Zurn Industries, Inc., Hydromechanics Div.; or
24 Jay R. Smith Mfg. Co.

25
26 Floor Drains and Sinks: Josam Mfg. Co.; Zurn Industries, Inc., Hydromechanics Div.; Jay R. Smith Mfg. Co.;
27 Wade; Watts Regulator Co.; or Mifab, Inc.

28
29 **Materials:**

30
31 Provide materials which have been selected for their surface flatness and smoothness. Exposed surfaces
32 which exhibit pitting seam marks, roller marks, foundry sand holes, stains, discoloration, or other surface
33 imperfections on finished units are not acceptable.

34
35 Where fittings, trim and accessories are exposed or semi-exposed provide bright chrome-plated or polished
36 stainless steel units. Provide copper or brass where not exposed.

37
38 Steel Sheets for Baked Enamel Finish: ASTM A 591, coating Class C, galvanized-bonderized.

39
40 Steel Sheets for Porcelain Enamel Finish: ASTM A 424, commercial quality, Type 1.

41
42 Galvanized Steel Sheet: ASTM A 526, except ASTM A 527 for extensive forming; ASTM A 525, G90 zinc
43 coating, chemical treatment.

44
45 Aluminum: ASTM B 209/B 221 sheet, plate, and extrusions, as indicated; alloy, temper and finish as
46 determined by manufacturer, except 0.40 mil natural anodized finish on exposed work unless another finish
47 is indicated.

48
49 Vitreous China: High quality, free from fire cracks, spots, blisters, pinholes and specks; glaze exposed
50 surfaces, and test for crazing resistance in accordance with ASTM C554.

51
52 **Water Coolers:**

53
54 Wall Hung ADA/H-C Water Cooler: Shall be factory assembled and tested, listed and labeled in compliance
55 with UL Standard 399, and have capacities rated in accordance with ASHRAE Standard 18, and ARI
56 Standard 1010. Water cooler shall fully comply with heights and clearances required by Fig. 27A of the
57 ADAAG.

58
59 Receptor: 18 gauge, type 304, stainless steel ASTM A-167, with No. 4 finish ASTM A-480 on the
60 outside.

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Waste: Concealed 1-1/4" O.D. tailpiece, chrome plated waste strainer and 1-1/4" I.P.S. trap.

Supply: 1/2" I.P.S. screwdriver stop.

Grille: Stainless steel, one-piece louvered grille matching receptor.

Refrigeration System: Refrigerant R-134a, hermetically sealed, capillary tube. All joints silver soldered.

Compressor: Hermetically sealed, with automatic reset overload protection.

Condenser: Air-cooled

Cooling unit: Tube type, self-cleaning, continuous coil of seamless copper.

Temperature Control: Thermostat with adjustable range of 42 deg. F. to 53 deg F.

Electrical Characteristics: 120 V, 60 Hz, 1/5 HP, provide 3-prong power lead-in cord.

Capacity: 8.0 GPH of 50 deg. F water, with ambient temperature of 90 deg. F, and 80 deg. F entering water temperature.

Connections: Provide p-trap and supply with stop valve as specified below.

Plumbing Fittings, Trim and Accessories:

Water Outlets: At locations where water is supplied (by manual, automatic or remote control), provide commercial quality faucets, valves, or dispensing devices, of type and size scheduled on the Drawings, and as required to operate as indicated. Include manual shutoff valves and connecting stem pipes to permit outlet servicing without shut-down of water supply piping systems.

Automatic Faucets:

Sensor-Operated Faucets: Actuation of faucet shall be via solenoid controlled by a battery-powered, dual beam infrared or multi-spectrum electronic sensor; adjustable cycles.

Vacuum Breakers: Provide with flush valves where required by governing regulations, including locations where water outlets are equipped for hose attachment.

P-traps: Where drains are indicated for direct connection to drainage system, provide heavy cast brass body p-traps with cleanout plugs, all chrome plated where exposed to view.

Escutcheons: Where fixture supplies and drains penetrate walls in exposed locations, provide escutcheons with set screw in accordance with Section 221116.

Aerators: Provide Laminar flow aerator for all faucets.

Fixture Accessories, Appurtenances and Trim:

Flush Valves:

Manual flush valves shall be metal lever handle operated diaphragm controlled flush valve with angle stop valve, vacuum breaker flush tube assembly, solid ring flush tube support, sweat solder adaptor, set screw secured cast brass pipe escutcheon, and nipple cover tubes, all parts entirely heavy chrome plated. Furnish and install trap primer kit flush tubes where indicated or required. Flush valve features shall include quiet operation adjustable type large diaphragm, non-siphon by-pass, non-drip handle seal and non-hold open. Valves shall be rated as follows:

Standard: Maximum 1.6 gal/flush

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High Efficiency: Maximum 1.28 gal/flush

Sensor-operated flush valves shall be diaphragm controlled flush valve with angle stop valve, vacuum breaker flush tube assembly, solid ring flush tube support, sweat solder adaptor, set screw secured cast brass pipe escutcheon, and nipple cover tubes, all parts entirely heavy chrome plated. Furnish and install trap primer kit flush tubes where indicated or required. Flush valve features shall include quiet operation adjustable type large diaphragm, non-siphon by-pass, non-drip handle seal and non-hold open. Sensor-operated flush valves shall be battery powered as indicated on the drawings. Valves shall be rated as follows:

Application	Maximum Water Consumption	
	Standard	High Efficiency
Water Closet	1.6 gal/flush	1.28 gal/flush
Urinal	1.0 gal/flush	0.25 gal/flush

Actuation of valve shall be via solenoid controlled by a dual beam infrared or multi-spectrum electronic sensor.

Water Closet Seats: Seats shall be heavy duty white solid plastic with self sustaining check hinges, enclosed stainless steel or brass hinge posts and matching locknuts and washers. Generally, seats shall be non-contour type, open front elongated less cover and with integral bumpers. Refer to fixture fixture schedule on the Drawings for required variations to include closed front, round bowl type, cover and color.

Fixture Stops and Supply Piping: Generally, heavy angle pattern brass loose key stops with replaceable chlorine or chloramine resistant washers or (ball valve type), all heavy chrome plated, shall be furnished and installed for all lavatories, flush tank water closets and where piping is exposed below sinks. Angle or straight pattern stops and stops integral with faucets and exposed or concealed valve (shower or bath) shall be provided where specified and/or indicated. Supplies shall be 1/2" IPS pipe or sweat x compression, with chrome plated flexible copper risers, unless otherwise specified, 1/2" chrome plated cast brass nipples or 1/2" chrome plated copper extension tubes and chrome plated brass flanges. Stops shall be as manufactured by McGuire, Brass Craft, Dearborn Brass, Keeney Manuf. Co., Zurn, or Chicago Faucet.

Fixture waste outlet, tailpiece, overflow and waste assembly piping and fittings:

Lavatory: Unless otherwise specified on drawings, lavatory waste outlet assembly shall be heavy chrome plated cast brass grid strainer outlet and seamless brass tailpiece assembly, McGuire Model 155A, with 1 1/4" x 1 1/2" chrome plated heavy cast brass body p-trap with cleanout plug and cast brass locknuts, 17 gauge chrome plated tubular brass wall bend and chrome plated brass deep wall flange, McGuire Model 8902DF or approved equivalents by Zurn, Keeney Manuf. Co., Dearborn Brass, Just Manuf. Co. or Kohler.

Fixture Supports and Fastenings:

Lavatory wall hangers shall be cadmium plated cast iron. Floor and wall plates and escutcheons shall be furnished and shall be as specified hereinbefore or as included by the fixture assembly numbers. All lavatories shall be set 36" from floor to basin top for able body persons, 34" from floor to basin top for ADA-H/C requirements or as otherwise noted on the contract documents.

Fixtures and equipment wall brackets and hangers shall be supported and fastened in a satisfactory manner. Where secured to freestanding marble, slate soapstone, or glass, supports shall be fastened with 1/4" brass through-bolts. Where secured to concrete or brick walls, supports shall be fastened with brass bolts or machine screws in lead sleeve type anchorage units or with brass expansion bolts. Expansion bolts shall be 1/4" brass bolts with 20 threads to the inch and of sufficient length to extend at least 3" into solid concrete or brickwork, fitted with loose tubing or sleeves of proper length to bring expansion sleeves in the solid concrete or brick wall. Where secured to hollow clay tile walls or partitions, supports shall be fastened with 1/4" brass toggle or through-bolts.

1 Inserts shall be securely anchored and the anchors shall be properly grouted with mortar. Inserts shall be
2 installed flush with the finished wall and shall be completely concealed when the fixtures are installed.
3 Supplies, shower heads and risers shall be securely anchored to masonry. Reinforcing plates and channels
4 or floor to ceiling carriers shall be provided for anchoring supply piping and shower heads and risers in stud
5 and gypsum wallboard or plaster partitions, or plaster partitions
6

7 Chair carriers shall be completely concealed in the building construction, provided with heavy foot or feet
8 bolted to the floor, and with vertical members either in pipe space or built into the partition, and shall rigidly
9 support fixtures from the floor or floor and ceiling structure where indicated or specified. Chair carriers shall
10 be epoxy paint coated cast iron with adjustable and invertible face plate with adjustable legs and feet (unless
11 otherwise specified), both vertically and horizontally and shall support fixtures in such a manner that no part
12 of fixture will be supported by wall or partition. All parts shall be made of metal; castings shall be of strong,
13 tough, even-grained metals; tubular members shall be square structural shape and thickness; steel parts
14 shall be heavy gauge with accurately punched or drilled holes; all screws and bolts shall have standard
15 threads. Carriers for standard use water closets are to be rated for 500 lb static load capacity unless
16 otherwise indicated on the drawings.
17

18 Bolts and nuts shall be hexagon and exposed bolts, nuts, cap nuts, and screws shall be chromium plated.
19 Exposed nuts, cap nuts and screw heads shall be provided with chromium plated brass washers.
20
21

22 **PART 3 - EXECUTION**

23 **INSTALLATION**

24
25
26
27 Examine roughing-in work of portable water and waste piping systems to verify actual locations of piping connections
28 prior to installing fixtures. Examine floors and substrates, and conditions under which fixture work is to be
29 accomplished. Correct any incorrect locations of piping, and other unsatisfactory conditions for installation of
30 plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected.
31

32 Install plumbing fixtures level and plumb, in accordance with fixture manufacturer's written instructions, and rough-in
33 drawings, in compliance with applicable codes and regulations, the design Drawings, and referenced standards.
34 Water closets, lavatories, urinals, and bidets shall not be installed closer than 15" from its center to any sidewall,
35 partition, vanity other fixture, or other obstruction, or closer than 30" center-to-center between fixtures. There shall be
36 at least 21" clearance in front of any fixture to wall, partition, vanity, other fixture, or other obstruction.
37

38 Comply with the installation requirements of ANSI A117.1, the *North Carolina State Building Code: Building Code*,
39 and the *Americans with Disabilities Act Architectural Guidelines* (ADAAG) with respect to plumbing fixtures for the
40 physically handicapped.
41

42 Secure supplies behind or within wall construction to provide rigid installation during rough-in.
43

44 Install a stop valve in an accessible location in each fixture water connection.
45

46 Install drains in compliance with Section 221316.
47

48 Install chrome plated escutcheons at each wall, floor, and piping ceiling penetration in exposed finished locations and
49 within cabinets and millwork.
50

51 Floor-mounted water closets/toilets:

52
53 Inspect fixture to ensure that waste outlet is fully glazed, inside and out. Reject any fixture that does not
54 meet this criteria.
55

56 Ensure that floor flange is not more than 1/2" above finished floor level and is installed plumb and square
57 with corrosion-resistant screws or bolts.
58
59
60

1 Install fixture with a tapered wax seal **without sleeve or "horn"**. Invert toilet on floor (cushion to prevent
2 damage) and install wax ring evenly around the fixture waste discharge, with tapered end of ring facing
3 toilet. Place fixture over floor flange, "rock" fixture into place, and tighten flange bolts. Take care to not over-
4 tighten flange bolts and damage fixture.

5
6 Ensure that fixture is level. Use nylon or non-hydroscopic composite toilet shims as necessary.

7
8 Seal fixtures to floor using silicone sealant. Match sealant color to fixture color.

9
10 The use of an offset closet flange is prohibited.

11
12 **Wall-mounted fixtures:**

13
14 Utilize carriers and ensure that fixture is not supported by the building structure.

15
16 Make waste connection with neoprene seal.

17
18 Seal fixtures to wall using silicone sealant. Match sealant color to fixture color.

19
20 For countertop sink/lavatory installations: Plumbing contractor shall provide template to general contractor for cutting
21 openings into countertop. Sink shall be installed using appropriate setting compound to provide watertight joints
22 between countertop and sink. Plumbing contractor shall be responsible for all connections to sink and for installation
23 of sink.

24 25 26 **FIELD QUALITY CONTROL**

27
28 Inspect each installed fixture for damage to finish before installation. If feasible, restore and match finish to original at
29 site; otherwise, remove fixture and replace with new unit. Feasibility and match to be judged by A-E.

30
31 Test fixtures to demonstrate proper operation upon completion of installation and after units are water pressurized.
32 Replace malfunctioning units, then retest.

33 34 35 **ADJUSTING**

36
37 Adjust water pressure at drinking fountains, faucets, shower valves, and flush valves to provide proper flow and
38 stream.

39
40 Replace washers of leaking or dripping faucets and stops.

41 42 43 **PROTECTION**

44
45 Protect installed fixtures from damage during remainder of construction period.

46
47 **Do not allow use of fixtures as temporary sanitary facilities during construction unless expressly approved**
48 **in writing by the Owner.**

49
50 Prior to final acceptance, clean fixtures, brass, trim, etc. using manufacturer's recommended cleaning methods and
51 materials.

52 53 54 **OWNER INSTRUCTION AND TRAINING**

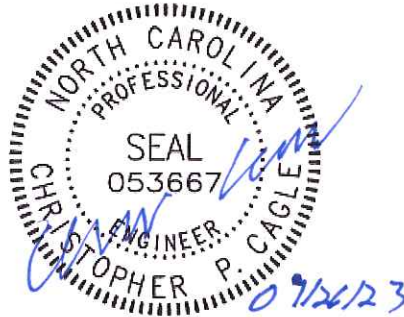
55
56 Provide Owner instruction and training in accordance with Section 019926.

57
58
59 **END OF SECTION 224000**

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SECTION 230210 – HVAC SUMMARY OF WORK

Engineer of Record for Heating, Ventilating, and Air-Conditioning work is Christopher P. Cagle, PE, Salas O'Brien, 1620 Midtown Place (27609), P. O. Box 19944, Raleigh, NC 27619. Heating, Ventilating, and Air-Conditioning work shall be defined by drawings numbered with the prefix "H-", the general provisions of the Contract including General Conditions and Supplementary Conditions, Division 1 Specification sections, and Division 23 Technical Specification sections listed below. In addition, Heating, Ventilating, and Air-Conditioning work may be defined by reference to other documents by any of the above-named sources as well as by project addenda.



DIVISION 23 - HVAC TECHNICAL SPECIFICATIONS

Section	Title
230210	HVAC Summary of Work
230510	HVAC Basic Requirements
230593	HVAC Testing, Adjusting, and Balancing
233713	Diffusers, Registers, and Grilles

25
26
27

END OF SECTION 230210

SECTION 230510 – HVAC BASIC REQUIREMENTS

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

The requirements specified herein shall govern all Sections in Division 23, whether stated therein or not.

Where items specified in the other sections of this Division conflict with requirements of this Section, the former shall govern.

SUBMITTALS

Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

TEMPERATURE AND HUMIDITY CRITERIA

Indoor temperature and humidity conditions in occupied spaces, unless specifically specified or indicated otherwise on the Drawings, shall be maintained as follows:

Space/ Area	Indoor Air Condition	Occupied Periods	Unoccupied Periods
General occupied spaces	Dry Bulb Temperature	70-77 deg F	55 deg F, Minimum 85 deg F, Maximum

PART 3 - EXECUTION

OPERATION OF HVAC SYSTEMS

The use of permanent HVAC systems to support general construction activities is prohibited. The need for heating, cooling, dehumidification, and/or ventilation during construction by the General Contractor or any project sub-contractor shall be met via use of temporary HVAC units or systems, as specified in Division 01, provided by the contractor(s) having the need.

HVAC equipment, subsystems, and/or systems may be started and temporarily operated as necessary to perform the work, testing, balancing, and/or verification as specified in various sections of Division 23. Air systems shall be started **only** after general construction activities in the areas served by the air systems are such that there is low risk of contamination and/or degradation to the system. Generally, the following construction status is required within the entire area served by an individual air system:

Floor/wall/ceiling preparation that requires sanding or other dust producing work is complete.

Wall/ceiling surfaces required to be painted shall at least have one coat of primer applied.

Ceiling spray-on decorative or acoustical coatings, where specified, are complete.

Lay-in ceilings, where specified, have been installed.

Floors finishes (tile, carpet, paint, etc.) shall be complete.

1 During temporary operation of air systems, the following additional measures are required:
2

3 Install temporary roll media filters (minimum MERV 13) over each air inlet (return or exhaust). Temporary
4 filters shall be replaced regularly in order to minimize pressure losses impose on fans.
5

6
7 Windings of open, drip proof electric motors shall be cleaned using low pressure compressed air at the end
8 of each 72 hours of operation.
9

10 Once HVAC systems verification has been completed, air systems shall be shut down, temporary filters removed,
11 and air handler filters replaced with new unless specifically directed otherwise by the A-E. **Only upon receipt of**
12 **written approval by the A-E shall HVAC systems be placed into final service prior to Substantial Completion**
13 **of the Project.**
14

15

16

END OF SECTION 230510

SECTION 230593 – HVAC TESTING, ADJUSTING AND BALANCING

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK

Extent of testing, adjusting, and balancing (TAB) work includes, but is not necessarily limited to, duct systems, piping systems, and associated equipment and apparatus of HVAC work.

SUBMITTALS

General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of this specification. Where a submitted item does not **comply fully** with each and every requirement of the Specifications, the submittal shall clearly indicate such deviations. Identification requirements for non-complying features of items are very specific. See Section 019913 for exact requirements.

Certification: Submit TAB subcontractor certification.

Instrument Calibration Report: Submit calibration test results for balancing instruments.

TAB Reports: Draft and final test reports

QUALITY CONTROL

TAB work shall be completed by an independent balancing subcontractor certified by the Associated Air Balance Council (AABC) or the National Environmental Balancing Bureau (NEBB).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

GENERAL

After systems have been started up and initially adjusted, the Contractor shall perform tests and accomplish the balancing necessary to provide the air flows indicated on the Drawings.

TAB subcontractor shall spot check systems with A/E at Final Inspection.

CERTIFIED TEST REPORTS

General: Four copies of the Draft Test and Balance Reports shall be provided to the A/E before the Final Inspection. The reports shall comply with reporting procedures defined in Chapter 13, ASHRAE Standard 111 and as hereinafter specified.

1 After the A/E check of the system at or before the Final Inspection, the Final Test and Balance Reports shall be
2 provided to the A/E. **Additionally, one copy of the Final Test and Balance Report shall be submitted to the**
3 **authority having jurisdiction and a copy shall be included with each copy of the Operating and Maintenance**
4 **Manuals.**

5
6 Certification: Both Draft and Final Reports shall be certified by the TAB subcontractor and shall:

7
8 Be certified proof that the systems have been tested, adjusted, and balanced in accordance with the
9 referenced standards.

10
11 Accurately represent how the systems have been installed.

12
13 Define how the systems are operating at completion of the TAB procedures.

14
15 Draft Reports: Upon completion of TAB procedures, prepare and submit draft reports for review by the A/E. Draft
16 reports may be hand written, but must be complete, factual, and legible. Organize and format draft reports as
17 hereinafter specified.

18
19 Final Reports: After review and verification by the field check by the A/E of the Draft Report, submit the Final
20 Reports, organized and formatted as hereinafter specified.

21
22 Reports Format: Bind report forms complete with schematic systems diagrams and/or plans and other referenced
23 data in reinforced, vinyl, three-ring binders.

24
25 Provide title page listing the name, address, and telephone numbers of the TAB subcontractor. Provide list of all test
26 instruments utilized, along with last date of calibration.

27
28 Provide certification page, signed by the TAB project manager, as hereinbefore specified.

29
30 Divide contents of the binder into the following divisions, as applicable, separated by divider tabs:

31
32 General Information and Summary

33
34 Air Systems TAB

35
36 Reports Contents:

37
38 System Diagrams: Include schematic layouts of air distribution systems. Present each system with single-
39 line diagram and include the following:

40
41 Quantities of outdoor, supply, return, and exhaust airflows.

42
43 Location and position of balancing devices.
44

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Design Data and Test Results: For each HVAC component and system, provide design data and final adjusted test data, including but not limited to the following:

Component Data	Test Data (Design and Final Adjusted Values)
Fans	
Identification Location Fan type Manufacturer Manufacturer model number and size Manufacturer's serial number Arrangement and class Fan sheave make, size in inches and bore Center-to-center dimensions of sheave, and amount of adjustments in inches Motor make, and frame type and size. Motor horsepower and rpm. Motor FLA and service factor Motor sheave make, size in inches and bore. Center-to-center dimensions of sheave, and amount of adjustments in inches Number, make, and size of belts	Total airflow rate in cfm Total system static pressure in inches wg Fan rpm Discharge static pressure in inches wg Suction static pressure in inches wg
Duct Traverse	
Identification (referenced to system diagrams included in TAB reports) System, air-handling-unit, and/or fan identification	Location and zone. Traverse air temperature in deg F Duct static pressure in inches wg Duct size in inches Duct area in sq. ft. Air flow rate in cfm Air velocity in fpm
Air Terminal Device (Register, Grille, Diffuser, etc.)	
System and air-handling unit identification Room/area served Number from system diagram. Manufacturer Type and manufacturer's model number. Size (face and neck) Effective area in sq. ft.	Test method Design air flow rate in cfm Design air velocity in fpm Preliminary measured air flow rate in cfm Preliminary measured velocity in fpm Final air flow rate in cfm Final velocity in fpm Space temperature in deg F
Air Terminal Unit	
Identification Location Rooms or area served Type (constant volume, variable volume, fan powered, etc.) Manufacturer Manufacturer model number and serial number Fan motor horsepower and rpm Fan motor FLA and service factor	Supply Air: Maximum airflow in cfm Minimum airflow in cfm Primary Air: Maximum airflow in cfm Minimum airflow in cfm Fan: Airflow in cfm Total static pressure in inches wg Motor voltage Motor amps Reheat Coil: See coil requirements above.

5

1 **TEST AND BALANCE PROCEDURES**
2

3 Test Instruments Calibration: Instruments for air balance shall have been calibrated within a period of six months prior
4 to balancing and tested for accuracy prior to start of work.
5

6 Air Systems Test and Balance Procedures:
7

8 General: Air handling and distribution systems, including supply, return, ventilation, and exhaust airflows
9 shall be balanced and adjusted in accordance with Chapter 10 of ASHRAE Standard 111 and Section 7.2.2
10 of ASHRAE Standard 62.1. Maximum air quantities at each outlet or inlet shall not vary more than -5% to
11 +10% from those indicated on the Drawings.
12

13 Drive Changes: If the measured cfm of a supply fan, return fan, or exhaust fan varies more than plus 10%
14 or minus 5% from design, adjust the drive of each fan to obtain required cfm. **Any changes in the pulleys,
15 belts and dampers required for correct balance shall be provided by the Contractor, including
16 replacement of fan and/or motor sheaves.**
17

18
19 **A/E QUALITY CONTROL CHECK**
20

21 In the presence of the A/E during or before the Final Inspection, the TAB subcontractor shall verify the balance of the
22 air systems as follows:
23

24 At least 15% of registers, grilles, and diffusers will be checked for proper air flow via calibrated flow hood..
25

26 **The TAB subcontractor shall provide all test instruments required for the Owner/Engineer check of the air
27 balance.**
28

29 During the A/E check, the TAB contractor shall verify the full range of air flows for the items selected to be checked.
30 The Contractor shall have the controls sub-contractor present during the A/E check of the air systems balance.
31

32
33 **END OF SECTION 230593**

SECTION 233713 - DIFFUSERS, REGISTERS AND GRILLES

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

QUALITY ASSURANCE

ARI Compliance: Test and rate air outlets and inlets in accordance with ARI 650, *Standard for Air Outlets and Inlets*.

ASHRAE Compliance: Test and rate air outlets and inlets in accordance with ASHRAE 70, *Method of Testing for Rating the Air Flow Performance of Outlets and Inlets*.

NFPA Compliance: Install air outlets and inlets in accordance with NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*.

ASTM Compliance: Paint hardness shall pass 125 hour ASTM B 117 salt spray test, 500 hour ASTM D-870 water impression test, and ASTM D-2794 reverse impact cracking test with a 50 in/lb force applied.

Acoustic Criteria: HVAC equipment shall be selected and installed to comply with the acoustic criteria defined in Section 230510.

SUBMITTALS

General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of this specification. Where a submitted item does not **comply fully** with each and every requirement of the Specifications, the submittal shall clearly indicate such deviations. Identification requirements for non-complying features of items are very specific. See Section 019913 for exact requirements.

Manufacturer's Data: Submit manufacturer's technical product data for air outlets and inlets including the following:

Schedule of air outlets and inlets indicating drawing designation, room location, number furnished, model number, size, and accessories furnished.

Data sheet for each type of air outlet and inlet, and accessory furnished; indicating construction, finish, and mounting details.

Performance data for each type of air outlet and inlet furnished, including aspiration ability, temperature and velocity traverses, throw and drop, and noise criteria ratings. Indicate selections on data.

Samples: Samples of each unit proposed shall be submitted for review upon request by A-E.

PART 2 - PRODUCTS

REGISTERS, GRILLES AND DIFFUSERS

General: Diffusers, registers, and grilles for supply, return, and exhaust air shall be provided as indicated on the Drawings. Units shall be selected for noise levels required by Section 230510, with "draftless" distribution (terminal air velocity 50 fpm or less). Units that are noisy in the opinion of the A-E, shall be removed and replaced with acceptable ones. Performance based on volume controls fully opened.

Units shall be furnished with gaskets at edges to prevent leakage.

1 The interior portions of wall grilles and registers, including connecting duct, which are exposed to view, shall be
2 painted flat black. Interior portion of ceiling diffusers shall be of the same color as the diffusers and accessories shall
3 be flat black.

4
5 **Manufacturer's model numbers specified herein are intended for ease of identification and comparison.**
6 **Equivalent products by manufacturers other than those listed, equal in appearance and performance, may be**
7 **acceptable upon review by A/E.**

8
9 Unless indicated otherwise on the Drawings, all registers, grilles, and diffusers shall be steel construction.

10
11 Exception: Registers, grilles, and diffusers located in wet areas, including but not limited to bathrooms and
12 toilets, kitchens, dining areas, etc. shall be aluminum construction. Egg-crate return or exhaust registers or
13 grilles shall be aluminum construction. **Registers, grilles, and diffusers located in coastal counties shall**
14 **be aluminum construction.**

15
16 Rectangular Louvered Face Ceiling Diffuser (**Type-B**): Louvered full face diffuser with round neck that is adjustable
17 horizontal to vertical, constructed of 24 gauge steel or aluminum, as indicated on the Drawings, and finished with
18 baked white enamel unless otherwise noted. Frame style shall match ceiling types(s). Diffuser shall be as follows:
19

Manufacturer	Steel Construction Model No.	Aluminum Construction Model No.
Titus	TMSA	TMSA-AA
Tuttle & Bailey	1300A	A1300A
Price	SCDA	ASCDA
Nailor	RNSA	ARNSA

20
21 Plenum Slot Diffusers (**Type-D**): Plenum slot diffusers with insulated sheet metal plenum, number and width of slots
22 as scheduled or required to meet performance criteria (minimum of 2 slots), lengths as scheduled or indicated in plan,
23 adjustable pattern controllers, constructed of heavy gauge aluminum and finished baked white enamel unless
24 otherwise indicated. Frame style shall match ceiling type(s). Provide opposed blade damper in duct. Diffuser shall
25 be Titus model ML-Series, Tuttle & Bailey model APPS or ITPS, Price SDS series, Nailor 5800 series, or equivalent.
26

27 Perforated Face Register or Grille (**Type-Z**): Perforated panel face diffuser with adjustable louver vanes, hinged flush
28 face, backpan and interior painted flat black. Register/grille shall be constructed of 26 gauge steel or aluminum as
29 indicated on the Drawings and finished baked white enamel unless otherwise noted. Frame style shall match ceiling
30 type(s). Register or grille shall be as follows:
31

Manufacturer	Steel Construction Model No.	Aluminum Construction Model No.
Titus	PAR	PAR-AA
Tuttle & Bailey	PG	APG
Price	PDDR	APDDR
Nailor	4360	4360AA

32
33
34 **PART 3 - EXECUTION**

35
36
37 **INSTALLATION**

38
39 Locate ceiling air diffusers, registers, and grilles as indicated on general construction "Reflected Ceiling Plans."
40 Unless otherwise indicated, locate units in center of acoustical ceiling modules.

41
42 Install diffusers, registers, and grilles in full accordance with the manufacturer's recommendations. **Modifications in**
43 **ductwork, accessories, and arrangement from that indicated on the Drawings, but required for integration of**
44 **the diffusers, registers and grilles proposed into the system as designed shall be the responsibility of the**
45 **Contractor.**

1 Unless indicated otherwise on the Drawings, registers, grilles, and diffusers shall be provided with balancing dampers
2 located at the branch duct connection, not at the air distribution device. Where a balancing damper is indicated at the
3 register, grille, or diffuser, it shall be a rectangular opposed blade damper for installation in square or rectangular
4 necks or a radial opposed blade damper for installation in round necks. **The use of butterfly dampers or horizontal
5 radial dampers at air distribution devices is prohibited.**
6

7

8 **OWNER INSTRUCTION AND TRAINING**

9

10 Provide Owner instruction and training in accordance with Section 019926.

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12

13

END OF SECTION 233713

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SECTION 260000 - SUMMARY OF ELECTRICAL WORK

Engineer of Record for electrical work is Matthew J. Johnson, PE, Salas O'Brien., 1620 Midtown Place (27609), P. O. Box 19944, Raleigh, NC 27619. Electrical work shall be defined by drawings numbered with the prefix "E", the general provisions of the Contract including General Conditions and Supplementary Conditions, Division 1 Specifications sections, and Division 26-28 Technical Specifications listed below. In addition, electrical work may be defined by reference to other documents from any of the above-named sources as well as by project addenda.



DIVISION 26 - ELECTRICAL

Section	Title
260000	Summary of Electrical Work
260500	Basic Electrical Requirements
260519	Secondary Voltage Wires and Cables
260526	Grounding
260529	Supporting Devices
260533	Electrical Identification
260534	Raceways
260535	Electrical Boxes and Fittings
260579	Temporary Power and Lighting
260593	Electrical Connections for Equipment
260923	Lighting Control Devices
262726	Wiring Devices
265000	Lighting Fixtures

23
24

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

Section	Title
283110	Fire Alarm System Modification

25
26
27

END OF SECTION 260000

SECTION 260500 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

SCOPE

The electrical design for this project is based on the requirements of the *National Electrical Code* (NEC), NFPA-70, 2020 Edition. Where not restricted to more stringent requirements by the Drawings and Specifications, the minimum requirements of the NEC shall prevail.

Contractor shall coordinate the work and equipment of this Division with the work and equipment specified elsewhere in order to assure a complete and satisfactory installation.

It is the intention of these Specifications and Drawings to call for finished work, tested and ready for operation. Whenever the words "supply," "provide," or "furnish" are used, it shall mean "furnish and install complete and ready for use at no additional cost."

Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the Work the same as if herein specified or shown.

Some items of equipment are specified in the singular; however, the Contractor shall provide and install the number of items of equipment as indicated on the Drawings, and as required for complete systems. The words "and" and "or" shall be interpreted in both the singular and plural sense (and/or) as appropriate to the use.

Electrical service entrance equipment arrangements for temporary and permanent connections to the Owner's system shall conform to the Owner's requirements. Coordinate circuit breakers with the existing system.

All ampacities or other conductor references where indicated or otherwise specified in the Drawings or Specifications are based on copper conductors. **Aluminum conductors are not acceptable and will not be permitted.**

DEFINITIONS

Definitions for "Concealed" and "Exposed" are provided for the purpose of specifying wiring methods or for defining the appearance of finished work and are not the same as definitions used in the National Electrical Code.

Concealed: Work within or behind various construction elements or in crawl spaces or trenches that is not exposed to view when the project is complete.

Exposed: Not "concealed" as defined above, or anything exposed to view when the project is complete.

Labeled: Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization accredited by NCBCC (North Carolina Building Code Council) to label electrical equipment and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Listed: Equipment or materials included in a list published by an organization accredited by NCBCC (North Carolina Building Code Council) to label electrical equipment and concerned with product evaluation, that maintains periodic inspection of production of listed equipment or materials, and whose listing states either that the equipment or material meets appropriate designated standards or has been tested and found suitable for use in a specified manner.

1 Wiring: Cable, raceways, fittings, mechanical supports, wire, junction boxes, device boxes, outlet boxes, switches,
2 cutouts, and related items.

3
4 **PART 2 – PRODUCTS (NOT USED)**

5
6
7 **PART 3 - EXECUTION**

8
9
10 **ENERGIZED SYSTEM WARNING**

11
12 Extreme caution is enjoined with regard to work with and around energized electrical equipment. The Contractor is
13 urged to coordinate all such activities with the Owner or the local electric utility so that electrical equipment may be
14 de-energized as required to safely perform necessary construction activities as defined in the Drawings and
15 Specifications. Suitable OSHA approved lockout-tagout procedures shall be used when circuits or equipment have
16 been de-energized for the purpose of performing construction activities. All work practices related to worker safety
17 are the complete responsibility of the Contractor.

18
19
20 **DUTIES OF CONTRACTOR**

21
22 The Drawings are generally diagrammatic in nature and are neither intended to show each fitting, box, elbow, offset,
23 hanger, *etc.*, nor a complete detail of all work to be done. The Drawings are for the purpose of illustrating the type of
24 system, showing raceway sizes, *etc.*, and special conditions considered necessary for the experienced mechanic to
25 take off materials and lay out work. This Contractor shall be responsible for taking such measurement as may be
26 necessary at the job and adapting his work to local conditions.

27
28 Contractor shall furnish and install all materials called for or reasonably implied in these Specifications and
29 accompanying Drawings. Apparatus must be furnished complete and ready for operation in every respect. Materials
30 and equipment called for in the Specifications and not indicated on the Drawings, or indicated on the Drawings and
31 not called for in the Specifications, shall be furnished by the Contractor.

32
33 Contractor is responsible for familiarizing himself with the project area and details of the construction of building.
34 Work performed under these Specifications that is installed improperly or which requires modification due to improper
35 reading or interpretation of building plans shall be corrected or otherwise modified as directed by the A-E without
36 additional cost to the Owner.

37
38 Contractor shall follow Drawings in laying out work and shall refer to drawings of other trades to verify exact spaces in
39 which work will be installed. Arrange installed items in such a manner as to maintain maximum headroom and space
40 conditions at all points. Where headroom or space conditions appear inadequate, A-E shall be notified before
41 proceeding with installation.

42
43
44 **INSPECTIONS**

45
46 The contractor shall notify the office of the local Authority Having Jurisdiction, to schedule required
47 inspections. This shall include all inspections of concealed work, interior and exterior, as well as intermediate
48 and final reviews.

49
50
51 **COOPERATION WITH OTHER TRADES**

52
53 The Contractor shall give full cooperation to other trades and shall furnish any and all information necessary to permit
54 the work of other trades. Information to be provided by the Contractor includes, but is not limited to templates,
55 patterns, setting plans, and shop details as may be necessary for the proper installation of work and for the purpose
56 of coordinating adjacent work. Information required by other trades shall be provided in a timely manner and shall be
57 sufficient to allow the work of such other trades to proceed with the least possible interference or delay.

1 Where the work of the Contractor will be installed in close proximity to, or may interfere with work of other trades, the
2 Contractor shall assist in working out space conditions to make a satisfactory adjustment. **If the Contractor installs
3 his work before coordination with other trades, he shall make the necessary changes in his work to correct
4 the condition without extra charge.**
5

6 Scaled Shop Drawings: If so directed by the A-E, the Contractor shall prepare composite working drawings
7 and sections at a suitable scale not less than 3/8"=1'-0", clearly showing how his work is to be installed in
8 relation to the work of other trades.
9

10 **SAFETY REQUIREMENTS**

11 All systems shall be installed so as to operate in a safe manner; all moving parts shall be covered where there is any
12 possibility of danger from such moving parts. All rough edges of equipment and materials shall be made smooth.
13

14 All safety controls shall be checked under the supervision of the Owner's representative and two (2) copies of test
15 data showing setting and performance of safety controls shall be submitted to the A-E by the Contractor.
16

17 During the construction the Contractor shall keep the site reasonably clean of debris and upon completion of
18 construction he shall clean up the premises to remove all evidence of his work. The Contractor shall provide, at no
19 additional cost to the Owner, additional cleaning of the site as directed by the Owner. In addition, upon completion of
20 construction, he shall clean, wash and/or polish all fixtures, equipment and exposed material and leave each item
21 clean, bright, and without blemish. Damaged items shall be replaced or repaired in a manner satisfactory to the
22 Owner by the Contractor at no additional cost to the Owner.
23

24 It shall be the responsibility of the Contractor to maintain a safe working environment at all times and to comply with
25 all OSHA regulations for the duration of the project.
26

27 **SUBMITTALS**

28 Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal
29 requirements are defined in each section of this Division.
30

31 Manufacturer's Data: Submit manufacturer's technical product data.
32

33 **NAMEPLATE DATA**

34 Each item of electrical utilization equipment shall be provided with a permanent operational data nameplate that shall,
35 as a minimum, indicate the following: equipment manufacturer, product name, model number, serial number,
36 capacity, voltage requirements, and either full load current or full load volt-amperes. Labels of tested compliances
37 and similar essential data shall be a part of this label or located nearby. All equipment nameplates shall be in an
38 accessible location.
39

40 In the event that the installation of equipment renders the manufacturer's nameplate inaccessible, the above
41 information shall be etched onto a laminated plastic nameplate securely fastened to the equipment by no less than
42 two machine screws or by other fastening methods approved by the A-E.
43

44 **FLASH PROTECTION WARNING**

45 Each piece of new electrical equipment, such as switchboards, parallel switchgear, panelboards, circuit breaker
46 enclosures, control panels, motor control centers, transfer switches, etc. that are likely to require examination,
47 adjustment, servicing or maintenance while energized, shall be field marked in a clearly visible location on the
48 equipment enclosure to warn qualified persons of potential electric arc flash hazards, in accordance with NEC
49 110.16.
50

1 **ACCESSIBILITY**
2

3 Contractor shall be responsible for the sufficiency of the size of shafts and chases and the adequate clearance in
4 double partitions and hung ceilings for the proper installation of his work. He shall cooperate with all other trades
5 whose work is in the same place and shall advise the General Contractor of his requirements. Such spaces and
6 clearances shall be kept to the minimum size required for such installations.
7

8 Contractor shall locate all equipment that must be serviced, operated, or maintained in fully accessible positions and
9 shall coordinate with other trades as necessary to meet the workspace requirements of the National Electrical Code.
10 Equipment where such space is required includes switchboards, motor control centers, panelboards, fire alarm
11 control panels, telephone and data terminal panels and cabinets, and similar items.
12

13 Minor deviations from Drawings may be made to allow improved accessibility. Submit requests for all changes to the
14 A-E for approval. Relocation of equipment, should such be required to meet NEC workspace requirements, shall be
15 made by the Contractor at no additional cost.
16

17
18 **CONCEALED RACEWAY**
19

20 In general, all raceway or cable wiring methods in finished spaces shall be run concealed in walls, partitions,
21 structural concrete panels, or above ceilings.
22

23 Exterior Raceway: Raceway may not be routed on exterior surfaces of the building or across a building roof
24 (either above, below, or within roof insulation) unless specifically indicated on the Drawings.
25

26 Raceway Below Concrete Floor Slabs: Raceway may not be routed below concrete floor slabs unless such
27 is specifically shown on the Drawings.
28

29 Concealment of raceway and covering of same shall not be done until authorized by the Authority Having Jurisdiction
30 (AHJ). This applies to all interior work and exterior work.
31

32
33 **SLEEVES AND PLATES**
34

35 Contractor shall provide and locate all sleeves and inserts required, or shall be responsible for the cost of cutting and
36 patching required where sleeves and/or inserts were not installed, or where incorrectly located. The Contractor shall
37 be responsible for all drilling required for the installation of his hangers.
38

39 Sleeves shall be provided for all raceway passing through concrete, masonry, or tile wall, floor, or overhead deck
40 construction. Sleeves shall be constructed of Schedule 40 black steel pipe unless otherwise indicated on Drawings.
41 Sleeves through concrete beams shall be constructed as indicated on Drawings.
42

43 Fasten sleeves securely in walls so that they will not become displaced when other construction is built around them.
44 Take precautions to prevent concrete, plaster, or other materials being forced into the space between raceway and
45 sleeve during construction.
46

47 Escutcheon plates shall be provided for all exposed (where permitted) raceway passing through walls and ceilings.
48 Plates shall be nickel plated, of the split ring type, of size to match the raceway. Where plates are provided for pipes
49 passing through sleeves that extend above the floor surface, provide deep recessed plates to conceal the pipe
50 sleeves.
51

52
53 **SUPPORTS, ATTACHMENTS**
54

55 Contractor shall furnish and install all necessary supports required for all electrical equipment, lighting fixtures,
56 raceway, outlet boxes, panelboards, generators, and for all other equipment furnished under this contract, and shall
57 submit drawings to the A-E for approval before purchase, fabrication, or construction of same.
58
59
60

1 All equipment, unless otherwise shown, shall be securely attached to the building structure in an approved manner.
2 Attachments shall be of a strong and durable nature; any attachments that are deemed by the A-E to be insufficient
3 due to reasons of strength, location, quality, or appearance shall be replaced as directed at no additional cost to the
4 Owner.

5
6 Framing members shall be standard rolled steel shapes, ASTM A36 steel, except that members welded to main
7 structural member shall be of the same specification as the main structural member.

8
9 Framing shall be "simple beam" type with end connections welded or bolted for shear loads. Cantilevers may be
10 used when detailed or specifically approved. Location of supplementary framing shall be subject to approval.
11 Welding, where required, shall be performed by certified welders.

12
13 Framing members shall be designed for their actual loads with allowable stresses set forth in the AISC Specifications
14 and the AISC Code, without excessive deflection and with consideration for rigidity under vibration, in accordance
15 with standard structural practices. Supplementary framing, including design loads, member size and location shall be
16 clearly shown on shop drawings.

17
18 When supplementary framing is indicated, verify that dimensions are suitable and that framing is structurally
19 adequate for the equipment furnished.

20 21 22 **FIRE RATED CONSTRUCTION**

23
24 The fire rating of all floors, ceilings, and partitions shall be maintained. It is the responsibility of this Contractor
25 provide and install any necessary fire resistive components so that the fire integrity of all fire rated structures
26 supporting or containing items required under Divisions 26-28 will not be diminished by the installation of such items.
27 Where device or junction boxes penetrate any fire rated structure, the boxes shall be located in such a manner as not
28 to reduce the fire rating of the structure. Where the Drawings indicate adjacent boxes or devices in rated partitions
29 that would reduce the fire rating of the partition if unprotected, suitable Listed protection methods shall be used to
30 insure the fire rating of the partition will not be decreased by the proximity of other boxes or penetrations.

31
32 Where recessed fixtures are used in fire rated ceilings, suitable construction shall be installed above and around the
33 fixture so that the fire rating of the ceiling is maintained. Refer to Architectural Drawings for fire ratings of ceilings.

34
35 Where recessed panelboards, recessed cabinets, or other items are located in a fire rated partition, suitable
36 construction behind and around the item shall be used to maintain the fire rating of the partition.

37
38 Where fire resistive insulation or other coverings have been applied to a structure or to structural elements to obtain a
39 fire rating and this insulation or covering is removed or otherwise disturbed by the installation of Division 26-28
40 components or other related items, this Contractor shall be responsible for restoring the material to a condition that
41 matches the original fire protective ability.

42
43 Approval must be obtained from the A-E before any boxes, devices, or other components are relocated for the
44 purpose of maintaining fire ratings.

45 46 47 **TESTING LABORATORY APPROVAL**

48
49 All equipment shall be approved for the intended use and shall be Labeled or Listed. In any case where the suitability
50 for a particular application is in question by the A-E or inspection authorities the Contractor shall furnish appropriate
51 standards covering the specific piece of equipment in question. Such standards, if required, shall be requested by
52 the A-E in writing and shall be furnished by the Contractor at no additional cost.

53 54 55 **PERSONNEL GROUND FAULT PROTECTION**

56
57 Personnel ground fault protection is to be provided for certain receptacles as indicated on the Drawings and/or as
58 required by the National Electrical Code. Protection is to be provided by the use of GFCI receptacles; the use of
59 GFCI circuit breakers is not acceptable for the protection of general use receptacles. GFCI receptacles may not be
60 used to protect other downstream non-GFCI receptacles unless specifically indicated on the Drawings.

If required, use GFCI circuit breakers to protect equipment or dedicated receptacles in locations as indicated on Drawings or panel schedules. GFCI receptacles may not be used to protect downstream circuit components.

TYPICAL MOUNTING HEIGHTS OF DEVICES

Typical mounting heights for electrical equipment shall be as follows unless otherwise noted on Drawings:

DEVICE	MOUNTING HEIGHT ABOVE FINISHED FLOOR (AFF)	TO
Panelboards	6'-6"	Top
Toggle Switches	3'-6"	Center Line
Receptacles	1'-6"	Center Line
Telephone Outlets	1'-6"	Center Line
Telephone Cabinets	6'-6"	Top
Telephone Backboards	6'-6"	Top
Safety Switches	5'-6"	Top
Data Outlets	1'-6"	Center Line

SCAFFOLDING, RIGGING, HOISTING

The Contractor shall furnish all scaffolding, rigging, hoisting and related sub-contract services necessary for equipment delivery and final placement as indicated on the Drawings.

All scaffolding, rigging and hoisting equipment shall be removed from the job site in a timely manner when such equipment is no longer required.

ELECTRICAL CIRCUITS

Circuit designations and connections are shown on the Drawings. Indicated circuit numbers and circuit breaker positions are mandatory unless changes are specifically approved by the A-E in writing.

Electrical neutral connections are indicated on the Drawings. Neutrals may not be reconfigured or otherwise changed without specific approval in writing from the A-E.

Request for circuit or neutral changes **can not be a part of the equipment submittal process.**

EQUIPMENT CONNECTIONS

In general, provide complete electrical power supply system connections to all equipment shown on Drawings. In addition, provide disconnection and re-connection to the power system of any items that are indicated on the Drawings as being moved or relocated.

Control wiring shall be installed in raceways and box system separate from power wiring, unless otherwise indicated on Drawings. Wiring within equipment enclosures shall be in raceways provided under this section of the Specifications unless approved raceway is provided by the manufacturer of the equipment or unless the equipment is listed for use as a raceway.

ELECTRICAL PROVISIONS FOR DIVISIONS 21 - 23

Division 26-28 Contractor shall provide complete power wiring to a disconnecting means provided under Division supplying the equipment. Extension of power from the disconnecting means to the utilization equipment shall be made under the Division supplying the equipment.

Starters, contactors, and similar control equipment shall be furnished and installed by other divisions unless specifically shown on the electrical Drawings. Control wiring is furnished by the Division supplying the control equipment.

- 1 Fuses for fused disconnects are furnished and installed by the division supplying the equipment to be protected.
- 2
- 3 Refer to Sections 210511, *ELECTRICAL PROVISIONS FOR FIRE PROTECTION WORK*, 220511, *ELECTRICAL*
- 4 *PROVISIONS FOR PLUMBING WORK* and/or 230511, *ELECTRICAL PROVISIONS FOR HVAC WORK* for a
- 5 complete description and breakdown of the responsibility of each trade (Divisions 20-23 and Divisions 26-28).
- 6
- 7
- 8 **END OF SECTION 260500**

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SECTION 260519 - SECONDARY VOLTAGE WIRES AND CABLES

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

QUALITY ASSURANCE

Manufacturers: Firms regularly engaged in manufacture of electrical products, of types and ratings required in this Section, whose products are Listed and Labeled for the purpose intended. Subject to compliance with requirements provide devices equivalent to one of the following:

- Encore Wire Corporation
- General Cable Corporation
- Southwire Company
- Cerro Wire

Codes and Standards:

NEC Compliance: Comply with NEC requirements as applicable to construction, installation and color coding of electrical wires and cables.

Testing Laboratory Compliance: Provide wiring/cablings and connector products that are Listed and Labeled.

SUBMITTALS

Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

Product Data: Submit manufacturer's data on electrical wires, cables and connectors.

PART 2 - PRODUCTS

SECONDARY VOLTAGE WIRES, CABLES, AND CONNECTORS

General: Provide electrical wires, cables, and connectors of manufacturer's standard materials, as indicated by published product information. Connections shall be designed and constructed using connectors as recommended by manufacturer for a complete installation for the application indicated. Provide copper conductors with conductivity of not less than 98% at 68° F.

Building Wires: Provide factory-fabricated wires of sizes, ampacity ratings, and materials for applications and services indicated. Where not indicated, provide proper wire selection as determined by Contractor to comply with project's installation requirements, NEC and NEMA standards. Select from the following Listed types those wires with construction features that fulfill project requirements:

- Type THWN/THHN: For general use as interior branch circuits and feeders; maximum operating temperature 90° C (194° F). Insulation, flame-retardant, moisture- and heat-resistant, thermoplastic; outer covering, nylon jacket; conductor, annealed copper.

1 Increase Drawing indicated size of conductors for ampacity and temperature rating as described below:
2

3 Conductor sizes shown on Drawings are based on the use of terminations Listed and Labeled for use at 75°
4 C. (167° F.). Where terminations are not Listed and Labeled for use at 75° C. (167° F.), the Contractor shall
5 increase the size of the conductor as required to meet the temperature rating of the conductor in accordance
6 with NEC Article 110.14(c). Conductor size increases required under this section shall be made without
7 additional cost.
8

9 Increase Drawing indicated size of conductors for voltage drop as follows:
10

11 Use #10 AWG conductor for 20 Ampere, 120 Volt branch circuit home runs longer than 50 feet, unless
12 otherwise noted on Drawings.
13

14 Use #10 AWG conductor for 20 Ampere, 277 Volt branch circuit home runs longer than 100 feet, unless
15 otherwise noted on Drawings.
16

17 Conduit runs shall contain the number of phase conductors shown on the plans. A dedicated neutral shall be
18 installed for each phase conductor served by single pole, 120 and 277 Volt, 20 Amp circuit breakers. Multi-pole
19 circuit breakers serving 120 and 277 Volt, 20 Amp multi-wire branch circuits with a common neutral shall not be
20 permitted. Conduits runs shall contain related grounding and/or isolated grounding conductors.
21

22 Conduit runs that contain more than one neutral shall have each neutral conductor uniquely identified at
23 each termination, splice and where routed through junction or pull boxes. Neutral conductors containing a
24 factory applied, trace line along the length that matches the color of the associated phase conductor shall be
25 used to meet this requirement. Machine printed labels with the panel and associated circuit number shall
26 also be permitted for identifying neutral conductors. Colored tape and pre-printed tags shall not be
27 acceptable.
28

29 Feeders and/or branch circuits shall not be combined either with each other or one with another into junction
30 boxes, pull boxes, device boxes, manholes, or other common routing unless such routing is specifically
31 indicated on the Drawings.
32

33 Neatly train wiring inside boxes, equipment and panelboards; Avoid bundling conductors with lacing or cable ties so
34 that generated heat may be more easily dissipated.
35

36 Conduit runs indicated on the Drawings as composed of parallel runs of conductors shall be made identical with
37 respect to length, conduit size, wire type, insulation type, routing, and terminations at each end.
38

39 Conductors Shall Be Color Coded as Follows:
40

41 Grounding Conductors: Green
42

43 Isolated Grounding Conductors: Green with yellow tracer
44

45 Grounded Neutral Conductors: White for 120 V systems, gray for 277 V systems
46

47 Ungrounded Phase Conductors for 208Y/120V Systems: Black (phase A), red (phase B), and blue (phase
48 C)
49

50 Ungrounded Phase Conductors for 480Y/277V Systems: Brown (phase A), orange, (phase B) and yellow
51 (phase C)
52

53 Switch Leg Travelers: Violet
54

55 Provide other wire colors as indicated on the Drawings.
56

57 Remarking of insulation colors by use of colored marker tape shall be permitted only as allowed by the NEC.
58

59 Install exposed cables (where permitted) parallel and perpendicular to surfaces, or exposed structural members.
60 Cables shall follow surface contours, where possible.

1 Completely and thoroughly swab raceway system before installing conductors.
2

3 Branch circuit wiring shall not loop through receptacle terminals, but shall be connected by means of conductor taps
4 joined to branch circuit conductors. At end of run, branch circuit conductors may terminate on receptacle screw
5 terminals. Quick make, clamp, or push-in type terminations may not be used to make connections to devices.
6

7 Position all splices in pull boxes and junction boxes of adequate volume so they are accessible from the removable
8 cover side of the box.
9

10 Conductors for signal systems shall be continuous (without splice) and shall be terminated on terminal strips or
11 terminate in a manner approved by the system's manufacturer.
12

13 All neutrals and ground wires in panels shall be labeled with cloth wire markers to indicate the circuits being served.
14

15 Pull conductors simultaneously where more than one is being installed in same raceway.
16

17 Use pulling compound or lubricant, where necessary; compound used must not deteriorate conductor or insulation.
18 After conductors have been pulled, clean exposed conductors and surrounding area to remove all evidence of the
19 use of pulling compound.
20

21 Use pulling means including fish tape, cable, rope and basket weave wire/cable grips that will not damage cables or
22 raceway.
23

24 Keep conductor splices to a minimum.
25

26 Install splices and taps that possess equivalent or better mechanical strength and insulation ratings than conductors
27 being spliced.
28

29 Use splice and tap connectors that are compatible with conductor material.
30

31 Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published
32 torque tightening values. Where manufacturer's torque requirements are not indicated, tighten connectors and
33 terminals to comply with tightening torques specified in UL Standard 486A and B.
34

35 **WIRING CONNECTIONS AND TERMINATIONS**

36 Splices shall be permitted on conductors up to #4 AWG. No splices shall be permitted on conductor #3 AWG and
37 larger without specific approval in writing by the A-E. Splices shall be made in accessible junction boxes; no splices
38 shall be made in conduit bodies.
39

40 Splices, taps, and attachments of fittings and lugs shall be electrically and mechanically secure. Connectors and lugs
41 shall be proper size and labeled as suitable for the number and type of conductors joined.
42

43 Solid conductors, namely those sized #10 and #12 AWG copper shall be spliced or tapped only by the use of Ideal
44 "Wing-Nuts" or "Wire Nuts", Buchanan's "B-Cap" or 3M Co.'s "Scotchlox" connectors. "Sta-Kon" or other permanent
45 type crimp connectors shall not be used.
46

47 Self-stripping electrical pigtail and tap connectors shall not be used.
48

49 Stranded conductors, namely #8 AWG to #4 AWG, shall be spliced or tapped by approved mechanical connectors.
50 Insulation for splices or taps shall be obtained by the use of Listed insulating covers designed for use with the
51 particular connector. Quality of insulation at splices shall equal that of the conductor insulation in terms of
52 temperature resistance, covering ability and durability.
53

54 Conductors, in all cases, shall be continuous from outlet to outlet, and no splicing shall be made except within outlet
55 or junction boxes, troughs, and gutters. No splices shall be permitted in panel enclosures, disconnects or utilization
56 equipment.
57
58
59
60

1 Lugs for conductors #8 through #4 AWG shall be copper, with a direct acting screw. Where permitted, lugs for
2 conductors #3 AWG and larger shall be copper, applied directly to the cable by hydraulic pressure. Lugs shall not be
3 split bolt or screw types.

4
5 Tape, where used, shall be made using special oil resistant vinyl plastic tape that is Listed, rated 105° C.

6
7 Splices or taps in grounding conductors (where permitted) in sizes #8 AWG and larger shall be by means of
8 exothermic welding and termination shall be by means of approved grounding connectors. As an alternate,
9 connectors using hydraulic compression tools may be used as a contractor selection option. Solder shall not be used
10 as a means of joining grounding conductors.

11
12 Thoroughly clean wires before installing lugs and connectors.

13
14 Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.

15
16 Terminate spare conductors with electrical tape.

17
18
19 **FIELD QUALITY CONTROL**

20
21 Prior to energizing circuitry, check installed wires and cables with megohm meter to determine insulation resistance
22 levels to insure requirements are fulfilled. Provide additional testing as directed by the A-E in accordance with
23 Section 260800, *TESTING AND PLACING IN SERVICE*.

24
25 Prior to energizing circuitry, test wires and cables for electrical continuity and for short circuits. Verify proper phasing
26 connections.

27
28 Subsequent to wire and cable hook-ups, energize circuitry and demonstrate functioning in accordance with
29 requirements. Where necessary, correct malfunctioning units, and then retest to demonstrate compliance.

30
31
32 **END OF SECTION 260519**

SECTION 260526 - GROUNDING

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

QUALITY ASSURANCE

Manufacturer's Qualifications: Firms regularly engaged in manufacture of grounding and bonding products, of types, and ratings required, and ancillary grounding materials, including stranded cable, grounding rods, and bonding jumpers whose products are Listed and Labeled for their intended usage.

Codes and Standards:

Electrical Code Compliance: Comply with applicable State electrical code requirements and the authority having jurisdiction, and NEC as applicable to electrical grounding and bonding, pertaining to systems, circuits and equipment.

Testing Laboratory Compliance: Comply with applicable requirements of UL Standards No.'s 467, "Electrical Grounding and Bonding Equipment," and 869, "Electrical Service Equipment," pertaining to grounding and bonding of systems, circuits and equipment. In addition, comply with UL Std. 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors." Provide grounding and bonding products that are Listed and Labeled for their intended usage.

IEEE Compliance: Comply with applicable requirements of IEEE Standard 142 and 241 pertaining to electrical grounding.

SUBMITTALS

Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

Product Data: Submit manufacturer's data on grounding and bonding products and associated accessories.

PART 2 - PRODUCTS

GROUNDING AND BONDING SYSTEMS

Materials and Components:

General: Except as otherwise indicated, provide electrical grounding and bonding systems indicated, assemble materials, including, but not limited to, cables/wires, connectors, solderless lug terminals, grounding rods, bonding jumpers, service arresters, and additional accessories as needed for a complete installation. Where more than one type component product meets indicated requirements, selection is Contractor's option. Where materials or components are not indicated, provide products that comply with NEC and UL requirements and with established industry standards for those applications indicated.

Conductors: Unless otherwise indicated, provide equipment grounding conductors in all conduit and wiring systems. Grounding conductors shall be insulated by the same type insulation as the ungrounded conductors and sized in accordance with NEC Table 250.122 unless otherwise specified.

1 Bonding Connectors, Terminals and Clamps: Provide electrical bonding connectors, terminals, lugs and
2 clamps as recommended by bonding connector, terminal and clamp manufacturers for indicated
3 applications.

4
5 Ground Rods: Provide rods made of steel with copper welded exterior, 3/4" diameter by 10 feet.

6
7 Ground Bus Bars: Provide copper bus bars mounted on standoff insulating bushings.

8
9 Hardware: Provide hardware for all grounding and bonding applications that consist of Type 300 series
10 stainless steel, silicon bronze or brass. Hardware used for connections to enclosures shall include flat
11 washers and split lock washers.

12
13 Electrical Grounding Connection Accessories: Provide electrical insulating tape, bonding straps, as
14 recommended by accessories manufacturers for type service indicated.

15
16
17 **PART 3 - EXECUTION**

18
19
20 **EXAMINATION**

21
22 Examine areas and conditions under which electrical grounding and bonding connections are to be made and notify
23 A-E in writing of conditions detrimental to proper completion of work. Do not proceed with work until unsatisfactory
24 conditions have been corrected.

25
26
27 **INSTALLATION OF ELECTRICAL GROUNDING AND BONDING SYSTEMS**

28
29 General: Install electrical grounding and bonding systems as indicated, in accordance with manufacturer's
30 instructions and applicable portions of NEC, NECA's "Standard of Installation," and in accordance with recognized
31 industry practices to ensure that products comply with requirements.

32
33 Install grounding systems as designed and submit certified test report on grounding system.

34
35 Coordinate with other electrical work as necessary to interface installation of electrical grounding and bonding system
36 work with other work.

37
38 Ground electrical service system neutral at service entrance equipment to grounding rod(s), grounded copper water
39 pipe, and building steel where effectively grounded. All ground connections shall be accessible. Provide additional
40 bonding connections to miscellaneous metallic piping systems entering the building such as fire protection and gas
41 piping.

42
43 Provide an intersystem ground bus bar adjacent service equipment as shown on the drawings.

44
45 Ground each separately-derived system neutral to:

46
47 Effectively grounded copper water pipe

48
49 Building structural steel

50
51 Connect together system neutral, service equipment enclosures, exposed noncurrent carrying metal parts of
52 electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground
53 connectors, and cold water systems.

54
55 Install direct burial type ground clamps for grounding electrode conductors to underground grounding rods.

56
57 Provide a separate, insulated equipment grounding conductor from each device to ground buses in panelboards.
58 Terminate each end on a grounding lug, bus, or insulated grounding bushing.

1 Provide separate insulated equipment grounding conductor, size to be determined from NEC Table 250.122, for each
2 circuit and in each conduit run. The grounding conductor shall be attached by means of a dedicated green screw to a
3 common point in each junction box, cabinet, device box, enclosure, or utilization equipment to which it runs or
4 through which it passes. Grounding methods depending on the continuity of electrical raceway, clips, or mounting
5 screws are not acceptable. This grounding requirement will be rigidly enforced.
6

7 Connect grounding electrode conductors to copper water pipe using a suitable grounding clamp as indicated on
8 drawings. Provide conduit grounding hubs and water pipe ground clamps as required.
9

10 Provide copper grounding conductor from supplemental ground bus bar adjacent service equipment to
11 communications (telephone/data or cable TV) backboards where shown on drawings. Terminate conductor on
12 insulated ground bus bar for use by others.
13

14 Provide an insulated bonding bushing on all panelboard feeders. Terminate feeder equipment grounding conductor
15 by passing the conductor through the terminal of the insulated bonding bushing and then onward to terminate at the
16 panel ground bus.
17

18 Provide an insulated bonding bushing at boxes, enclosures or cabinets with concentric, eccentric or over-sized
19 knockouts. Terminate equipment grounding conductor by passing the conductor through the terminal of the insulated
20 bonding bushing and then onward to terminate at ground bus or lug.
21

22 Connect grounding electrode conductors to 1-inch diameter, or greater, metallic cold water pipe using a suitably sized
23 ground clamp.
24

25 Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with
26 manufacturer's published torque tightening values for connectors and bolts. Where manufacturer's torquing
27 requirements are not indicated, tighten connections to comply with tightening torque values specified in UL 486A to
28 assure permanent and effective grounding.
29

30 Apply corrosion-resistant finish to field-connections, buried metallic grounding and bonding products, and places
31 where factory applied protective coatings have been destroyed.
32

33 Install clamp-on connectors on clean metal contact surfaces to ensure electrical conductivity and circuit integrity.
34

35 Sectionalizing switchgear housing, cable shielding and primary grounding conductors shall be connected to a driven
36 copper ground rod having a maximum resistance of 25 Ohms by means of # 3/0 AWG bare copper stranded
37 conductor.
38

39 Service transformer housing, cable shields, primary and secondary neutrals shall be connected to a driven copper
40 ground having a maximum resistance of 25 Ohms using # 3/0 AWG bare stranded copper conductor. Primary neutral
41 conductor shall be unbroken to transformer primary neutral bushing, and thereafter grounded as indicated on the
42 Drawings.
43

44 **FIELD QUALITY CONTROL**

45
46
47 Upon completion of installation of electrical grounding and bonding systems, test ground resistance with ground
48 resistance tester. Where tests show resistance-to-ground is over 25 Ohms, take appropriate action to reduce
49 resistance to 25 Ohms, or less, by driving additional ground rods; then retest to demonstrate compliance.
50

51 Provide written certified testing report indicating resistance-to-ground value.
52

53
54 **END OF SECTION 260526**

SECTION 260529 - SUPPORTING DEVICES

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification section, apply to work of this section.

QUALITY ASSURANCE

Manufacturers: Firms regularly engaged in manufacture of supporting devices, of types, sizes, and ratings required.

Codes and Standards:

NEC Compliance: Comply with NEC requirements as applicable to construction and installation of electrical supporting devices.

Testing Laboratory Compliance: Provide electrical components that are Listed and Labeled.

ANSI Compliance: Comply with ANSI/MSS SP-69, Hangers and Supports – Selection and Application for selecting electrical supporting devices.

SUBMITTALS

Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

Product Data: Submit manufacturer's data on supporting devices including catalog cuts, specifications, and installation instructions, for each type of support, anchor, sleeve and seal.

PART 2 - PRODUCTS

MANUFACTURED SUPPORTING DEVICES

General: Provide supporting devices as herein specified which comply with manufacturer's standard materials, design and constructed in accordance with published product information and as required for complete installation. Where more than one type of supporting device meets indicated requirements, selection is Installer's option.

Supports: Provide supporting devices of types, sizes and materials indicated that have the following construction features:

Clevis Hangers: For supporting large rigid metal conduit hangers shall be steel with finish appropriate for application and 1/2" diameter hole for round steel rod. Approximate weight is 54 pounds per 100 units.

Reducing Couplings: Steel rod reducing coupling shall be 1/2", 3/8" or 1/4" x 5/8" steel, with finish appropriate for application.

C-Clamps: C-clamps shall be ductile iron, with finish appropriate for application and 1/2", 3/8" or 1/4" rod size. Approximate weight is 50 pounds per 100 units.

I-Beam Clamps: I-beam clamps shall be steel, with finish appropriate for application. 1-1/4" x 3/16" stock with 3/8" cross bolt. Flange width shall be 2". Approximate weight is 52 pounds per 100 units.

1 Conduit Hangers: Hangers shall be galvanized steel used for supporting conduit up to 2". Weight varies with
2 conduit size, up to 25 pounds per 100 units for 2" trade size.

3
4 One-Hole Conduit Straps: One hole conduit straps used for supporting 1/2" conduit (where such is
5 permitted) and 3/4" conduit, shall be galvanized steel. Approximate weight is 7 pounds per 100 units.

6
7 Two-Hole Conduit Straps: Two hole conduit straps, used for supporting conduit larger than 3/4", shall be
8 galvanized steel. Weight varies with conduit size.

9
10 Hexagon Nuts: For 1/2", 3/8" or 1/4" rod sizes, nuts shall be galvanized steel.

11
12 Round Steel Rod: Use black steel for 1/2", 3/8" or 1/4" diameter rod.

13
14 Anchors: Provide anchors of types, sizes and materials indicated, with the following construction features:

15
16 Lead Expansion Anchors: 1/2", approximately 38 pounds per 100 units.

17
18 Toggle Bolts: Springhead type, 3/16" x 4", approximately 5 pounds per 100 units.

19
20 Powder actuated anchors and fasteners are not permitted.

21
22 Watertight Wall and Floor Seals: Provide factory-assembled watertight wall and floor seals of types and sizes
23 indicated. Wall and floor seals shall be suitable for sealing around conduit, pipe, or tubing passing through concrete
24 walls. Construct seals with steel sleeves, malleable iron body, neoprene sealing grommets and rings, metal pressure
25 rings, pressure clamps, and cap screws.

26
27 U-Channel Strut Systems: Provide U-channel strut system for supporting electrical equipment and conduit where
28 runs of more than two conduit must be supported from overhead structure. System shall be 12-gage minimum
29 hot-dip galvanized steel of types and sizes indicated. Use 1 1/2" deep channel to support conduit larger than 1 1/2"
30 trade diameter. Furnish with the following fittings that mate and match with U-channel:

31
32 Channel hangers

33
34 End caps

35
36 Beam clamps

37
38 Wiring studs

39
40 Thinwall conduit clamps

41
42 Rigid conduit clamps

43
44 Conduit hangers

45
46 U-bolts

47
48
49 **FABRICATED SUPPORTING DEVICES**

50
51 Pipe Sleeves: Provide pipe sleeves as follows:

52
53 Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe; remove burrs.

54
55 Sleeve Seals: Provide sleeves for piping which penetrates foundation walls below grade, or exterior walls. Caulk
56 between sleeve and pipe with non-toxic, UL classified caulking material to ensure watertight seal.

57
58
59

PART 3 - EXECUTION

INSTALLATION OF SUPPORTING DEVICES

Install hangers, anchors, sleeves and seals as indicated, in accordance with manufacturer's written instructions and with recognized industry practices to insure supporting devices comply with requirements. Comply with requirements of NECA and NEC for installation of supporting devices.

Coordinate with other electrical work, including raceway and wiring work, as necessary to interface installation of supporting devices with other work.

Install hangers, supports, clamps and attachments to support conduit properly from building structure. Arrange for grouping of parallel runs of horizontal conduits to be supported together on trapeze type hangers where possible. Install supports with spacings indicated and in compliance with NEC requirements.

Torque sleeve seal nuts, complying with manufacturer's recommended values. Ensure that sealing grommets expand to form water tight seal.

END OF SECTION 260529

SECTION 260533 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

QUALITY ASSURANCE

Manufacturers: Firms regularly engaged in manufacture of electrical identification products, of types required.

Codes and Standards:

NEC Compliance: Comply with NEC as applicable to installation of identifying labels and markers for wiring and equipment.

UL Compliance: Comply with applicable requirements of UL Std. 969, "Marking and Labeling Systems," pertaining to electrical identification systems.

NEMA Compliance: Comply with applicable requirements of NEMA Std. No's. WC-1 and WC-2 pertaining to identification of power and control conductors.

SUBMITTALS

Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

Product Data: Submit manufacturer's data on electrical identification materials and products.

Label Wording: Submit exact wording for approval prior to the construction of laminated nameplates or specialized signs. Submittal shall show both proposed wording and physical layout of each label, including mounting holes.

PART 2 - PRODUCTS

ELECTRICAL IDENTIFICATION MATERIALS

General: Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than single type is specified for an application, selection is Installer's option, but provide single selection for each application.

Engraved Plastic-Laminate Signs:

General: Provide engraving stock melamine plastic laminate, in sizes and thicknesses indicated, engraved with engraver's standard letter style of sizes and wording indicated or as required to properly identify items installed under this division.

Color scheme shall be as indicated herein or on the Drawings. Signs shall be punched for mechanical fastening.

Thickness: 1/16", for units up to 20 sq. in. or 8" length; 1/8" for larger units.

Fasteners: Self-threading, blunt end, stainless steel machine screws.

1 Color-Coded Plastic Tape:

2
3 General: Provide manufacturer's standard self-adhesive vinyl tape not less than 3 mils. thick by 1-1/2" wide.
4 Tape shall be listed for use at 105°C. or the temperature rating of the conductors to be marked, whichever
5 is higher.
6

7 Cable/Conductor Identification Bands:

8
9 General: Provide pre-numbered or pre-lettered manufacturer's standard cloth self-adhesive cable/conductor
10 markers of wrap-around type. Printing shall show circuit identification by indicating panel designation and
11 circuit number.
12

13 Underground Type Plastic Line Marker:

14
15 General: Manufacturer's standard permanent, bright colored, continuous printed plastic tape, intended for
16 direct burial service, not less than 6" wide x 4 mils thick. Provide electrically conductive tape with printing
17 which most accurately indicates type of service of buried conduit or cable.
18

19 Place line marker 6" to 8" below finished grade and directly above line to be protected. For multiple conduit
20 or cable runs in the same trench, use multiple line markets, one above each conduit or cable.
21

22 Baked Enamel Danger Signs:

23
24 General: Provide manufacturer's standard "DANGER" signs of baked enamel finish on 20-gage steel.
25 Signs shall be of standard red, black and white graphics, 14" x 10" size. Where larger size exceeds space
26 available, the 10" x 7" size may be used. Signs shall have recognized standard explanation wording, such
27 as, "HIGH VOLTAGE," "KEEP AWAY," "BURIED CABLE," "DO NOT TOUCH SWITCH," etc.
28

29 Code-Colored Conduit Markers:

30
31 General: Provide manufacturer's standard pre-printed, flexible or semi-rigid, permanent, plastic-sheet
32 conduit markers, for feeders extending 360 degrees around conduits. Markers shall be designed for
33 attachment to conduit by adhesive, adhesive lap joint of marker, matching adhesive plastic tape at each end
34 of marker, or pre-tensioned snap-on. Except as otherwise indicated, provide lettering that indicates voltage
35 of conductor(s) in conduit. Provide 8" minimum length for 2" and smaller conduit, 12" length for larger
36 conduit.
37

38 Colors: Unless otherwise indicated on the Drawings or required by governing regulations, provide white
39 markers with black letters.
40
41

42 **LETTERING AND GRAPHICS**

43
44 General: Coordinate names, abbreviations and other designations used in electrical identification work, with
45 corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if
46 not otherwise indicated, as recommended by manufacturer or as required for proper identification and
47 operation/maintenance of electrical systems and equipment.
48
49

50 **WIRE COLOR CODE SCHEDULE**

51
52 Where more than one nominal voltage system exists within a single facility, a schedule of conductor color codes shall
53 be posted at each panelboard that is installed, relocated, renovated, or otherwise modified. The schedule, meeting
54 the requirements of NEC 210.5(C) for branch circuit panelboards, shall be permitted to be either a plastic laminate
55 sign or a printed label with permanent self-adhesive containing the information given in Section 260519,
56 *SECONDARY VOLTAGE WIRES AND CABLES*. The label shall be installed so that it is clearly visible with the
57 panelboard cover removed but with any shields or protective barriers in place. The label shall be installed after the
58 installation of all conductors so that it may be located in an un-observed location.
59
60

1 **SERVICE EQUIPMENT AVAILABLE FAULT CURRENT LABEL**

2
3 Based on the short circuit study conducted by the engineer for the distribution system, the Contractor shall prepare a
4 phenolic field label to identify the available fault current at service equipment. This label shall be consistent with the
5 requirements of this Section, with respect to color scheme and size. The label shall clearly indicate the date in which
6 the calculation was prepared, as indicted by the engineer.
7

8
9 **PART 3 - EXECUTION**

10
11
12 **APPLICATION AND INSTALLATION**

13
14 **General Installation Requirements:**

15
16 Install electrical identification products as indicated, in accordance with manufacturer's written instructions,
17 and requirements of NEC.
18

19 Coordination: Where identification is to be applied to surfaces that require finish, install identification after
20 completion of painting.
21

22 Regulations: Comply with governing regulations and requests of governing authorities for identification of
23 electrical work.
24

25 **Conduit and Box Identification:**

26
27 General: Apply color-coded identification to match system color code on electrical conduit and junction
28 boxes in accordance with the following:
29

30 All empty conduit runs and conduit with conductors for future use shall be identified for such use;
31 identification shall indicate where such conductors or empty conduct terminate. Identification shall be by
32 tags attached to the pull cord or spare conductors. Each end of the pull cord shall be identified.
33

34 All outlet boxes, junction boxes and pull boxes, either exposed or concealed, shall have their covers and
35 exterior visible surfaces painted with the field colors described in this section. Boxes shall also be marked to
36 indicate the panelboard and circuit number(s) of the circuits contained within. Lettering may be by hand for
37 concealed or non-public locations only. Machine printed labels are to be used to identify boxes where such
38 are permitted to appear in areas accessible by the public; embossed type plastic labels are not acceptable
39 for use on this project. Where hand produced marking is permitted, the lettering shall be made with
40 waterproof ink.
41

42 **Equipment/System Identification:**

43
44 General: Install an engraved plastic laminate sign on each major unit of electrical equipment on project.
45 Such equipment includes central or master unit of each electrical system including communication, control,
46 and signal systems, unless unit is specified with its own self-explanatory identification. Except as otherwise
47 indicated, provide single line of text, 1/2" high lettering, on 1-1/2" high sign (2" high where 2 lines are
48 required), white lettering in field color as indicated below. Provide text matching terminology and numbering
49 of the Contract Documents and shop drawings.
50

51 Field Colors shall be the following:

52
53 Blue surface with white core for 120/208 Volt equipment.

54 Black surface with white core for 277/480 Volt equipment.

55 Bright red surface with white core for all equipment related to fire alarm system.

56 Dark red (burgundy) surface with white core for all equipment related to security.

57 Green surface with white core for all equipment related to emergency systems.

58 Yellow surface with black core for all equipment related to optional stand-by systems.

59 Yellow surface with red core for all equipment related to legally required stand-by systems.

60 Orange surface with white core for all equipment related to telephone systems.

- 1 Brown surface with white core for all equipment related to data systems.
- 2 White surface with black core for all equipment related to paging systems.
- 3 Purple surface with white core for all equipment related to TV systems.
- 4

5 Cable/Conductor Identification (Low Voltage):

- 6
- 7 General: Apply cable/conductor identification, including feeder number, on each cable/conductor in each
- 8 box/enclosure/cabinet where wires of more than one circuit or communication/signal system are present,
- 9 except where another form of identification (such as color-coded conductors) is provided. Match
- 10 identification with marking system used in panelboards, shop drawings, contract documents, and similar
- 11 previously established identification for project's electrical work.
- 12

13 Optional Identification and Warnings:

- 14
- 15 General: Install self adhesive plastic signs or similar equivalent identification wherever reasonably required
- 16 to prevent misuse by unauthorized personnel or to ensure safe and efficient operation and maintenance of
- 17 electrical systems, electrically connected mechanical systems, and general systems and equipment. Install
- 18 self-adhesive plastic signs or similar equivalent identification giving instruction or warnings on switches,
- 19 outlets, controls, or devices where instructions or explanations are needed. Provide plasticized tags with
- 20 clearly written messages adequate for intended purposes.
- 21

22 **END OF SECTION 260533**

23

SECTION 260534 - RACEWAYS

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 specification sections, apply to work of this section.

QUALITY ASSURANCE

Manufacturers: Firms regularly engaged in manufacture of raceway systems of types and sizes required, whose products are Listed and Labeled.

Codes and Standards:

NEMA Compliance: Comply with applicable requirements of NEMA Standards Publications pertaining to raceways.

Testing Laboratory Compliance and Labeling: Comply with applicable requirements of UL safety standards pertaining to electrical raceway systems. Provide raceway products and components that have been Listed and Labeled.

NEC Compliance: Comply with applicable requirements of the latest edition of the NEC pertaining to construction and installation of raceway systems.

SUBMITTALS

Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

Product Data: Submit manufacturer's technical product data, including specifications and installation instructions, for each type of raceway system required. Include data substantiating that materials comply with requirements.

PART 2 - PRODUCTS

METAL CONDUIT AND TUBING

General: Provide metal conduit, tubing and fittings of types, grades, sizes and weights (wall thicknesses) for each use indicated. Where types and grades are not indicated, provide proper selection determined by Installer to fulfill wiring requirements as stated herein while complying with applicable portions of NEC for raceways.

Electrical Metallic Tubing (EMT): Provide electrical metallic conduit conforming to ANSI C80.3 and UL 797.

Flexible Metal Conduit (FMC): Provide steel flexible metal conduit conforming to UL 1. Conduit shall be formed from continuous length of spirally wound, interlocked zinc-coated strip steel.

Liquid-Tight Flexible Metal Conduit (LFMC): Provide flexible liquid-tight metal conduit constructed of single strip, flexible, continuous, interlocked, and double-wrapped steel. Inside and outside shall be galvanized; conduit shall be coated with liquid-tight jacket of flexible polyvinyl chloride (PVC).

Rigid Metal Conduit Fittings: Provide cast malleable iron, galvanized or cadmium plated.

Use Type 1 fittings for raintight connections.
Use Type 2 fittings for concrete tight connections.

1 Conduit Locknuts: Provide case-hardened steel locknuts for use on threaded raceway.

2
3 Conduit Bushings:

4
5 Insulated: Provide Listed and Labeled, threaded, thermosetting plastic bushings at each end of all threaded
6 raceway. Provide grounding type if same is indicated elsewhere.

7
8 Grounding (bonding type): Provide Listed and Labeled, threaded, insulated throat, bonding type bushings.
9 Provide steel frame bushings for use on ferrous raceway. Provide bushings with tin-plated copper
10 grounding saddle sized to accept grounding conductor size as indicated on the Drawings. Where grounding
11 conductors are oversized, provide separate copper grounding lugs that are appropriately sized.

12
13 Flexible Metal Conduit Fittings: Provide steel conduit fittings for use with flexible steel conduit of threadless hinged
14 clamp type. All flexible metal conduit fittings shall be Listed as suitable for grounding.

15
16 Straight Terminal Connectors: Provide insulated throat type, one piece body, female end with clamp and
17 deep slotted machine screw for securing conduit, and male threaded end provided with steel locknut.

18
19 45° or 90° Terminal Angle Connectors: Provide steel insulated throat type, two-piece body construction with
20 removable upper section, female end with clamp and deep slotted machine screw for securing conduit, and
21 male threaded end provided with steel locknut.

22
23 Liquid-Tight Flexible Metal Conduit Fittings: Type 1, Class 3, Style G. Provide cadmium plated, malleable iron
24 fittings with compression type steel ferrule and neoprene gasket sealing rings, with insulated throat and steel locknut.
25 All liquid tight flexible metal conduit fittings shall be Listed as suitable for grounding.

26
27 EMT Fittings:

28
29 EMT Conduit Couplings: Cadmium plated steel, dual compression type with two (2) hexagon compression
30 fittings. Fittings that can not be tightened with an open-end wrench of the appropriate size are not
31 acceptable.

32
33 EMT Conduit Connectors: Cadmium plated steel, insulated throat, compression type with hexagon
34 compression fitting and steel locknut. Fittings that can not be tightened with an open-end wrench of the
35 appropriate size are not acceptable.

36
37 Unacceptable fitting types: Pot metal, set screw, and indenter type fittings, or connectors that do not have
38 insulated throats, are not acceptable for use on this project.

39
40 Conduit Bodies: Provide galvanized steel conduit bodies of types, shapes and sizes as required to fulfill job and NEC
41 requirements. Conduit bodies shall be constructed with threaded conduit entrance ends, removable covers, either
42 cast or of galvanized steel, and corrosion-resistant screws.

43
44 Metallic Conduit, and Tubing Accessories: Provide metallic conduit and tubing accessories of types, sizes, and
45 materials, complying with manufacturer's published product information, which mate and match conduit and tubing.

46
47
48 **PART 3 - EXECUTION**

49
50 **INSPECTION**

51
52 Examine areas and conditions under which raceways are to be installed, and substrate that will support raceways.
53 Notify A-E in writing of conditions detrimental to proper completion of the Work. Do not proceed with work until
54 unsatisfactory conditions have been corrected.

1 **SELECTION OF RACEWAY AND SIZE OF RACEWAY SYSTEM**

2
3 General: Install concealed raceway system in new construction work, either in walls or above hung ceilings.

4
5 Do not route raceway below slabs unless such routing is specifically indicated on the Drawings.

6
7 Do not use surface metal raceway unless such use is specifically indicated on the Drawings.

8
9 Conduit Installation: Unless otherwise indicated on the Drawings, provide rigid steel zinc-coated conduit (RMC)
10 where embedded in concrete, masonry, earth, or installed outdoors. Follow minimum requirements in other areas as
11 follows:

12
13 Steel zinc-coated EMT may be installed in all areas except where specifically indicated otherwise in the
14 Drawings or under the conditions of use listed below:

- 15
16
- 17 • Where it will be installed in exterior walls.
 - 18 • Where it will be installed outdoors, in concrete or in direct contact with the earth.
 - 19 • Where it will be subject to physical damage.
 - 20 • Where it will be installed lower than four (4) feet from finished floor in areas where exposed to
21 possible damage from area use activities.
 - 22 • Where it will be subject to corrosive influence.
 - 23 • Where it will be installed indoors in wet or damp locations.
 - 24 • Where trade size is larger than 2".

25 **Any of the above use conditions may be overridden by the Drawings.**

26
27 Avoid use of dissimilar metals throughout system to reduce the possibility of galvanic action. Where dissimilar metals
28 must be in contact, coat surfaces with corrosion inhibiting compound before assembling.

29
30 Use liquid-tight flexible metal conduit (LFMC) only where specifically indicated on the Drawings or where subjected to
31 one or more of the following conditions:

- 32
- 33 • Flexible connection in an exterior location.
 - 34 • Final 18" connection to motors.
 - 35 • Equipment subject to movement or vibration.

36
37 Do not use PVC raceway unless such use is specifically indicated on the Drawings.

38
39 Use Flexible Metal Conduit (FMC) only for final connections to light fixtures and utilization equipment. Any other use
40 shall be limited to applications where specifically indicated on the Drawings

41
42 Flexible Metal Conduit may not be used to interconnect device or junction boxes, utilization equipment,
43 fixtures.

44
45 Flexible Metal Conduit length shall not exceed six feet.

46
47 Size raceway and raceway systems as follows:

48
49 Size raceway to meet NEC requirements, or as indicated on the Drawings, whichever size is larger, except
50 no conduit smaller than 3/4 inch trade size shall be installed.

51
52
53 **INSTALLATION OF RACEWAY SYSTEMS**

54
55 General: Install raceways as indicated, in accordance with manufacturer's written installation instructions, and in
56 compliance with the NEC and NECA's "Standards of Installation." Install raceway and related boxes and fittings
57 plumb and level, $\pm 2^\circ$. Maintain manufacturer's recommended clearances.

1 Fasten heavy wall conduit terminations in sheet metal enclosures by two locknuts, one inside and one outside of
2 enclosure, and terminate with insulated bushing; terminate other conduit systems with connectors listed for the
3 purpose and as described above.

4
5 Conduit couplers shall be steel threaded type in all locations where such use is possible. Otherwise use 3-piece
6 union.

7
8 Conduits are not to cross pipe shafts or ventilating duct openings. Conduit is not to be routed in elevator shafts
9 unless necessary to serve items within the shaft.

10
11 Keep conduits a minimum distance of 6" from parallel runs of hot water pipes or other sources of heat. Wherever
12 possible, install horizontal raceway runs above water piping.

13
14 Support riser conduit at each floor level with clamp hangers.

15
16 Use of running threads at conduit joints and terminations is prohibited. Where required, use threaded nipples and
17 3-piece unions.

18
19 Support exposed conduit by use of hangers, clamps or clips Listed for the purpose. Support conduit on each side of
20 bends and on spacing not to exceed following:

- 21
22
- 23 • Rigid Metal Conduits Up to 1": 8'-0".
 - 24 • Rigid Metal Conduits 1-1/4" and Over: 10'-0".
 - 25 • EMT Up to 1": 8'-0".
 - 26 • EMT 1-1/4" and Over: 10'-0".

27 Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using
28 galvanized straps, lay-in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers Listed for
29 the purpose. Requirements for exposed conduits also apply to conduits installed in space above hung ceilings.

30
31 Concealed Conduits:

- 32
- 33 • Metallic raceways installed underground, in floors below grade (where permitted), or outside are to
34 have conduit threads painted with corrosion inhibiting compound before couplings are assembled.
35 Draw up coupling and conduit sufficiently tight to ensure a water tight joint.
 - 36 • For floors-on-grade (where permitted), install conduits under crushed rock and concrete slabs.
 - 37 • Install underground conduits 24" below finished grade (24" cover) as a minimum or as otherwise
38 indicated on the Drawings if a greater depth is shown.

39
40 Exposed Conduits:

- 41
- 42 • Install conduits in a manner so as not to damage or run through structural members. Avoid
43 horizontal or cross runs in building partitions or side walls.
 - 44 • Install exposed conduits and extensions from concealed conduit systems neatly, parallel with, or at
45 right angles to walls of building.
 - 46 • Install exposed conduit work as not to interfere with ceiling inserts, lights or ventilation ducts or
47 outlets. Coordinate conduit installation with other trades as required.
 - 48 • Install exposed conduit directly on structure using two hole straps. Provide offsets at all boxes and
49 as required to avoid exiting utilities.
 - 50 • Conduits installed on interior of exterior walls shall be spaced off the wall surface a minimum of ¼
51 inch with appropriate straps.

52
53 Run conduits for outlets on waterproof walls exposed where indicated on the Drawings. Set anchors for
54 supporting conduit on waterproof wall in waterproof cement. Requirements for exposed conduit also apply to
55 conduits installed in space above hung ceilings.

56

1 Non-Metallic Raceway:
2

- 3 • Make solvent cemented joints in accordance with recommendations of manufacturer.
4 • Install PVC raceway in accordance with NEC.

5
6 All PVC conduit connections to PVC junction boxes shall be made with listed connectors, approved for the
7 application.
8

9 Raceway Fittings: Install connectors, couplers, and related fittings as required for a complete raceway system.
10

11 Install insulated bushings for terminating all types of raceway where termination is not made with an
12 insulated throat connector.
13

14 Where concentric, eccentric or over-sized knockouts are encountered, a grounding-type insulated bushing
15 shall be provided. Bushing shall be connected to the equipment grounding conductor.
16

17 Miscellaneous fittings such as reducers, chase nipples, 3-piece unions, and plugs are to be constructed from
18 steel and specifically designed and Listed for their particular application.
19

20 Coordinate with other work including wires/cables, boxes, and panel work, as necessary to interface installation of
21 electrical raceways and components with other work.
22

23 Mechanically fasten together metal conduits, enclosures, and other components comprising raceway system to form
24 a continuous electrical conductor. Connect to electrical boxes, fittings and cabinets to provide electrical continuity
25 and firm mechanical assembly.
26

27 Raceway must be installed as a complete system prior to the installation of cables, conductors, or pull wires
28 into any part of the systems.
29

30 Install miscellaneous fittings such as reducers, chase nipples, 3-piece unions, and plugs that have been specifically
31 designed and manufactured for their particular application. Install expansion fittings in raceways every 200' linear run
32 maximum and wherever structural expansion joints are crossed.
33

34 Use roughing-in dimensions of electrically supplied utilization equipment furnished by supplier or by other divisions as
35 appropriate. Set conduit and boxes for connection to units only after receiving review of dimensions and after
36 verification of location with other trades.
37

38 Do not set final connections for fixtures and/or utilization equipment until connection points and requirements
39 are accurately known. The Contractor is responsible for the relocation of mis-located connection points as
40 required to match equipment at no additional cost.
41

42 Cut conduits straight, properly ream. Threads shall be cut into heavy wall conduit using equipment designed for the
43 purpose.
44

45 Make changes in direction of raceway run by means of proper field bends or with proper fittings, supplied by raceway
46 manufacturer.
47

48 Field-bend conduit with benders designed for purpose so as not to distort nor vary internal diameter.
49

50 Properly support and anchor raceways for their entire length by structural materials. Raceways are not to span any
51 space unsupported for lengths in excess of the maximum support distance as previously specified. Raceways may
52 not be used to support other raceways or other items of equipment.
53

54 Arrange conduit to maintain headroom and present a neat appearance.
55

56 Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls and adjacent piping.
57

58 Group raceway in parallel runs where three (3) or more raceway are routed together. Use conduit rack constructed of
59 steel channel with conduit straps or clamps. Provide space for 25% additional conduit.
60

1 Do not fasten and/or hang conduit with wire or perforated pipe straps. Before conductors are pulled, remove all wire
2 used during construction for temporary conduit support.

3
4 Bring conduit to the shoulder of fittings and couplings and fasten securely. All raceway shall be cut to proper length
5 so ends fit accurately in connectors or couplers.

6
7 Use conduit hubs for fastening conduit to cast boxes and for fastening conduit to sheet metal boxes in damp or wet
8 locations.

9
10 Use conduit bodies to make sharp changes in direction, as around beams.

11
12 Use hydraulic one-shot conduit bender for all field bends in conduit. All field made conduit bends shall meet
13 minimum bending radius requirements of the NEC. Bends in metallic conduit shall be made while "cold". Factory
14 made conduit sections may be used in lieu of field made bends for conduit larger than 2".

15
16 Avoid moisture traps where possible; where unavoidable, provide junction box with drain fitting at conduit low point.

17
18 Use suitable conduit caps to protect installed conduit against entrance of dirt and moisture.

19
20 Where raceways penetrate walls or partitions separating spaces with differing environmental conditions, such as
21 freezers, coolers and exterior walls, provide an internal seal to prevent condensation within the raceway as it enters
22 the conditioned space.

23
24 Where conduit penetrates fire rated partitions, provide penetration protection in accordance with the UL through-
25 penetration detail indicated on the Drawings for the type of partition and conduit involved. All instructions furnished
26 with firestopping materials shall be followed explicitly.

27
28 Route conduit through roof openings for piping and ductwork where possible; otherwise, route through roof jack with
29 pitch pocket. All pitch pockets shall be absolutely water tight; once conduit has been routed through a pitch pocket
30 the water integrity of the pitch pocket is the responsibility of the Division 26-28 Contractor.

31
32 Combining of circuits into raceway systems other than indicated on Drawings shall not be permitted.

33
34 Bolts, clamps, screws and expansion bolts shall be used in securing conduit, equipment, etc. Holes for lead shields
35 or other anchors shall be the size recommended by the fastener manufacturer and shall be completely covered by
36 the mounted item. Holes used for support of conduit on brick or block walls shall be located in mortar joints where
37 such location is possible.

38
39 Provide nylon pull string in empty conduits where indicated, including conduit placed for telephone and data use.
40 Conduit installed but left empty (with pull string) shall be tested with a ball mandrel. Clear any conduit that rejects ball
41 mandrel. Any costs involved for restoration of conduit and surrounding surfaces to original condition are the
42 responsibility of the Contractor.

43
44
45 **END OF SECTION 260534**

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SECTION 260535 - ELECTRICAL BOXES AND FITTINGS

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

QUALITY ASSURANCE

Manufacturers: Firms regularly engaged in manufacture of electrical boxes and fittings, of types, sizes, and capacities required, whose products are Listed and Labeled.

Codes and Standards:

NEC Compliance: Comply with NEC as applicable to construction and installation of electrical wiring boxes and fittings.

Testing Laboratory Compliance: Comply with applicable requirements of UL 50, UL 514-Series, and UL 886 pertaining to electrical boxes and fittings. Provide electrical boxes and fittings that are Listed and Labeled.

SUBMITTALS

Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

Product Data: Submit manufacturer's data on electrical boxes and fittings.

PART 2 - PRODUCTS

FABRICATED MATERIALS

Aluminum products are not acceptable for use on the project.

Outlet Boxes: Provide galvanized coated flat rolled sheet-steel outlet wiring boxes, of shapes, cubic inch capacities, and sizes, including box depths as indicated, suitable for installation at respective locations. Construct outlet boxes with mounting holes, and with cable or conduit-size knockout openings in bottom and sides. Provide boxes with threaded screw holes for attachment of grounding conductor and cover plate or device attachment fittings.

Provide waterproof outlet boxes where box is installed in an outdoor location or in a wet location as defined by the NEC.

Outlet Box Accessories: Provide outlet box accessories as required for each installation, including box supports, mounting ears and brackets, wallboard hangers, box extension rings, fixture studs, cable clamps and metal straps for supporting outlet boxes. Supplied items shall be compatible with outlet boxes being used to fulfill installation requirements for individual wiring situations. Choice of accessories is Contractor's code-compliance option.

1 Device Boxes: Provide galvanized coated flat rolled sheet-steel device boxes, of shapes, cubic inch capacities, and
2 sizes, including box depths as indicated, suitable for installation at respective locations. Unless otherwise specified
3 device boxes shall be 4" square by 2 1/8" deep, flush mounted, and furnished with suitable plaster ring for the type
4 devices to be used and of a depth to match the type of construction involved. Device boxes shall have 3/4" knockout
5 openings in bottom and ends, and with threaded screw holes in the rear for attachment of a grounding conductor. All
6 fasteners shall have a corrosion resistant finish.

7
8 Where more than two devices are ganged together at a single location provide gangable device boxes with suitable
9 partitions, conduit knockouts and attachment hardware.

10
11 Device Box Accessories: Provide device box accessories as required for each installation, including mounting
12 brackets, device box extensions, switch box supports, plaster ears, and plaster board expandable grip fasteners,
13 which are compatible with device boxes being utilized to fulfill installation requirements for individual wiring
14 situations. Choice of accessories is Contractor's code-compliance option.

15
16 Where device boxes are surface mounted (as may permitted elsewhere) use cast steel type 'FS' boxes. Raintight
17 device boxes shall have threaded conduit holes for the attachment of electrical conduit, cast-metal face plates with
18 spring-hinged watertight caps suitable configured for each application, including face plate gaskets and
19 corrosion-resistant plugs and fasteners. Boxes provided under this section shall have a threaded internal grounding
20 conductor attachment point.

21
22 Device boxes exposed to outdoor or wet locations shall be flush mounted and shall be equipped with cast steel
23 covers that are designed to exclude water when closed.

24
25 Provide covers that are suitable for use in wet location with device attached if such use is indicated on the
26 Drawings.

27
28 Where flush mounting is not possible or not practicable due to the location of the device, provide surface
29 mounted cast steel type 'FS' boxes as described elsewhere.

30
31 Junction boxes with no more than 4 entries of 3/4" conduit containing conductors no larger than #12 may be 4" square
32 by 2 1/8" deep with 3/4" knockouts, threaded hole for connection of grounding conductor and threaded holes for the
33 attachment of a blank cover plate. Provide suitable blank cover plate. Box extensions shall not be used to obtain
34 more volume in 4" square junction boxes.

35
36 If box volume is not sufficient, the contractor may, as a code compliance option, may use 4 11/16" square by
37 2 1/8" deep boxes with 3/4" knockouts, threaded hole for connection of grounding conductor and threaded
38 hoses for the attachment of a blank cover plate. Provide suitable blank cover plate. Box extensions shall
39 not be used to obtain more volume in 4 11/16" square junction boxes.

40
41 Use fabricated junction boxes as described below if box volumes that can be obtained by the use of 4"
42 square or 4 11/16" square boxes are not sufficient to meet NEC minimum volume requirements.

43
44 Junction and Pull Boxes: Provide as required galvanized code-gage sheet steel junction and pull boxes, no
45 knockouts, Listed, with screw-on covers. Types, shapes, and sizes of junction and pull boxes shall be suitable for
46 each respective location and installation. Boxes shall have welded seams and shall be equipped with stainless
47 fastening hardware. Provide steel barriers in boxes with multiple feeder circuits.

48
49 Auxiliary Wireways: Construct as required in accordance with UL 870, with Listed and Labeled components.

50
51 Construction: 16-gage galvanized sheet metal parts for 4" x 4" to 6" x 6" sections, and 14-gage parts for 8"
52 x 8" and larger sections. Provide wireways with no knockouts.

53
54 Finish: Provide 14-gage and 16-gage galvanized sheet metal parts. Plate hardware to prevent corrosion.

55
56 In outdoor or wet locations provide wireways that are NEMA 3R. Do not use gaskets that can rip or tear
57 during installation, or would otherwise compromise raintight capability of the wireway.

58
59 Do not use cover screws that will protrude into the trough area and damage wire insulation.

60
61

1 Size of device, outlet, junction, pull boxes, gutters, and similar components shall be as required to match the number
2 of devices and/or conductors contained within as based on the requirements of NEC Article 314.16.

3
4 Bushings, Knockout Closures and Locknuts: Provide corrosion-resistant box knockout closures, conduit locknuts and
5 malleable iron conduit insulated bushings, offset connectors, of types and sizes, to suit respective installation
6 requirements and applications.

7
8
9 **PART 3 - EXECUTION**

10
11
12 **INSTALLATION OF ELECTRICAL BOXES AND FITTINGS**

13
14 General: Install electrical boxes and fittings as indicated, in accordance with manufacturer's written instructions,
15 applicable requirements of NEC and NECA's "Standard of Installation," and in accordance with recognized industry
16 practices to fulfill project requirements.

17
18 Coordinate installation of electrical boxes and fittings with wire/cable, wiring devices, and raceway installation work.

19
20 Provide weatherproof boxes and fittings for interior and exterior locations that are exposed to weather or moisture.
21 Weatherproof boxes must be Listed and Labeled and identified as "extra duty" for use in wet locations.

22
23 Provide knockout closures to cap unused knockout holes where blanks have been removed.

24
25 Install electrical boxes and similar items only in those locations that ensure accessibility to enclosed electrical wiring.

26
27 Avoid installing boxes back-to-back in walls. Provide not less than 6" separation in non-rated partitions. Provide 24"
28 minimum horizontal separation in fire-rated partitions or in acoustic rated walls.

29
30 Position recessed outlet or device boxes in walls or ceilings accurately to allow for surface finish thickness. Where
31 the surface material or covering is combustible the front edge of the plaster ring (or box) shall be flush (- 0", +1/32")
32 with the finished surface. Where the wall or ceiling material is non-combustible, the front edge of the plaster ring (or
33 box) may be recessed into the wall no further than 3/16". The maximum gap between the edge of an installed
34 box/plaster ring combination shall not exceed 1/8". **These requirements will be rigidly enforced.**

35
36 Fasten electrical boxes firmly and rigidly to substrates, or structural surfaces to which attached, or solidly embed
37 electrical boxes in concrete or masonry. All boxes shall be supported independently of conduit.

38
39 Provide electrical connections for installed boxes.

40
41 Electrical box locations indicated on Drawings are approximate unless dimensioned. Verify location of outlets prior to
42 rough-in. Coordinate exact locations with the work of other Divisions. Mis-located outlets and/or devices shall be
43 relocated upon instruction from Owner's representative at no additional cost.

44
45 Locate and install to maintain headroom and to present a neat appearance.

46
47 Use multiple gang boxes where more than one device is mounted together; do not use sectional boxes. Provide
48 barriers to separate wiring of different voltage systems. Provide barriers to separate adjacent devices where the
49 voltage is greater than 150 Volts between the devices.

50
51 Install boxes in walls without damaging wall insulation or fire proofing.

52
53 Position outlets to locate lighting fixtures and/or luminaries as indicated on Drawings. Boxes are to be positioned
54 plum and vertical, $\pm 2^\circ$.

55
56 Align wall mounted outlet boxes for switches, thermostats, and similar devices.

57
58 Subsequent to installation of boxes, protect boxes from construction debris and damage.

1 **GROUNDING**

2

3 Upon completion of installation work, properly ground electrical boxes and demonstrate compliance with
4 requirements.

5

6

7 **END OF SECTION 260535**

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SECTION 260579 - TEMPORARY POWER AND LIGHTING

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

SUBMITTALS

Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

Manufacturer's Data: Submit manufacturer's technical product data.

SCOPE OF WORK

Provide complete jobsite temporary electrical power service equipment, distribution panels, distribution wiring, luminaries, and connection devices as described in this section of the project specifications.

Cost of electrical energy for the duration of the project shall be the responsibility of the Owner.

PART 2 - PRODUCTS

Products shall be new and as specified in this Division unless reuse of existing facilities is specifically indicated on the Drawings.

PART 3 - EXECUTION

Connect temporary electrical circuits to existing electrical distribution system. Coordinate all electrical connections to existing system with Owner. Coordinate all electrical outages with the Owner to avoid disruption of Owners activities. No service, feeder, or branch circuit may be tapped or de-energized unless specific approval has been obtained from the Owner's representative.

Provide Temporary Lighting: Provide temporary lighting for general illumination and task illumination for the General Contractor, other prime contractors, and for all sub-contractors for the duration of the construction. Lighting levels provided are to be in compliance with applicable workplace standards.

Complaints concerning lighting levels and/or lighting quality in a specific area or areas of the project will be reviewed by the A-E. If directed by the A-E, the Contractor shall provide additional luminaries and/or additional distribution wiring required under this section at no additional cost.

All temporary lighting shall be supplied by circuits protected by ground fault circuit breakers. All temporary lighting shall be in accordance with NFPA-70 Article 590.

Provide Temporary Power Distribution: Provide temporary power distribution and connection devices for use by General Contractor, other prime contractors, and for all sub-contractors for the duration of the construction. Provide temporary power distribution and connection devices for the testing of selected items of utilization equipment as required by General Contractor, other prime contractors, or any sub-contractor.

1 Complaints concerning power distribution or devices available in a specific area or areas of the project will
2 be reviewed by the A-E. If directed by the A-E, the Contractor shall provide additional power distribution or
3 connection devices required under this section at no additional cost.

4
5 All temporary branch circuits shall be supplied by circuits protected by ground fault circuit breakers. All temporary
6 branch circuits shall be in accordance with NFPA-70 Article 590.

7
8 Remove all Temporary Wiring: At the conclusion of construction activities remove all wiring, both exposed and
9 concealed, used for temporary lighting and power distribution.

10
11
12 **END OF SECTION 260579**

SECTION 260593 - ELECTRICAL CONNECTIONS FOR EQUIPMENT

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

QUALITY ASSURANCE

Manufacturers: Firms regularly engaged in manufacture of electrical connectors and terminals, of types and ratings required, and ancillary connection materials, including electrical insulating tape, solder/fluxes, and cable ties, whose products are Listed.

Codes and Standards:

NEC Compliance: Comply with applicable requirements of NEC as to type products used and installation of electrical power connections (terminals and splices), for junction boxes, motor starters, and disconnect switches.

Testing Laboratory Compliance: Comply with UL Std. 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors" including, but not limited to, tightening of electrical connectors to torque values indicated. Provide electrical connection products and materials that are Listed and Labeled.

SUBMITTALS

Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

Product Data: Submit manufacturer's data on electrical connections for equipment products and materials.

PART 2 - PRODUCTS

MATERIALS AND COMPONENTS

General: For each electrical connection indicated, provide complete assembly of materials, including but not necessarily limited to, pressure connectors, terminals (lugs), electrical insulating tape, cable ties, solderless wire-nuts, and other items and accessories as needed to complete splices and terminations of types indicated.

Metal Conduit, Tubing and Fittings:

General: Provide metal conduit, tubing and fittings of types, grades, and sizes indicated for each type service. Where types and grades are not indicated, provide proper selection as determined by Installer to fulfill wiring requirements and comply with NEC requirements for raceways. Provide products complying with Section 260534, RACEWAYS, and in accordance with the following listing of metal conduit, tubing and fittings:

- Rigid steel conduit
- Rigid metal conduit fittings
- Electrical metallic tubing
- EMT fittings

- 1 Flexible metal conduit
- 2
- 3 Flexible metal conduit fittings
- 4
- 5 Liquid-tight flexible metal conduit
- 6
- 7 Liquid-tight flexible metal conduit fittings
- 8

9 Wires, Cables, and Connectors:

10
11 General: Provide wires, cables, and connectors complying with Section 260519, *SECONDARY VOLTAGE*
12 *WIRES AND CABLES*.

13
14 Wires/Cables: Unless otherwise indicated, provide conductors for electrical connections that match,
15 including sizes and ratings, of wires/cables that are supplying electrical power. Provide copper conductors
16 with conductivity of not less than 98% at 68° F.

17
18 Connectors and Terminals: Provide copper electrical connectors and terminals that mate and match,
19 including sizes and ratings, with equipment terminals and are recommended by equipment manufacturer for
20 intended applications. **Aluminum conducting components are not acceptable for use on this project.**

21
22 Electrical Connection Accessories: Provide electrical insulating tape, wirenuts and cable ties as
23 recommended for use by accessories manufacturers for type services indicated.

24
25
26 **PART 3 - EXECUTION**

27
28
29 **INSPECTION**

30
31 Inspect area and conditions under which electrical connections for equipment are to be installed and notify A-E in
32 writing of conditions detrimental to proper completion of the Work. Do not proceed with the Work until unsatisfactory
33 conditions have been corrected.

34
35
36 **INSTALLATION OF ELECTRICAL CONNECTIONS**

37
38 Install electrical connections as indicated in accordance with equipment manufacturer's written instructions and with
39 recognized industry practices, and complying with applicable requirements of UL, NEC and NECA'S "Standard of
40 Installation" to ensure that products fulfill requirements.

41
42 Coordinate with other work, including wires/cables, raceway and equipment installation, as necessary to properly
43 interface installation of electrical connections for equipment with other work.

44
45 Connect electrical power supply conductors to equipment conductors in accordance with equipment manufacturer's
46 written instructions and wiring diagrams. Mate and match conductors of electrical connections for proper interface
47 between electrical power supplies and installed equipment.

48
49 Cover splices with electrical insulating material equivalent to, or of greater insulation resistivity rating than electrical
50 insulation rating of those conductors being spliced.

51
52 Prepare cables and wires by cutting and stripping covering armor, jacket, and insulation properly to ensure uniform
53 and neat appearance where cables and wires are terminated. Exercise care to avoid cutting through tapes that will
54 remain on conductors. Also avoid "ringing" copper conductors while skinning wire.

55
56 Trim cables and wires as short as practicable and arrange routing to facilitate inspection, testing and maintenance.
57 Leave a minimum of 6" of excess spare conductor at each termination.

1 Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturers
2 published torque tightening values for equipment connectors. Accomplish tightening by utilizing proper torquing tools,
3 including torque screwdriver, beam-type torque wrench, and ratchet wrench with adjustable torque settings. Where
4 manufacturer's torque requirements are not available, tighten connectors and terminals to comply with torque values
5 contained in UL 486A.

6
7 Provide flexible connections to equipment as follows:

8
9 Provide Flexible Metal Conduit (FMC) for connection of electrical equipment where subject to movement and
10 vibration or as otherwise required by the Specifications or on the Drawings.

11
12 Provide metal Liquidtight Flexible Metal Conduit (LFMC) for equipment in exterior locations, wet locations, or
13 in other locations where so indicated on the Drawings.

14
15 Fasten identification markers to each electrical power supply wire/cable conductor that indicates their voltage, phase
16 and feeder number in accordance with Section 260533, *ELECTRICAL IDENTIFICATION*. Affix markers on each
17 terminal conductor, as close as possible to the point of connection.

18
19

20 **FIELD QUALITY CONTROL**

21
22 Upon completion of installation of electrical connections, and after circuitry has been energized with rated power
23 source, test connections to demonstrate capability and compliance with requirements. Ensure that direction of
24 rotation of each motor fulfills requirement. Correct malfunctioning units at site, then retest to demonstrate
25 compliance.

26
27

28 **END OF SECTION 260593**

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 – GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section includes time control switches, daylight sensors, occupancy sensors, and multi-pole lighting relays and contactors.

QUALITY ASSURANCE

Manufacturers: Firms regularly engaged in manufacture of lighting control devices, of types and ratings required in this Section, whose products are Listed and Labeled for the purpose intended. Subject to compliance with requirements provide equipment equivalent to that provided by manufacturers listed in this Section.

Codes and Standards:

NEC Compliance: Comply with NEC requirements pertaining to lighting control devices.

Code of Federal Regulations Compliance: Comply with 47 CFR 15, Subparts A and B, for Class A digital devices.

SUBMITTALS

Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

Product Data: Include dimensions and data on features, components, and ratings for lighting control devices.

Samples: Provide samples of submitted occupancy sensors for color selection and evaluation of technical features if requested in writing by the A-E. If approved, the sample may be used on the project.

Shop Drawings: Submit shop drawings showing equipment, with proposed quantities and locations, and connecting wiring of lighting controls system. Layout and wiring diagrams shall be based on the project floor plans, with devices and proposed control groups shown. Provide clearly drawn connections between control devices and controlled lighting in all rooms and/or areas where multiple control groups are present. Provide distinctive boundaries for override zones on each floor unless specified as a single zone for floor. Provide equipment designations that will coincide with documentation of Functional Performance Tests outlined in Section 260596. Provide a draft of the narrative of system operation specified in this section as part of the Operations and Maintenance Manual.

Provide coverage pattern templates for each occupancy sensor type used as part of the project. Where requested by the Engineer, provide drawings that overlay the proposed coverage patterns on the project lighting plans. Provide summary of settings available for each sensor type. Identify and highlight deviations from options/setting specified in this Section.

Provide summary of settings available for each time clock.

Maintenance Data: For lighting control devices to include in maintenance manuals specified in Division 1.

PART 2 – PRODUCTS

OCCUPANCY SENSORS

Manufacturers: Provide equipment equivalent to that provided one of the following manufacturers:

- Wattstopper
- Novitas
- Sensor Switch
- Hubbell

Sensors shall be provided with a single pole, isolated relay (30V AC/DC, 1A) for interface with building automation system. Relay and contact ratings shall be clearly indicated in submittal literature.

Occupancy sensors are diagrammatically indicated on the lighting plans, based on coverage areas of approximately 1,000 square feet/sensor for ceiling heights up to 10 feet. Contractor shall verify the locations and quantities of sensors installed to properly cover each space based on actual coverage patterns of submitted/approved products. Sensors shall be installed in coordination with the manufacturer's instructions, including separation from air distribution patterns associated with HVAC diffusers.

Wall Switch Occupancy Sensor: Provide a wall mounted, dual technology occupancy sensor with a manual on/off switch. Switch shall support manual-on and automatic-on (previous setting) operation. Switch to be rated at 800W @ 120V and 1,200W @ 277V. Provide vandal resistant, hard usage lens for sensor.

Wall Switch Occupancy Sensor/Dimmer: Provide a wall mounted, dual technology occupancy sensor with 0-10V dimming. Switch shall support manual-on and automatic-on (previous setting) operation. Multiple switches may be used together, each providing full dimming operation, in up to four locations for a switch group. Switch to be rated at 1,000W @ 120V and 1,200W @ 277V. Provide vandal resistant, hard usage lens for sensor.

Dual Technology Ceiling Mounted Occupancy Sensor: Provide a 24 VAC ceiling mounted combination passive infrared and ultrasonic sensor. Coverage for normal desktop motion shall be 900 square feet at a 360° pattern. Provide sensor with an integral daylighting control interface. Provide compatible power modules as required to interconnect sensors to controlled loads.

Sensors shall be provided with the following options and set in accordance with values listed.

Sensor Parameter	Option	Setting
Activation	Manual / Automatic	Automatic
Time Delay		15 minutes
Walk Through	On / Off	Off
PIR Sensitivity	10-100% (10% increments) / Off	90%
Ultrasonic Sensitivity	10-100% (10% increments) / Off	70%
Test Mode	In / Off	Off
Detection Technology	Ultrasonic / PIR / Both / Either	Both
Retrigger Technology	Ultrasonic / PIR / Both / Either	Either

PART 3 – EXECUTION

INSTALLATION

Install equipment level and plumb and according to manufacturer's written instructions.

Mount lighting control devices according to manufacturer's written instructions and requirements in Section 260500, *BASIC ELECTRICAL REQUIREMENTS*.

1 Mounting heights indicated are to bottom of unit for suspended devices and to center of unit for wall-mounting
2 devices.

3
4 Spare Parts: Provide the following spare parts with the system, each individually packaged and labeled. For multi-
5 building projects, calculate separately for each building:

6
7 Wall mounted occupancy sensors (each type) 4% of installed quantity
8 Ceiling mounted occupancy sensors (each type) 4% of installed quantity

9
10 Increase decimal quantities of spare parts to the next higher whole number. For example if a system has 20
11 wall mounted passive infrared sensors, provide 2 spare sensors.

12 13 14 **CONTROL WIRING INSTALLATION**

15
16 General: Install wiring between sensing and control devices according to manufacturer's written instructions and as
17 specified in Section 260519, *SECONDARY VOLTAGE WIRES AND CABLES*, for low-voltage connections and for
18 digital circuits.

19
20 Wiring Method: Install all wiring in raceway as specified in Section 260534, *RACEWAYS* and Section 260535,
21 *ELECTRICAL BOXES AND FITTINGS*.

22
23 Connections: Tighten electrical connectors and terminals according to manufacturer's published torque-tightening
24 values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

25 26 27 **IDENTIFICATION**

28
29 Identify components and power and control wiring according to Section 260533, *ELECTRICAL IDENTIFICATION*.

30 31 32 **FIELD QUALITY CONTROL**

33
34 Inspect control components for defects and physical damage, testing laboratory labeling, and nameplate compliance
35 with the Contract Documents.

36
37 Verify settings of photoelectric devices with photometer calibrated within previous six months.

38
39 Electrical Tests: Use particular caution when testing devices containing solid-state components. Perform continuity
40 tests of circuits prior to installing devices. Perform operational tests according to manufacturer's written instructions.
41 Set and operate devices to demonstrate their functions and capabilities in a methodical sequence that cues and
42 reproduces actual operating functions. Test devices under conditions that simulate actual operational conditions.
43 Record control settings, operations, cues, and functional observations.

44
45 Correct deficiencies, make necessary adjustments, and retest. Verify that specified requirements are met.

46 47 48 **CLEANING**

49
50 Cleaning: Clean equipment and devices internally and externally using methods and materials recommended by
51 manufacturers, and repair damaged finishes.

52 53 54 **TESTING & DOCUMENTATION**

55
56 Provide a minimum 90 minute battery test for each inverter under complete load. Provide documentation of output
57 voltage at unit at beginning of the test and at the end of the 90 minute period. All product features shall be verified by
58 the Contractor and demonstrated for the engineer.

1 Provide verification of proper installation of components and systems as outlined in Section 260596, Lighting
2 Systems Commissioning. Provide all necessary components to properly demonstrate operation of equipment to
3 engineer.
4

5
6 **OPERATIONS AND MAINTENANCE MANUAL**

7
8 Manuals shall include product data for all installed products that identifies all selected options for each component of
9 lighting controls system.
10

11 Identify manufacturer's requirements and recommendations for routine maintenance actions, recalibration and
12 cleaning. Identify schedule for items above.
13

14 Provide a narrative of the system operation, specific to the installation, including the actual set points.
15
16

17 **TRAINING**

18
19 Engage a factory-authorized service representative to train Owner's maintenance personnel as specified below:
20

21 Train Owner's maintenance personnel on troubleshooting, servicing, adjusting, and preventive maintenance. Provide
22 a minimum of 16 hours of training.
23

24 Training Aid: Use the approved final version of maintenance manuals as a training aid.
25

26 Schedule training with Owner, through A-E, with at least seven days' advance notice.
27
28

29 **WARRANTY PERIOD**

30
31 Warranty period for occupancy sensors shall be one year, beginning upon acceptance of the installation by the
32 Owner. Include up to three site visits within the first year, upon request by the Owner, to adjust light levels, make
33 program changes, and adjust sensors and controls to suit actual conditions.
34

35 Warranty period for branch circuit inverters shall be full 3 years for defects in workmanship, battery and materials.
36 Battery shall have an additional 7 year prorated warranty.
37
38

39 **END OF SECTION 260923**

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

QUALITY ASSURANCE

Manufacturers: Firms regularly engaged in manufacture of wiring devices, of types and ratings required in this Section, whose products are Listed and Labeled for the purpose intended. Subject to compliance with requirements provide devices equivalent to that provided by one of the following manufacturers:

Hubbell
Cooper Devices
Leviton
Pass & Seymour

Codes and Standards:

NEC Compliance: Comply with NEC as applicable to installation and wiring of electrical wiring devices.

Testing Laboratory Compliance: Comply with applicable requirements of UL 20, 486A, 498, and 943 pertaining to installation of wiring devices. Provide wiring devices that are Listed and Labeled.

NEMA Compliance: Comply with applicable portions of NEMA Standards No. WD 1, "*General Purpose Wiring Devices*", WD 2, "*Semiconductor Dimmers for Incandescent Lamps*", and WD 5, "*Specific Purpose Wiring Devices*".

SUBMITTALS

Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

Product Data: Submit manufacturer's data on electrical wiring devices.

PART 2 - PRODUCTS

FABRICATED WIRING DEVICES

General: Provide factory fabricated wiring devices in types, colors, and electrical ratings for applications indicated and which comply with NEMA WD 1.

"Specification" grade devices, as used in this section shall be "Federal Specification" grade devices.

Color: Provide white color devices unless indicated otherwise for selected locations elsewhere in the Specifications or on the Drawings.

1 Receptacles:

2
3 General-Use Duplex: Provide duplex specification grade, tamper resistant type receptacle, 2-pole, 3-wire,
4 grounding, with green hexagonal equipment ground screw, high impact nylon face, ground terminal, brass
5 triple wipe contacts, 20 Ampere rated, 125-volts, with metal plaster ears. Provide receptacles with
6 grounding terminal internally connected to mounting yoke. Receptacles shall be designed for side and back
7 wiring with spring-loaded, screw activated pressure plates, with NEMA configuration 5-20R unless otherwise
8 indicated.
9

10 Ground-Fault Interrupter: Provide specification grade, tamper resistant type ground-fault circuit interrupter,
11 with heavy-duty duplex receptacles capable of being installed in a 1-1/2" deep outlet box without adapter.
12 Ground fault interrupter receptacles shall be grounding type, UL Class A, Group 1, 20 ampere rated,
13 120-volts, 60 Hz, with high impact nylon face, brass triple wipe contacts, and solid-state ground-fault sensing
14 and signaling. Devices shall have 5 milliamperes ground-fault trip level and shall be equipped with NEMA
15 configuration 5-20R.
16

17 Switches:

18
19 Snap: Provide heavy-duty, specification grade, flush single-pole AC quiet toggle switches, 20 Amperes,
20 120-277 Volts AC, with silver cadmium oxide contacts, brass terminal screws, and mounting yoke insulated
21 from mechanism. Equip switches with plaster ears, switch handle, and green hexagonal equipment
22 grounding screw. Switches shall be designed for side and back wiring with spring-loaded, screw activated
23 pressure plates.
24

25 Duplex Snap: Provide heavy duty, specification grade, flush dual single pole AC quiet switches, 20
26 Amperes, 120-277 Volts, with silver cadmium oxide contacts, brass terminal screws, and mounting yoke
27 insulated from mechanism. Equip switches with plaster ears, switch handles, green hexagonal equipment
28 grounding screw and side wired screw terminals with break-off tab feature that allows wiring with separate or
29 common feed.
30

31 Two Pole Snap: Provide heavy duty, specification grade, flush two pole AC quiet switches, 20
32 Amperes, 120-277 Volts, with silver cadmium oxide contacts, brass terminal screws, and mounting
33 yoke insulated from mechanism. Equip switches with plaster ears, switch handle, green hexagonal
34 equipment grounding screw and side wired screw terminals.
35

36 Three Way: Provide heavy-duty, specification grade, flush 3-way AC quiet switches, 20 Amperes, 120-277
37 Volts, with silver cadmium oxide contacts, brass terminal screws, and mounting yoke insulated from
38 mechanism. Equip switches with plaster ears, switch handle, green hexagonal equipment grounding screw.
39 Switches shall be designed for side and back wiring with spring-loaded, screw activated pressure plates.
40

41 Four Way: Provide heavy-duty, specification grade, flush 4-way AC quiet switches, 20 Amperes, 120-277
42 Volts, with silver cadmium oxide contacts, brass terminal screws, and mounting yoke insulated from
43 mechanism. Equip switches with plaster ears, switch handle, green hexagonal equipment grounding screw.
44 Switches shall be designed for side and back wiring with spring-loaded, screw activated pressure plates.
45

46 Lighted Handle Snap: Provide heavy duty, specification grade, flush single pole AC quiet lighted handle
47 toggle switches with silver cadmium oxide contacts and brass terminal screws in any of the pole
48 configurations indicated above. Switches shall be equipped with plaster ears, have side wired screw
49 terminals, and a 20 Amperes, 120-277 Volts rating. Lighted handle shall be illuminated when the switch is in
50 the open position.
51

52 Pilot Light Handle Snap: Provide heavy duty, specification grade, flush single pole AC quiet pilot
53 light handle toggle switches with silver cadmium oxide contacts and brass terminal screws in any of
54 the pole configurations indicated above. Switches shall be equipped with plaster ears, have side
55 wired screw terminals, and a 20 Amperes, 120-277 Volts rating. Lighted handle shall be
56 illuminated when the switch is in the closed position.
57
58
59

1 Miscellaneous Features:

2
3 Provide the following additional switch features where such is indicated on the drawings:

4
5 Key operation; supply one key per switch.

6
7 0-10 Volt Dimmers: Provide specification grade, preset type slide control, single pole branch lighting solid state 0-10
8 Volt DC dimmer control for LED source fixtures. Dimmers shall be designed for side and back wiring with spring-
9 loaded, screw activated pressure plates where such are available. Wattage shall be a minimum of 125% of the
10 connected load unless otherwise specified on the Drawings. Dimmer shall be compatible with fixture driver/ballast in
11 coordination with light fixture package provided.

12
13
14 **WIRING DEVICE ACCESSORIES**

15
16 Wallplates for Flush Mounted Devices: Provide standard sized stainless steel (Type 302) wallplates for flush
17 mounted single and combination wiring devices of types, sizes, and with ganging and cutouts as required for the
18 application. Select plates that mate and match wiring devices to which attached; provide blank plates for empty or
19 unused boxes. Provide screws for securing plates to devices; screw heads shall match finish of plates. Oversized
20 plate shall not be used unless specifically permitted by the A-E. A quantity of 2% spare plates shall be provided for
21 the Owner.

22
23 Wallplates for Surface Mounted Devices: Provide steel plates as required to match device box construction.

24
25 Wallplates for exterior and/or wet locations: Provide weatherproof PVC products listed as "extra duty while in use."
26 Covers shall be rectangular, transparent high-impact, UV-resistant polycarbonate.

27
28
29 **PART 3 - EXECUTION**

30
31
32 **INSTALLATION OF WIRING DEVICES**

33
34 Install wiring devices as indicated in accordance with manufacturer's written instructions, applicable requirements of
35 NEC and NECA's "Standard of Installation," and in accordance with recognized industry practices to fulfill project
36 requirements.

37
38 Coordinate with other work, including painting, electrical boxes and wiring work, as necessary to interface installation
39 of wiring devices with other work.

40
41 Install wiring devices only in electrical boxes that are clean, free from excess building materials, dirt, and debris.

42
43 Install wiring devices after wiring work is completed.

44
45 Install wallplates after painting work is completed.

46
47 Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's
48 published torque tightening values for wiring devices. Where manufacturer's torquing requirements are not indicated,
49 tighten connectors and terminals to comply with tightening torque's specified in UL Stds 486A and B. Use properly
50 scaled torque indicating hand tool.

51
52
53 **PROTECTION OF WALLPLATES AND RECEPTACLES**

54
55 Upon installation of wallplates and receptacles, advise other project Contractors regarding proper and cautious use of
56 convenience outlets. At time of Substantial Completion, replace those items that have been damaged, including
57 those burned and scored by faulty plugs.

1 **GROUNDING**

2
3 Provide equipment grounding connections for all wiring devices, unless otherwise indicated. All devices, including
4 switches, shall be grounded by an individual insulated green equipment grounding conductor connected to the
5 grounding conductor that is run with the ungrounded conductors, and attached to the device box. Comply with
6 tightening torque's specified in UL Std. 486A to assure permanent and effective grounds.
7

8
9 **TESTING**

10
11 Prior to energizing circuitry, test wiring for electrical continuity, and for short-circuits. Ensure proper polarity of
12 connections is maintained. Subsequent to energizing, test wiring devices to demonstrate compliance with
13 requirements.
14

15
16 **FIELD QUALITY CONTROL**

17
18 Subsequent to completion of installation of electrical disconnect switches, energize circuitry and demonstrate
19 capability and compliance with requirements. Correct any faults to assure compliance with requirements. Retest to
20 demonstrate compliance. Devices that fail to comply with requirements shall be removed and replaced with new
21 units. Retest all replaced devices.
22

23
24 **END OF SECTION 262726**

SECTION 265000 - LIGHTING FIXTURES

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

QUALITY ASSURANCE

Manufacturer's Qualifications: Firms regularly engaged in the manufacture of interior lighting fixtures of types, sizes, and ratings required, whose products are Listed and Labeled.

Codes and Standards:

Electrical Code Compliance: Comply with applicable State building code requirements, the requirements of the authority having jurisdiction, and the NEC as applicable to installation and construction of lighting fixtures.

NEMA Compliance: Comply with applicable requirements of NEMA Stds Pub/No.'s LE 1 and LE 2 pertaining to lighting equipment. Comply with applicable requirements of NEMA Std. Pub No.'s 1B 4, 1B 5, and FA 1 pertaining to emergency lighting. Comply with NEMA Std. Pub. No.'s SH 5 and TT 1 pertaining to pole/standard construction materials, installation and pole hardware.

Testing Laboratory Compliance: Comply with UL standards, including UL 486A and B, pertaining to interior lighting fixtures. Provide lighting fixtures and components that are Listed and Labeled.

ANSI Compliance: Provide lamp ballast which comply with ANSI C82.

NFPA Compliance: Comply with applicable requirements of NFPA 99, "Health Care Facilities" and NFPA 101, "Life Safety Code."

NC Code Compliance: Comply with applicable requirements of current NC Energy Code.

IEC Compliance: Provide LED drivers and transformers which comply with IEC 61000-3-2 – Harmonic current emissions.

SUBMITTALS

Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

Product Data: Submit manufacturer's product data and installation instructions on each type interior building lighting fixture and component. Include product data on lamps and ballasts used for each fixture type. Submit manufacturer's data from the ballast manufacturer that certifies compatibility for the lamps served. Include warranty data for each fixture type.

Photometric Data: Where indicated below or for substitutions, supply complete photometric data for the fixture, including optical performance, rendered by NVLAP approved laboratory developed according to the methods of the Illuminating Engineering Society of North America. Submit electronically, in IESNA LM-63 standard format.

1 Shop Drawings: Submit layout drawings of interior lighting fixtures and their spatial relationship to each other. In
2 addition, submit fixture shop drawings in booklet form with separate sheet for each fixture, assembled in "luminaire
3 type" alphabetical or numerical order, with proposed fixture and accessories clearly indicated on each sheet. Submit
4 details indicating compatibility with ceiling system and methods of support for each interior fixture type. Mounting
5 standards or poles for each exterior fixture type shall be clearly indicated, include certified dimensioned drawings for
6 fabricated poles, standards and mast arms.

7
8 Maintenance Data: Submit maintenance data and parts list for each interior lighting fixture and accessory; including
9 "trouble- shooting" maintenance guide. Include that data, product data, and shop drawings in a maintenance manual
10 submitted in accordance with requirements of Division 1.

11 Specification Sheets: If lacking sufficient detail to indicate compliance with contract documents, standard specification
12 sheets will not be accepted. This includes, as applicable to the respective luminaire source, but is not limited to,
13 luminaire type designation, manufacturer's complete catalog number, voltage, LED type, CCT, CRI, specific driver
14 information, system efficacy, lumen maintenance (L70) rating, Total Harmonic Distortion (THD), R9 color value,
15 driver/transformer IEC 61000-3-2 compliance, and any modifications necessary to meet the requirements of the
16 contract documents.

17
18 Lumen Maintenance Rating: Lumen maintenance ratings shall be identified for LED luminaires, based on short term
19 test data obtained under LM-80 test methods. Long-term lumen maintenance projections shall be based on IES Test
20 Method TM-21-11, to render L70 rating.

21 22 23 PART 2 - PRODUCTS

24 25 INTERIOR LIGHTING FIXTURES

26
27
28 General: Provide lighting fixtures of sizes, types and ratings indicated. Fixtures shall be supplied complete with all
29 suspension accessories, canopies, housings, hickey, sockets, starters, holders, reflectors, ballasts, louvers, frames,
30 poles, hangers, standards, and any and all other items necessary to install fixtures.

31
32 Provide fixtures with accessories appropriate for all ceiling types into which the fixtures are placed. See architectural
33 Drawings and Specifications to verify ceiling types, modules, or suspension systems appropriate to installation. Refer
34 to the Fixture Schedule for specific fixture requirements.

35
36 Fixtures shall have the manufacturer's name, trademark, model number, serial number, date of manufacture (month-
37 year), and lot number as identification permanently marked inside each unit and the outside of each packaging box.
38 Operating characteristics shall be permanently marked inside each unit, including rated voltage and power in Watts
39 and Volt-Ampere.

40
41 Recessed lay-in fixtures shall be fabricated of not less than 22 gauge, prime, cold rolled steel, die formed, and
42 welded into a one-piece housing. Recessed lay-in fixtures shall have die embossed housing with the full length die-
43 formed stiffeners for rigidity. Lamp holder brackets shall enclose all wiring and shall be securely fastened to fixture
44 housing. Lamp holder shall be attached with machine screws. Electronic components shall be mounted directly to
45 the housing with not less than two captive bolts or nuts. Finish shall be electrostatically-applied, baked-on alkyd
46 enamel, with minimum 85 percent reflectance. Finish shall be applied only after complete fixture fabrication. Lay-in
47 fixtures shall be field adaptable for either concealed suspension mounting or flanged installation.

48
49 All fixture systems in linear, corner, square, rectangular, or other continuous patterns to be of approximate length
50 and configuration as shown on plans. Electrical contractor to be responsible for field measurements to determine
51 exact lengths so that fixture will fit precisely between walls where required. Fixtures to be pre-wired for feeding
52 location as determined by electrical contractor. Fixture to be supplied with steel splines for sides of housing to allow
53 for positive alignment on continuous linear mounting. Fixture to also be supplied with the correct number and size of
54 corners, extensions, end caps, and other associated appurtenances as required to create the indicated pattern. All
55 extraneous components shall match exactly the finished fixture (including baffles) and be provided by same
56 manufacturer as individual fixtures.

1 Wiring: Provide electrical wiring within fixture suitable for connecting to branch circuit wiring. Maximum temperature
2 at point of connection to branch circuit wiring shall not exceed 75°C.
3

4
5 **LED FIXTURES**
6

7 LED luminaires shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire
8 shall consist of a housing, LED array, and electronic driver (power supply) and integral controls as per this
9 specification. All electrical components shall be RoHS compliant.

10
11 Luminaire shall be designed to operate at an average operating temperature of 25°C. The overall operating
12 temperature range shall be -20°C to 50°C ambient.
13

14 Minimum operational life shall be minimum 50,000 hours at 70% light output (L70) when operated at the average
15 operating temperature.
16

17 LED luminaire housing to have no visible welding, screws, springs, hooks, rivets, bare LED's or plastic supports. The
18 luminaire shall be a single, self-contained device, not requiring on-site assembly for installation. The power supply
19 and circuit board for the luminaire shall be integral to the unit.
20

21 Individual LED's shall be connected such that a catastrophic loss or the failure of one LED will not result in the loss of
22 the entire luminaire. LED Boards shall be suitable for field maintenance and have with plug-in connectors. LED
23 boards shall be upgradable.
24

25 LED Drivers: Provide solid state drivers that are modular and field serviceable, capable of operating lamp types
26 indicated. Provide drivers meeting the following minimum requirements:
27

- 28 UL Listed 8750, Sound Rated A.
- 29 Lighting regulation: ±10% over design voltage range.
- 30 Voltage range: ±10% nominal.
- 31 Power factor: >0.90; THD: <20%.
- 32 Operating range: -20°C to 50°C ambient.
- 33 Built-in transient protection per ANSI/IEEE C64.41 2002, Category A.
- 34 Must meet requirements of FCC 47 Part 15 (radiated RF).
35

36 Dimming: Driver shall be suitable for full-range dimming, where indicated on the Fixture Schedule. Quality of dimming
37 to be defined by dimming range, freedom from perceived flicker or visible stroboscopic flicker, smooth and continuous
38 change in level (no visible steps in transitions), natural square law response to control input, inaudible in 26 db
39 environment, and stable when input voltage conditions fluctuate over what is typically experienced in a commercial
40 environment. Dimming range shall be 100% to 10% of rated lumen output with a smooth shut off function.
41

42 Drivers shall track evenly at all light levels, and shall have an input signal to output light level that allows smooth
43 adjustment over the entire dimming range.
44

45 The electronics/power supply enclosure shall be internal to the luminaire and be accessible per UL requirements.
46

47 Surge Suppression: The luminaire shall include surge protection within the driver to withstand high repetition noise
48 and other interference.
49

50 In Rush Current: Meet or exceed NEMA 410 driver inrush standard of 430 Amps per 10 Amps of load, with a
51 maximum value of 370 amps² – seconds.
52

53 RF Interference: The luminaire and associated on-board circuitry must meet Class A emission limits referred in
54 Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 Non-Consumer requirements for
55 EMI/RFI emissions.
56

57 Electrical connections between normal power and driver must be modular utilizing a snap fit connector. All electrical
58 components must be easily accessible after installation and be replaceable without removing the fixture from the
59 ceiling.
60

1 The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper
2 operation of the luminaire over the expected useful life.

3
4 The driver manufacturer's maximum case temperature shall be stated in the product submittal and shall not be
5 exceeded at the maximum operating ambient. Thermal management shall be passive by design. The use of fans or
6 other mechanical devices shall not be allowed.

7
8 Warranty: The manufacturer shall provide a single source, 5 year minimum limited warranty against loss of
9 performance and defects in materials and workmanship for all components of the luminaire. Warranty is from the
10 time of acceptance of the Luminaires. All warranty documentation shall be provided to customer prior to the first
11 shipment. Provide manufacturer's warranty covering 5 years minimum on drivers from date of acceptance.

12
13 High-Intensity-Discharge Lamp Ballasts:

14
15 Provide HID lamp ballasts, capable of operating lamp types with ratings indicated. Ballast shall be
16 autotransformer type, high power-factor, core and coil assembly encapsulated in non-melt resin. Install
17 capacitor(s) outside ballast encapsulation for easy field replacement.

18
19 Provide HID lamp ballasts, which properly mates and matches lamps to electrical supply by providing
20 appropriate voltages and impedances for which lamps are designed. Design ballasts to operate lamp within
21 the lamp's power trapezoid requirements.

22
23 Lamps:

24
25 Provide LED lamps of types and wattages as indicated in the Fixture Schedule. Correlated Color
26 temperature (CCT) of 4000K shall be correlated to chromaticity as defined by the absolute (X, Y)
27 coordinates on the 2-D CIE chromaticity chart. Color shift over 6,000 hours shall be <0.007 change in u' v'
28 as demonstrated in IES LM-80 report.

29
30 LED lamp R9 value shall be 30 or greater. The color rendition index (CRI) shall be a minimum of 80. LED
31 boards to be tested for color consistency and shall be within a space of 2.5 MacAdam ellipses on the CIE
32 chromaticity chart.

33
34
35 **EMERGENCY LIGHTING FIXTURES**

36
37 General: Provide lighting fixtures, of sizes, types and ratings indicated complete with, but not limited to, housings,
38 batteries, lamps, lamp holders, reflectors, energy-efficient ballasts, starters, and wiring.

39
40 Wiring: Provide wiring within fixtures for connection to branch circuit wiring as follows:

41
42 NEC Type SF-2 for 120 Volt, minimum No. 18 AWG.

43
44 Exit Fixtures - Battery Powered: Provide surface, wall, or ceiling mounted Light Emitting Diode (LED) type fixtures as
45 indicated. Fixtures shall have selectable exit arrow directions. The arrow directions, where indicated on the
46 Drawings, shall be selected to point as shown.

47
48 Legend Panels: Provide panels or other legend medium with permanent letters, minimum size to be: 6"
49 high, 3/4" stroke. Letter color and background color shall be the same as the fixture indicated in the Fixture
50 Schedule. Provide special wording on legend panels in lieu of "EXIT" where indicated in the Fixture
51 Schedule.

52
53 Exit Fixtures - Non-battery Powered: Provide surface, wall, or ceiling mounted Light Emitting Diode (LED) type
54 fixtures as indicated. Fixtures shall have selectable exit arrow directions. The arrow directions, where indicated on
55 the Drawings, shall be selected to point as shown.

- 1 Legend Panels: Provide panels or other legend medium with permanent letters, minimum size to be: 6"
- 2 high, 3/4" stroke. Letter color and background color shall be the same as the fixture indicated in the Fixture
- 3 Schedule. Provide special wording on legend panels in lieu of "EXIT" where indicated in the Fixture
- 4 Schedule.
- 5
- 6 Emergency Lights - Battery Powered: Provide surface, wall, or ceiling mounted emergency fixtures as indicated.
- 7 Light units shall operate at 12 VDC. Provide two, incandescent lamps in heads that permit azimuth and elevation
- 8 adjustments to provide accurate aiming. In selected fixtures as indicated on the Fixture Schedule, the emergency
- 9 light feature may be combined with the exit sign as a single fixture.
- 10
- 11 Fixtures with Emergency Battery Ballast: In selected fixtures as indicated on the Drawings emergency batteries shall
- 12 be installed. Where the illuminated test switch is not mounted on the fixture provide a 1/4" diameter red dot on the
- 13 fixture frame, visible from the floor, to identify its use as an emergency fixture.
- 14
- 15 Provide charging system for exit and emergency fixtures that are automatic solid state, full wave rectifying, current
- 16 limiting type. Systems shall be furnished complete with nickel cadmium battery which shall be automatically
- 17 connected to the lamps upon loss of AC power. Batteries shall be a high temperature type with an operating range
- 18 from 0-60 degrees C and contain a re-sealable pressure vent. Normal life expectancy for battery shall be no less
- 19 than 10 years. The battery shall be sized to supply light for a minimum of 90 minutes unless otherwise specified in
- 20 the Fixture Schedule. Upon restoration of normal AC supply the unit shall return to the pre-loss condition. Provide a
- 21 test push button and a fault indicator light that indicates battery or charging system failure; provide any accessory
- 22 items as described in the Fixture Schedule.
- 23
- 24 Provide exit and emergency fixtures with pilot light to indicate the unit is connected to A.C. power. The battery shall
- 25 have high rate charge pilot light, unless self-diagnostic type. Provide a test switch to simulate the operation of the
- 26 unit upon loss of A.C. power by energizing the lamps from the battery. This simulation must also exercise the
- 27 transfer relay.
- 28
- 29 Provide exit and emergency fixtures with manufacturer's three year warranty. The battery must have an additional
- 30 two more years pro-rated warranty. Warranty shall start from the date of project final acceptance. Warranty shall be
- 31 included in the contract document.
- 32

PART 3 - EXECUTION

EXAMINATION

39 Examine areas and conditions under which lighting fixtures are to be installed, and substrate for supporting lighting
40 fixtures. Notify A-E in writing of conditions detrimental to proper completion of the work. Do not proceed with work
41 until unsatisfactory conditions have been corrected.

INSTALLATION OF INTERIOR LIGHTING FIXTURES

46 Install interior lighting fixtures at locations and heights as indicated, in accordance with fixture manufacturer's written
47 instructions, applicable requirements of NEC, NECA's "Standard of Installation," NEMA standards, and with
48 recognized industry practices to ensure that lighting fixtures fulfill requirements.

50 Where fixtures are supported directly from an outlet box, provide fixtures and/or fixture outlet boxes with hangers to
51 properly support fixture weight. Submit design of hangers, method of fastening, other than indicated or specified
52 herein, for review by A-E.

54 Install flush mounted fixtures properly to eliminate light leakage between fixture frame and finished surfaces.

56 Provide plaster frames for recessed fixtures installed in other than suspended grid type acoustical ceiling systems.
57 Brace frames temporarily to prevent distortion during handling.

1 Fasten fixtures securely to indicated structural supports; ensure that pendant fixtures are plumb and level. Provide
2 individually mounted pendant fixtures longer than 2 feet with twin stem hangers. Provide stem hanger with ball
3 aligners and provisions for minimum one inch vertical adjustment. Mount continuous rows of fixtures with an
4 additional stem hanger greater than number of fixtures in the row.
5

6 Lighting fixtures, related junction boxes, and conduit are to be supported directly from the building structure. Support
7 fixture independently from each corner using ceiling grid gauge wire; use of the ceiling grid or wires supporting ceiling
8 grid to support fixtures, junction boxes, or conduit is not permitted. Provide a screw at four corners to secure fixture
9 to ceiling grid system.
10

11 Support surface mounted fixtures greater than 2 feet in length at two points in addition to the outlet box fixture stud.
12

13 Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's
14 published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not
15 indicated, tighten connectors and terminals to comply with tightening torques specified in UL Stds 486A and B, and
16 the National Electrical Code. Tap connections are permitted within fixtures that are mounted end-to-end and supplied
17 with power from a single end.
18

19 Otherwise, no splices, other than those necessary for the connection of a single fixture, shall be made within a fixture
20 enclosure.
21

22 **INSTALLATION OF EMERGENCY LIGHTING FIXTURES**

23
24
25 Install emergency lighting fixtures at locations and heights as indicated, in accordance with fixture manufacturer's
26 written instructions, applicable requirements of NEC, NECA's "Standard of Installation," NEMA standards, and with
27 recognized industry practices to ensure that lighting fixtures fulfill requirements.
28

29 Coordinate with other electrical work as appropriate to properly interface installation of emergency lighting fixtures
30 with other work.
31

32 Wall mounted fixtures shall be installed plumb and vertical. Fixtures shall be located as shown on the Drawings,
33 mounted to fixture boxes or other suitable boxes with matching plaster rings as required by the type of construction.
34 Where used over single doors, the fixture shall be centered in the door opening. Where used over double doors, the
35 fixture shall be centered over either the center of the door or over the exit side of the door as indicated in the
36 Drawings. Where emergency lighting is used at a door location and ceiling height is low, fixtures shall be mounted so
37 that there is no conflict between the door swing and the fixture.
38

39 Ceiling mounted fixtures shall be supported from fixture boxes or other suitable boxes with matching plaster rings as
40 required by the type of construction. Fixture boxes used to support ceiling mounted fixtures shall be supported
41 directly by the building structure using threaded rod and appropriate hardware. Use of grid ceiling tile, grid support
42 wires, or grid members for the support of emergency fixtures shall not be permitted.
43

44 **FIELD QUALITY CONTROL**

45
46
47 Replace defective and burned out lamps for a period of one year following approval of final inspection.
48

49 After approval of final inspection, replace lamps in interior lighting fixtures that are observed to be noticeably dimmed
50 after Contractor's use and testing, as judged by Engineer.
51

52 Upon completion of installation of emergency lighting fixtures, and after building circuitry has been energized with
53 normal power source, apply electrical energy to demonstrate capability and compliance with requirements. Test
54 emergency lighting after units have been permanently installed and charged per manufacturer's instructions, but no
55 less than 24 hours. Batteries shall be tested for 90 minutes and meet the minimum illumination requirements of
56 NFPA-101. Record illumination level at floor level beneath each unit before and after test and submit to engineer for
57 review. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise,
58 remove and replace with new units, and proceed with retesting.
59
60

1 **ADJUSTING AND CLEANING**

2

3 Clean lighting fixtures of dirt and construction debris upon completion of installation. Clean fingerprints and smudges
4 from lenses.

5

6 Protect installed fixtures from damage during remainder of construction period.

7

8

9 **GROUNDING**

10

11 Provide equipment grounding connections for all interior lighting fixtures. Each interior lighting fixture shall be
12 grounded by means of a separate insulated grounded conductor routed with the ungrounded conductor(s). The
13 grounding conductor to each fixture shall terminate on a dedicated green screw within the fixture itself. Tighten
14 connections to comply with tightening torques specified in UL Std. 486A to assure permanent and effective grounds.

15

16

17 **END OF SECTION 265000**

SECTION 283110 - FIRE ALARM SYSTEM MODIFICATIONS

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

SCOPE

This section of the specifications includes the furnishing, installation, and connection of new initiation devices, alarm appliances, and related items to an existing fire alarm system. The final product shall be a complete coordinated system ready for operation. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, auxiliary control devices, annunciators, power supplies, and wiring as shown on the Drawings and specified herein.

QUALITY ASSURANCE

Manufacturer's Qualifications: Firms regularly engaged in manufacture of fire alarm systems of types, sizes, and electrical characteristics required, and whose products are Listed and Labeled. Products of firms that do not maintain factory authorized service organization and spare parts stock are not acceptable for use on this project.

Installer's Qualifications: Installer shall be a company specializing in performing the work of this section, with a minimum of 5 years documented experience installing fire detection and alarm systems similar in size and scope to this project. Installer shall be certified by the manufacturer to install, program and service the system. Installer shall directly provide the final connections between the equipment and the wiring system and the addressing of all system devices.

Installer shall directly provide the installation of all wiring and devices required in the system, or provide supervision over this work when provided by the electrical contractor. Installer shall not sub-contract any portion of the required work to a third party. All work shall be performed in accordance with the Installer's submitted and approve fire alarm shop drawings and calculations.

System programming shall be done only by a manufacturer, or by an authorized Installer. The Installer's technicians who perform this work shall be trained and individually certified by the manufacturer, for the model and series of equipment being installed. The technicians' training and certification must have occurred in the most recent 24 months. Qualifications of installer, including technician certifications, shall be provided with equipment submittal.

Installer shall be present on site for the 100% test, Designer's pre-final review and Owner inspections.

Codes and Standards:

NFPA Compliance: Comply with applicable requirements of NFPA-72, 2013 National Fire Alarm Code.

NEC Compliance: Comply with applicable requirements of NFPA-70, National Electrical Code (NEC) standards pertaining to fire alarm systems.

Testing Laboratory Compliance: Comply with provisions of UL safety standards pertaining to fire alarm systems. Provide products and components which are Listed and Labeled.

UL Compliance: Provide fire alarm notification appliances consistent with requirements in UL 1971, Signaling Devices for the Hearing Impaired, for determining device operating currents and device ratings.

NCBC Compliance: Fire Alarm notification appliances shall comply with NC Building Code and NC Accessibility Code criteria for intensity and placement.

1 FM Compliance: Provide fire alarm systems and accessories which are FM approved.
2
3

4 **SUBMITTALS**

5
6 Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal
7 requirements are defined in each section of this Division.
8

9 Product Data: Submit Manufacturer's technical product data, including specifications and installation
10 instructions, for each type of fire alarm system equipment. Submit technical product data on the fire alarm
11 service equipment. Submittals shall provide mA draw for each device submitted and UL listed minimum
12 voltage required to operate. Panel submittal shall list voltage drop allowed for panel and for individual NAC
13 circuits.
14

15 Shop Drawings: Submit shop drawings showing equipment, device identification numbers and locations,
16 and connecting wiring of entire fire alarm system. Include wiring and riser diagrams. Wiring diagrams shall
17 be based on the project floor plans, with devices and proposed conduit routing shown. Provide conductor
18 composition for each conduit section. Provide distance and route for each NAC (Notification Appliance
19 Circuit). Risers diagrams shall show consecutive connections for all devices with addresses and ratings.
20 Copies of Project Construction Documents or details therefrom may not be a part of the shop drawing
21 submittal. Shop drawings shall be prepared in an electronic format that is convertible to DXF files. The fire
22 alarm contractor shall submit complete shop drawings to the engineer for review prior to installation.
23

24 Wiring and Cabling: Submit wire and cable for signal circuits and notification circuits.
25

26 Installation Instructions: Submit Manufacturer's detailed installation instruction for all duct mounted smoke
27 detectors, flow switches, tamper switches, supervisory switches, and similar items which require mechanical
28 installation.
29

30 Battery Calculations: Provide battery calculations used to size secondary power source. Calculations must
31 be submitted prior to installation of equipment. Battery calculations shall utilize the UL 1971 RMS DC or full
32 wave rectified (FWR) current values of notification appliances, as appropriate for the power supply used,
33 provided by the product manufacturer. These values shall be highlighted in the submittal for each appliance
34 used in the project. Identify notification appliance circuit (NAC) current draws and calculate voltage drops
35 for each circuit in the submittal package. Identify EOL voltage for each proposed NAC, based on a source
36 voltage of 20.4 volts. In no case shall the calculated EOL for any NAC be below the minimum listed
37 operating voltage for the devices used.
38

39 Device List: Submit a listing for each addressable device that indicates the device address, function and
40 location. This information shall be the basis for the device descriptions to be programmed into the system,
41 contingent upon approval of Designer and Owner. Information shall be included in device identification that
42 is observed at the FACP and FAAP. Device addresses shall exactly match the information provided on the
43 shop drawings.
44

45 Maintenance Data: Submit maintenance data and parts lists for each type of fire alarm equipment installed,
46 including furnished specialties and accessories. Include this data, product data, and shop drawings in
47 maintenance manual.
48

49 Certifications: Submit a certification from the major equipment manufacturer indicating that the proposed
50 supervisor of installation and the proposed performer of contract maintenance is an authorized
51 representative of the major equipment manufacturer. Include names and addresses, and telephone
52 numbers in the certification.
53
54

PART 2 - PRODUCTS

ALARM APPLIANCES

Programmable Electronic Sounders shall be located as shown on the Drawings; sounders located outdoors shall be listed for use in wet locations. Electric sounders shall operate with synchronized audible output and have the following specifications:

Voltage: Programmable electronic sounders shall operate on 24 VDC nominal.

Programming: Electronic Sounders shall provide the ANSI S3.41 three-pulse temporal pattern audible evacuation signal, described in NFPA 72, with an output sound level of at least 90 dBA measured at 10 feet from the device. Output sound level shall be 120 dB maximum. Electronic Sounders shall be field programmable without the use of special tools.

Mounting: Provide flush mounting devices suitable for mounting in a standard single gang device box unless otherwise indicated on the Drawings. Unless otherwise indicated on the Drawings, electronic sounders shall be mounted at 6'-8" (2.05 M) Above Finished Floor (AFF) or 6" (15.3 Cm) Below Finished Ceiling (BFC), whichever is lower.

Strobe Lights shall be located as shown on the Drawings. Strobe lights indicated for use exterior to the building shall be mounted at the indicated elevation and listed for use in wet locations. Strobe lights shall operate with synchronized flash output and have the following specifications:

Voltage: Strobe lights shall operate on 24 VDC nominal.

Maximum pulse duration: 2/10ths of one second.

Mounting: Provide flush mounting devices suitable for mounting in a standard single gang device box unless otherwise indicated on the Drawings. Unless otherwise indicated on the Drawings, strobe lights shall be mounted with the lower edge of the visual element at 6'-8" (2.05 M) Above Finished Floor (AFF) or 6" (15.3 Cm) Below Finished Ceiling (BFC), whichever is lower.

Strobe intensity and flash rate: Must meet minimum requirements of UL 1971. Provide strobe lights with minimum intensity Candela (Cd) rating of 15 Cd, or greater if such is indicated adjacent to the device symbol on the Drawings.

Audible/Visual Combination Devices shall be located as shown on the Drawings and shall comply with all applicable requirements for both Audible Device and Strobe Lights. Unless otherwise indicated on the Drawings, combination A/V devices shall be mounted with the lower edge of the visual element at 6'-8" (2.05 M) Above Finished Floor (AFF) or 6" (15.3 Cm) Below Finished Ceiling (BFC), whichever is lower.

Bells shall be 10" diameter vibrating type located as shown on the Drawings; bells located outdoors shall be listed for use in wet locations. Bells shall have the following specifications:

Voltage: Bells shall operate on 24 VDC nominal.

Mounting: Provide flush mounting devices suitable for mounting in a standard single gang device box unless otherwise indicated on the Drawings. Bell mounting elevation shall be as described on the Drawings.

PART 3 - EXECUTION

Fire and smoke detection and alarm systems shall comply with the following system requirements with regard to operation and installation.

All equipment and components shall be installed in strict compliance with manufacturers' recommendations. All equipment supplied must be specifically listed for its intended use and shall be installed in accordance with any instructions including in its listing. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation. Refer to the Riser/Connection diagram for all specific system installation/termination/wiring data.

All system components shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load. Adhesives are not permitted to mount fire alarm system components to building surfaces or structure.

The system shall be new and furnished with a warranty (parts & labor) of at least one year from the date of final inspection and acceptance by the Owner. Equipment, initiating devices, and alarm appliances shall be arranged as described in the Drawings; annunciator zones shall be configured as described in the Drawings.

Systems are to be provided with a separate and independent source of emergency power. Switching to emergency power during alarm shall not cause signal drop-out. Batteries must meet the appropriate NFPA capacity requirements, with a 25% safety factor. This requirement is in effect even if generator power is supplied to the Fire Alarm Control Panel.

Style 6 Circuits Required: Systems with one or more addressable sub-panels that (1) have an integral addressable loop controller, or (2) monitor multiple non-addressable initiation zones, shall comply with the NFPA 72 requirements for Style 6 circuits.

All wiring shall be color coded in accordance with the following scheme, which shall be maintained throughout the system, without color change in any wire run:

Signal Line Circuit cable	Red jacket with Red(+)/Black(-)
Alarm Indicating Appliance Circuits	Blue (+)/Black (-)
AHU Shutdown Circuits	Yellow (+)/Brown (-)
Initiation Circuits from Monitor Modules	Violet (+)/Gray (-)
Door Control Circuits	Orange
Elevator Capture Circuits	Brown

There shall be NO splices in the system other than at terminals in panels, fire alarm terminal cabinets (FATC) and devices. "Wire nuts," crimp splices, or insulation piercing type connectors are not acceptable. All terminal blocks shall be mounted in enclosures. All terminal screws shall have pressure wire connectors of the self-lifting or box lug type.

Permanent wire markers shall be used to identify all splices and terminations for each circuit. For splices within FATC's, use markers or other means to indicate which conductors leads to the FACP.

All fire alarm system cables and conductors shall be installed in raceway, couplers, and connectors meeting the performance of installation requirements of Section 260534, RACEWAYS. The minimum size for fire alarm system raceway shall be 3/4" trade size.

The exterior of all junction boxes containing fire alarm conductors shall be painted red; box interiors shall not be painted. Box covers for junction boxes containing fire alarm conductors shall be painted red on both sides. All painting of junction boxes and junction box covers shall be accomplished prior to installation of the boxes to avoid possible problems with overspray. Those boxes in finished areas are permitted to be painted to match the finish color.

- 1 Box covers shall be labeled to indicate the circuit(s) or function of the conductors contained therein. Labels
- 2 shall be neatly applied black lettering on a clear background. Handwritten labels or labels made from
- 3 embossed tape are not acceptable.
- 4
- 5 Raceways that penetrate outside walls from conditioned space shall have an internal seal to prevent condensation
- 6 within the raceway as it enters the conditioned space.
- 7
- 8 Provide metal backboxes or plastic skirts as manufactured by the fire alarm manufacturer for devices installed in a
- 9 surface mounted application. Such boxes shall match device in size and color.
- 10
- 11 Wire shall be new AWG #12 minimum stranded copper, type THHN/THWN for Notification Appliance Circuits.
- 12 Addressable loop (signaling line) circuits shall be wired with type FPL/FPLR/FPLP fire alarm cable, AWG 18
- 13 minimum, low capacitance, twisted shielded copper pair. Cable shield drain wires are to be connected at each device
- 14 on the loop to maintain continuity, taped to insulate from ground, and terminated at the FACP. Acceptable cables
- 15 include Atlas 22-18-1-1STP, BSCC S1802s19 (same as EEC 7806LC), West Penn D975, D991 (AWG 16), D995
- 16 (AWG 14), or equal wire having capacitance of 30pf/ft maximum between conductors. The cable jacket color shall be
- 17 red, with red (+) and black (-) conductor insulation.
- 18
- 19 EXCEPTION #1: Unshielded cable, otherwise equal to the above, is permitted to be used where the manufacturer's
- 20 installation instructions unequivocally require, or state a preference for, the use of unshielded cable for all systems,
- 21 AWG #16 minimum.
- 22
- 23 EXCEPTION #2: In underground conduit, use Type TC or PLTC cable (PE insulated) to avoid problems from
- 24 moisture.
- 25
- 26 Detection or alarm circuits must not be included in raceways containing AC power or AC control wiring. Within the
- 27 FACP, any 120 VAC control wiring or other circuits with an externally supplied AC/DC voltage above the nominal 24
- 28 VDC system power must be properly separated from other circuits and the enclosure must have an appropriate
- 29 warning label to alert service personnel to the potential hazard.
- 30
- 31 Provide an engraved label in FACP identifying its 120 VAC power source. This label shall include panelboard
- 32 location, identification, and circuit number.
- 33
- 34 Branch circuit breakers serving fire alarm systems shall be physically protected from inadvertent contact using a
- 35 breaker handle lock. Load designation shall be clearly identified (typed) in the panel directory. Breakers shall be
- 36 further identified with a permanent red dot applied to the handle or other visible portion of the breaker. Do not cover
- 37 operable portions of the breaker or written information on the case in meeting this requirement.
- 38
- 39 All wiring shall be checked for grounds, opens, and shorts, prior to termination at panels and installation of detector
- 40 heads. The minimum resistance to ground or between any two conductors shall be ten megohms (10 MW), as
- 41 verified with a megger. Provide advance notice to the A-E of these tests.
- 42
- 43 All connections at the FACP must be made by the Manufacturer's authorized, factory trained representative (rather
- 44 than by the electrical contractor).
- 45
- 46 The system shall be electrically supervised for open or (+/-) ground fault conditions in SLC, alarm circuits, and control
- 47 circuits. Removal of any detection device, alarm appliance, plug-in relay, system module, or standby battery
- 48 connection shall also result in a trouble signal. Fire alarm signal shall override trouble signals, but any pre-alarm
- 49 trouble signal shall reappear when the panel is reset.
- 50
- 51 Spare Parts: Provide the following spare parts with the system, each individually packaged and labeled. For multi-
- 52 building projects, calculate separately for each building:
- 53
- 54 Fuses 2 of each size used in the system
- 55 Manual Stations 2% of installed quantity
- 56 Addressble Control Modules 4% of installed quantity
- 57 Indoor Horns/Strobes 4% of installed quantity
- 58 Indoor Strobe-only Notification Appliances 4% of installed quantity
- 59 Monitor Modules (Addressable interface) 4% of installed quantity
- 60 Isolation Modules /Isolation Bases 4% of installed quantity

1	Addressable Heat Detectors, Bases	4% of installed quantity
2	Spot Smoke Detectors, Bases	6% of installed quantity

3
4
5
6
7

Increase decimal quantities of spare parts to the next higher whole number. For example, if a system has 20 spot-type smoke detectors provide 2 spare detectors with bases.

8 **ALARM VERIFICATION FOR SMOKE DETECTORS**

9
10
11
12
13

Fire alarm systems with automatic drift compensation functions shall be programmed with this feature activated for all spot-type detectors. Fire alarm systems equipped with alarm verification, shall not be programmed with the feature activated unless it is determined necessary through system testing.

14
15
16

Alarm verification shall be by device, with timer and tally. The system shall provide a timer function that can be set for a specific detector or input module.

17
18
19

The timer function shall delay alarm signal for a field-programmable time period. The control panel shall override the alarm verification functions if a subsequent alarm is reported during the verification period.

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The tally function shall be capable of monitoring the total quantity of verification cycles initiated at the panel. A maximum verification count may be set in the field, ranging from 0-20. When the counter threshold is exceeded, a trouble signal shall be generated to the FACP.

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Alarms from other than spot type smoke detectors must not be delayed by Alarm Verification. Alarm Verification is NOT to be applied to duct smoke detectors, nor to any software configured "cross-zoned" detection devices.

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29 **FIRE ALARM SYSTEM INSTALLATION AND CONFIGURATION**

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In addition to other requirements of these Specifications the fire alarm system must comply with the following:

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The addressable fire alarm system shall be connected, programmed, and tested only by the Manufacturer or by an authorized distributor who stocks a full compliment of spare parts for the system. Technicians performing this service shall be trained and individually certified by the Manufacturer for the model of system being installed. Copies of installer certification must be included with the Contractor's submittal.

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The complete configuration data (site-specific programming) for the system must be permanently stored on a USB drive or compact disc (CD) and archived by the manufacturer or authorized distributor. A USB drive or compact disc (CD) copy of this data must be submitted to the A-E for transmission to the Owner when the system is commissioned.

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The Manufacturer or authorized distributor must maintain software version (VER) records on the system installed. The system software shall be upgraded free of charge if a new VER is released for any reason during the warranty period. For any new VER to correct problems, free upgrade shall apply during the entire life of the system.

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All addressable loop controller circuits (SLCs) must be NFPA 72 Style 6 ("Class A") and shall have a minimum of 20% spare addresses for future use. "T-taps" from the loop are not permitted. To minimize the impact of a wiring fault on the system, isolation modules must be provided as follows:

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1. At the FACP, at each end of the loop.
2. At the mid-point of a loop with less than 20 devices or control points.
3. After each 20 devices/control points on any addressable circuit.
4. For each circuit extending outside the building.
5. At each terminal cabinet on loops serving multiple floors (each floor).

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Notification Appliance Circuits (NACs) shall be NFPA 72 Style Y (Class B). The load connected to each circuit must not exceed 80% of rated supply output. The coverage of each circuit shall not exceed 3 floors. The NAC voltage drop during alarm shall not exceed 14% of the voltage measured across the batteries. The contractor shall use power outage testing to verify proper installation.

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1 Supervision required: The connection between individual addressable modules and their contact type
2 initiating device(s) must be supervised.

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4 In addition to the system tests and certification described elsewhere, the Manufacturer or authorized
5 distributor must 100% test all site-specific software functions for the system and provide a written test report
6 or detailed check list.

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9 **SYSTEM DOCUMENTATION**

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11 The contractor shall provide the A-E with three copies of the following:

- 12
13 1. As-built wiring and conduit layout diagrams, including wire color code and/or label numbers, and
14 showing all interconnections in the system.
15 2. Electronic circuit diagrams of all control panels, modules, annunciators, communications panels,
16 etc.
17 3. Technical literature on all major parts of the system, including control panels, batteries, detectors,
18 manual stations, alarm indicating appliances, power supplies, and remote alarm transmission
19 means.
20 4. Detailed maintenance requirements as recommended by the fire alarm manufacturer.

21
22 The contractor shall provide the A-E with one copy of the following:

- 23
24 1. All software required, both for the installed fire alarm system and for any personal computer (PC)
25 necessary to access the fire alarm system for trouble shooting, programming, modifications,
26 monitoring, de-bugging, or similar functions.
27 2. Complete documentation for all software for both the installed fire alarm system and for any
28 interface PC software necessary for system functions as described in (1) above.
29 3. Framed floor plans for installation at the FACP. Plans shall show all system devices with the
30 unique device identification numbers indicated adjacent to each device. The identification numbers
31 shall match those represented in the as-built drawings and those reported at the FACP and the
32 LCD annunciator.

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35 **SYSTEM TESTING & CERTIFICATION**

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37 Upon completion of the installation the Division 28 Contractor and the Manufacturer's authorized installer together
38 shall conduct a 100% performance test of each alarm initiating device that is added and/or modified as part of the
39 construction activity for proper response. In addition, a 10% test as defined in NFPA 72 shall be conducted for
40 system devices and circuits in the building that were not directly impacted by the specified work. The system shall
41 operate for 48 hours prior to start of test. The Division 28 Contractor shall be present for the full 100% test.

42
43 The Contractor's 100% Performance test shall consist of the following. Upon activation of each alarm initiating
44 device, verify effective operation of every alarm notification appliance and all other functions such as elevator
45 capture, control smoke doors/dampers, proper operations of HVAC systems, and pressurization fans. In addition,
46 verify proper annunciation of each activated device, including device identification number, type and location, at the
47 FACP and each remote annunciator. The FACP shall reset after testing of each alarm initiating device. The digital
48 communicator shall be on-line and tested for proper communication to the receiving station. Equivalent methods of
49 demonstrating proper operation of HVAC shutdown are acceptable for this test. All supervised circuits must also be
50 tested to verify proper supervision. (Control circuits and remote annunciation lines are among those required to be
51 supervised.)

52
53 All testing described above shall be repeated in the event that subsequent software or wiring modifications are
54 determined necessary to meet the requirements of the contract documents. Such re-testing shall be included as part
55 of the base bid and provided at no additional cost to the Owner.

1 The A-E must be given 7 days advance notice of the tests.

2
3 The contractor must submit the following test documentation:

- 4
5 1. Written verification that this system test (100% and 10%) was done with copy of print out generated
6 during test.
7 2. System status and programming report, including a system operation matrix showing the actual
8 FACP response for each initiating device. In addition, provide the measured sensitivity of each
9 smoke detector. (Generate on date of Designer Pre-Final).
10 3. NFPA 72-2013 "Record of Completion" form: Use this form to detail the system installation and to
11 certify that it was installed per code requirements.
12 4. Voltage table indicating voltage at battery and at the last device on each NAC circuit. Take
13 readings at the start of test and every 15 minutes during NAC test. Test shall be 30 minutes
14 minimum.
15

16 After completion of the Contractor's 100% performance test and submission of the above documentation, the
17 contractor will request in writing that the A-E set up a pre-final review.
18

19 If the initial inspection determines that the required 100% system test was not reasonably done, or if a reinspection of
20 the project is requested without the punch list being nearly completed, the Contractor *may* be required to reimburse
21 the Designer for inspection costs.
22

23 System Report: In addition to the shop drawing submittal the fire alarm system contractor shall provide the engineer
24 two bound copies of the following technical information, for transmittal to the owner:

- 25 1) As-Built wiring diagram showing all loop numbers and device addresses, plus terminal numbers where
26 they connect to control equipment.
27 2) Manufacturer's detailed maintenance requirements
28 3) Technical literature on all control equipment, isolation modules, power supplies, alarm/ supervisory
29 signal initiating devices, alarm notification appliances, relays, etc...
30 4) The as-built "calculations" sheet referenced elsewhere in this specification.
31

32 Electronic archive: Complete configuration data (site-specific programming) for the system must be stored on
33 electronic media and archived by the fire alarm system manufacturer or authorized distributor. A USB drive or
34 compact disc (CD) copy of this data shall be submitted to the engineer for transmission to the owner.
35

36 37 **INSPECTIONS**

38
39 Fire Alarm System Designer Pre-final Review: Upon completing the fire alarm system installation, and prior to
40 scheduling the Designer Pre-final review, the installation contractor must successfully conduct and complete a 100%
41 performance test of the entire fully functional system. All audio visual device tests shall be scheduled with the owner.
42

43 As part of the Designer Pre-final review the system will be inspected and functionally tested on a comprehensive
44 basis. Equipment intended for open area protection or releasing device service may be subjected to simulated or
45 actual test fires in accordance with ANSI/UL guideline and sound engineering practice, to verify proper response.
46

47 The Contractor shall provide two-way radios, equipment keys, as-built drawings, ladders, smoke products, meter and
48 other materials required to test the system. The test will be conducted entirely by the Contractor. Any deficiencies
49 shall be recorded and corrected. After the items have been corrected, the system shall be tested again in the
50 presence of the Engineer.
51

52 In the event of malfunctions or excessive nuisance alarms, the Contractor must take prompt corrective action. The
53 Owner may require a repeat of the Contractor's 100% system test, or other inspections. Continued improper
54 performance during the warranty period shall be cause to require the Contractor to remove and replace the system.
55

56 Test Report: Upon successful completion of the Performance Inspection and correction of all deficiencies, the
57 manufacturer's authorized representative shall issue a test report to the Engineer, detailing and certifying the test.
58

59 Final Inspection: At the Owner's request and after passing the pre-final review, the Division 28 Contractor and
60 Manufacturer's authorized installer will conduct a full system test in the presence of the Owner and the Designer.

1 Upon request, a copy of the final database software must be presented to the Owner on USB drive before this test.
2 The software shall be loaded from the drive into the system in the presence of the Owner and Engineer. See
3 requirements for pre-final test and conduct similarly.
4
5 System Acceptance: After successful completion of the Final Inspection and recommendation of the Engineer, the
6 system will be accepted by the Owner. At this time the warranty period begins. In the event of malfunctions or
7 excessive nuisance alarms, the Contractor must take prompt corrective action. The Owner may require a repeat of
8 the Contractor's 100% system test, or other inspections. Continued improper performance during the warranty period
9 shall be cause to require the Contractor to remove the system.

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12 **END OF SECTION 283110**

