INVITATION FOR BIDS

TO

COUNTY OF DURHAM

FOR THE RENOVATION OF

Durham County Administration I Building
County Legal Department - Suite Renovation

Date: February 13th, 2025

ARCHITECTS/ENGINEERS:
DTW Architects & Planners, Ltd. • 3333 Durham-Chapel Hill Blvd., Suite D100, Durham, NC
Edmondson Engineers, P.A. • MEP Engineers, Durham, NC

Durham County Administration I Building
County Legal Department - Suite Renovation

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BID SCHEDULE

(Note: The dates below are subject to change)

Durham County Administration I Building
County Legal Department - Suite Renovation

Advertisement Date	February 13th, 2026
Pre-Bid Conference (Required to Bid)	February 24th, 2026 at 2:00pm
Site Visit	February 24th, 2026 (after the Pre-Bid)
Last Date for Questions	March 2nd, 2026
Bids Due Date	March 12th, 2026 at 2:00pm

0001 – Advertisement for Bids

ADVERTISEMENT FOR BIDS

Durham County Administration I Building

County Legal Department - Suite Renovation

Bids will be received by the County of Durham, Engineering & Environmental Services, Durham County, 201 East Main Street, 5th Floor, Durham, North Carolina 27701, until 2:00 P.M. Eastern Time, on March 12th, 2026. The work contemplated will include Reconfiguration of 732 square feet of office space in the Durham County Administration I Building - County Legal Department

A **MANDATORY** Pre-Bid Conference will be held on February 24th, 2026 at 2:00 P. M. Eastern Time at 201 East Main Street, Room 126, Durham, NC 27701. All bidders who intend to bid are **REQUIRED** to attend.

Site Visit: A site visit will be held immediately afterward in the Durham County Administration I Building – Legal Department. ESCORTED ONLY.

Instructions for submitting bids, specifications, a complete description of the work involved, and the apparatus, supplies, materials, and equipment for this bid, can be examined at the office DTW Architects & Planners, Ltd. located at 3333 Durham-Chapel Hill Blvd., Suite D100, Durham, NC 27707; and at the following locations:

Durham Equity & Inclusion Department Plan Room
Durham, NC 27701
Eric.miller@durhamnc.gov / www.durhamnc.gov

NC Institute of Minority Economic Development
Durham, NC 27701
info@theinstitute.org

Construct Connect
Cary, NC
www.content@constructionconnect.com

Dodge Data & Analytics
www.construction.com

Construction Journal
www.constructionjournal.com

The Blue Book Online Plan Room
www.thebluebook.com

Prospective Bidders should contact DTW Architects at the contact noted below in order to be e-mailed a link to download the project manual and bid documents and to receive a list of bidders. Contractors may secure document sets after 9:00 A.M., until 5:00 P.M., Monday through Friday.

Please contact:
Dawn Vanorsdale, Senior Business Administrator
(phone) 919.317.4020 / (e-mail) dvanorsdale@dtwarch.com

Contractors who bid must be licensed to do work in the State of North Carolina under the Act to Regulate the Practice of General Contracting. The Contractor's North Carolina License number shall be designated on the outside of the envelope containing the bid.

A 5% bid security is required with each bid that equals or exceeds $300,000.00.

Bids will be evaluated and the Contract will be awarded in accordance with statutory public contract requirements as supplemented.

The County reserves the right to reject any and/or all bids, waive informalities, and/or accept such bid as appears in its judgement to be in the best interest of the County.

Publication Date: February 13th, 2025

0002 – Instructions to Bidders

INSTRUCTIONS TO BIDDERS

1. For a Bid to be considered, it must be in accordance with the following instructions:

   Bids must be made in strict accordance on the "Bid Form" provided therefore and all blank spaces for the Bid Alternates and Unit Prices shall be properly filled in When alternates are requested, and alternates are not included in the bid, the bid will be considered non-responsive. The Bidders agree that Bids on Bid Form detached from Specifications will be considered and will have the same force and effect as if attached hereto. **Numbers shall be stated both in writing and in figures for the Base Bid and Alternates. One (1) original copy shall be submitted to the Purchasing Division.**

   Any modification to the Bid Form (including Alternates and Unit Prices) may disqualify the Bid and may cause the Bid to be rejected.

   The Contractor shall fill in the Bid Form as follows:

   A. If the documents are executed by a sole Owner, that fact shall be evidenced by the word of "Owner" appearing after the name of the person.

   B. If the documents are executed by a Partnership, that fact shall be evidenced by the word of "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 person shall appear after their signatures. The Seal of the Corporation shall be impressed on each signature page of the documents.

   D. If the Bid 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. It shall be the specific responsibility of the Bidder to deliver this Bid to the proper official at the appointed place and prior to the time for the opening of the Bids. Late delivery of a Bid for any reason, including delivery by the United States Mail, shall disqualify the Bid.

   G. Modifications of previously deposited Bids will be acceptable only if delivered to the place of the bid opening prior to the time for opening Bids.

   H. Unit Prices quoted in the Bids shall include overhead and profit and shall be the full compensation for the Contractor's cost involved in the work.

2. It is understood and mutually agreed that by submitting a Bid the Contractor acknowledges that he/she has carefully examined the bidding documents pertaining to the work, the locations, 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 him/herself as to the nature of the work, the condition of the existing buildings and structures, the conformation of the ground, the character, quality and quantity of the materials to be encountered; the character of the equipment, machinery, plant and other facilities needed preliminary to and during prosecuting

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 Health Act of 1970 and all rules and regulations issued pursuant thereto. It is further mutually agreed that by submitting a Bid, the Contractor acknowledges that he/she has satisfied him/herself as to the feasibility and meaning of the plans, drawings, Specifications, and other contract documents for the construction of the work and that he/she accepts all terms, conditions and stipulations contained therein and that he/she is prepared to work in cooperation with the other contractors performing work on the site.

3. Material substitutions will be considered during the bidding phase until 3:00 P.M., on March 2nd, 2026. No substitutions will be considered after that time and date.

   For proposed material substitutions submit the following information directly to the Architect/Engineer at: **DTW Architects & Planners, Ltd. • Attn: J. Paul Young, AIA at pyoung@dtwarch.com Email or 919.371.4020 (Office Phone) • 919.697.7816 (Cell).**

   Name of manufacturer
   Address of manufacturer
   Phone number of manufacturer
   Trade name
   Model or catalogue designation
   Manufacturer's date including:
      Performance and test data
      Reference standards

   Detailed comparison with specified product including:
      Performance
      Test results
      Warranties
      Gauge, thickness or strength of material finish
   Other pertinent data
   Other information requested by the Project Manager

4. To ensure a fair bidding process, all questions from the contractors must be emailed to **J. Paul Young, AIA at pyoung@dtwarch.com** later than 3:00 P.M., on March 2nd, 2026. These questions will be addressed in an Addendum.

   Any Addenda to Specifications issued during the time of bidding will be sent to each bidder and are to be considered covered in the bid and in closing a Contract will become part thereof. All Addenda issued will be posted on our eBid System. All Addenda shall be acknowledged by the bidder(s) on the Bid Form. Failure to do so may disqualify the bid and may cause the bid to be rejected.

   It shall be the Contractor's responsibility to ascertain prior to bid time the Addenda issued and to see that his/her bid includes any changes thereby required.

5. Neither the Owner nor the Project Manager will be responsible for any oral instructions. Any interpretation of the proposed document will be made only by Addendum duly issued, a copy of which will be mailed or delivered to each person receiving a set of such documents.

6. For projects that equals or exceeds $300,000.00 on the bids, a bid bond is required. No bid that equals or exceeds the $300,000.00 amount will be considered or accepted unless accompanied by a Bid Guarantee in the form a cash deposit or certified check drawn on a bank authorized to do business in North Carolina and licensed by the Federal Deposit Insurance Corporation and is payable to the order of County of Durham, representing five percent (5%) of the total Bid. Said deposit to be retained by the Owner if the successful bidder fails to execute the contract within fifteen (15) days after the award or gives satisfactory Surety as required by law.

   Such deposit of cash or certified check may be held by the County of Durham until the successful bidder has executed and delivered the contract documents, including Performance and Payment Bonds, to the County of Durham. Bid deposits submitted in the form of cash, cashier's check or certified check will be deposited in the County's account as required by North Carolina Local Government Budget and Fiscal Control Act (N.C. General Statute Chapter 159, Article 3). The bids will be evaluated, and the contract will be awarded in accordance with statutory public contract requirements as supplemented.

7. Bids shall be received in strict accordance with requirements of the General Statutes. All copies of the Bid, the Bid Security, if any and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope can be hand delivered or mailed and shall be addressed to the Durham County Purchasing Division, Durham County Administrative Complex, 201 East Main Street, 7th Floor Durham, NC 27701, and should be identified with the project name, time and date of Bid Opening, the Bidder's name and address, Bidder's license number and designated portion of the work for which the Bid is submitted.

8. It is the responsibility of the bidder to ensure that the bid arrives at or before the time and date indicated.

   A Bidder may withdraw its formal Bid after the Bids are opened without forfeiting its Bid deposit in certain limited circumstances. Withdrawal after opening is permitted only if all conditions specified in North Carolina General Statutes Section 143-129.1 are met.

9. Bids shall be evaluated using the Total Bid. The Total Bid shall be the summation of the product of all of the Items' Unit Bid Prices by their Estimated Quantities. In the event of a math error, the Extended Totals and the Total Bid will be corrected based on the Unit Price furnished in the bid. Bids with math errors will be compared using the corrected Total Bid (i.e., the math must be correct before a bid is considered for award).

10. The Owner shall award the contract to the lowest responsible, responsive bidder taking into consideration the past performance of the Bidder on Construction Contracts for the County of Durham, the State of North Carolina, or other governmental agencies with particular concern given to completion times, quality of work, cooperation with other Contractors, and cooperation with the Project Manager and Owner. The Owner shall have the right to accept Alternates in any order of combination.

11. The successful Bidder, upon award of the Contract, shall furnish a Performance Bond in an amount equal to one hundred percent (100%) of the Contract Price.

12. The successful Bidder, upon award of Contract, shall furnish a Payment Bond in an amount equal to one hundred percent (100%) of the Contract Price.

13. For all work being performed under this Contract, the County of Durham has the right to inspect, examine, and to make copies of any books, accounts, records, and other writings related to the performance of the work. Audit shall take place at times and locations mutually agreed upon by both parties, although the contractor must make the materials to be audited available within one (1) week of the request.

14. Contract completion time for all work on this project is **120 calendar days** or 30 days from substantial completion, whichever is first. Bidders shall note the 120 calendar day-time limit for the substantial completion of such work as may be contracted for as follows: **See schedule in Division 1, Section 013216 Construction Schedule.**

15. Bids will be examined promptly after opening and award will be made at the earliest possible date. The prices quoted must be held firm for ninety (90) days. Bids may be withdrawn by written notice of a request to withdraw the bid within seventy-two hours of the bid opening date, not including Saturdays, Sundays, or other days (such as holidays) on which the local government offices are closed.

16. All bidders must complete the Vendor Application/W-9 Form and include it with their bid package. This information will be used to create or update Durham County's electronic Bidder/Vendor files if awarded bid.

17. A Pre-Bid Conference will be held on February 24th, 2026 at 2:00 P. M. Eastern Time at 201 East Main Street, Room 126, Durham, NC 27701. **All bidders who intend to bid are REQUIRED to attend.**

18. **Security of Non-public Records:** Pursuant to N.C.G.S. § 132-1.7, entitled, "Sensitive Public Security Information", public records, as defined in G.S. 132-1, shall not include information containing specific details of public security plans and arrangements or the detailed plans and drawings of public buildings and infrastructure facilities. Therefore, all information provided, received, gathered or obtained by BIDDER containing specific details of public security plans and arrangements or the detailed plans and drawings of public buildings and infrastructure facilities shall be held confidential and shall be used by the BIDDER only for the purpose of responding to this bid. All plans and drawings shall be returned to the County. Any breach of this paragraph by the BIDDER may result in BIDDER being barred from being awarded any contracts with the COUNTY.

19. **E-VERIFY**: As a condition of payment for services rendered under this agreement, CONTRACTOR shall comply with the requirements of Article 2 of Chapter 64 of the General Statutes. Further, if CONTRACTOR provides the services to the County utilizing a subcontractor, CONTRACTOR shall require the subcontractor to comply with the requirements of Article 2 of Chapter 64 of the General Statutes as well. CONTRACTOR shall verify, by affidavit, compliance of the terms of this section upon request by the COUNTY.

20. **DRUG FREE WORKPLACE:** The Contractor acknowledges and certifies that they understand that the following acts by the Contractor, its employees and/or agents performing services on County property is prohibited.
    - The unlawful manufacture, distribution, dispensing, possession or use of alcohol or other drugs, and;
    - Any impairment or incapacitation from the use of alcohol or other drugs (except the use of drugs for legitimate medical purposes).

The Contractor further acknowledges and certifies that it understands that a violation of these prohibitions constitutes a breach of contract and may result in default action being taken by the County of Durham in addition to any criminal penalties that may result from such conduct.

21. The following forms/documents must be returned with your original Bid Proposal:
    a. Bid Form (All Addenda issued must be acknowledged on the Bid Form)
    b. Non-Collusion Affidavit **(Must be Notarized)**
    c. Vendor Application with W-9 Form
    d. Bid Deposit, if required (Bid Bond, cash, cashier's check, or certified check). Power of Attorney must be included when submitting a Bid Bond.
    e. Affidavit of Compliance **(Must be Notarized)**

END OF INSTRUCTIONS TO BIDDERS

0003 – Equal Employment Opportunity

EQUAL EMPLOYMENT OPPORTUNITY

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

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

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

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

D. In the event of the contractor's noncompliance with nondiscrimination clauses of this contract or with any such rules, regulations or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further County contracts.

E. The contractor will include the provisions of this section in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Board of County Commissioners of the County of Durham, North Carolina so that such provisions will be binding such subcontractor or vendor.

0004 – General Conditions of the Contract for Construction

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

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GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

ARTICLE 1
GENERAL PROVISIONS

1.1. BASIC DEFINITIONS

1.1.1 Contract for Construction. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification.

1.1.2 Contract Documents. The Contract Documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, addenda issued prior to execution of the Contract, advertisement or invitation to bid, Instructions to Bidders, other documents listed in the Agreement and Modifications issued after execution of the Contract. In the event of conflicts among the contract documents, the Specifications shall take precedence over the Drawings, and the Supplementary Conditions shall take precedence over the General Conditions. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Owner and a Subcontractor or Sub-subcontractor.

1.1.3 Contractor. The person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. Unless otherwise stated, the term "Contractor" means the General Contractor or the General Contractor's authorized representative.

1.1.4 Drawings. The Drawings are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

1.1.5 Designer. The Architect or Engineer registered in accordance with the provisions of Chapter 89C of the NC General Statutes, identified as such in the Contract for Construction and is referred to throughout the Contract Documents as if singular in number. The term "Designer" refers to the Designer or the Designer's authorized representative(s). The Designer shall be entitled to performance and enforcement of obligations under the Contract for Construction intended to facilitate performance of the Designers' duties.

1.1.6 Modification. A Modification is (1) a written amendment to the Contract signed by the parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Designer.

1.1.7 Owner. The person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Owner" means the Owner or the Owner's authorized representative.

1.1.8 Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate contractors.

1.1.9 Project Manual. The Project Manual is the volume usually assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

1.1.10 Specifications. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.

1.1.11 Work. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the project.

1.2 EXECUTION, CORRELATION, AND INTENT

1.2.1 The Contract Documents shall be signed by the Owner and Contractor as provided in the Agreement. If either the Owner or Contractor or both do not sign all the Contract Documents, the Designer shall identify such unsigned Documents and insure that they are properly signed by the necessary parties.

1.2.2 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be performed, correlated personal observations with requirements of the Contract Documents, has checked and verified all site conditions, and hereby waives any and all claims, present or future, for misrepresentation on the part of the Owner or Designer.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all.

1.2.4 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any Subcontractor.

1.2.5 Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

1.3 OWNERSHIP AND USE OF DESIGNER'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

1.3.1 The Drawings, Specifications and other documents prepared by the Designer are instruments of the Designer's service through which the Work to be executed by the

Contractor is described. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Designer. The Owner will retain all common law, statutory and other reserved rights, in addition to the copyright of the drawings, specifications and other documents prepared by the Designer. All copies of them, except the Contractor's record set, shall be returned or suitably accounted for to the Designer, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Designer, and copies thereof furnished to the Contractor, are for use solely with respect to this Project; they are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects without the specific written consent of the Owner and Designer. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Designer appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this license shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Designer. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Owner's copyright or other reserved rights.

1.4 CAPITALIZATION

Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs and Clauses in the document or (3) the titles of other documents.

1.5 INTERPRETATION

In the interest of brevity, the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

ARTICLE 2
OWNER

2.1 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.1.1 The Owner shall furnish plan and profile of existing County utilities. The Contractor is responsible for locating all existing utilities prior to Work.

2.1.2 Except for permits and fees which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

2.1.3 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in orderly progress of the Work.

2.1.4 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work.

2.2 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may after such seven-day period, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case, an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Designer's additional services and expenses made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior review and confirmation by the Designer. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3
CONTRACTOR

3.1. REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

3.1.1 The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the Owner pursuant to Section 2.1, and shall at once report to the Designer errors, inconsistencies or omissions discovered. If the Contractor performs any construction activity knowing or should have known it involves an error, inconsistency or omission in the Contract Documents without such notice to the Designer, the Contractor shall assume full responsibility for such performance and shall bear the full costs for correction.

3.1.2 The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Designer immediately.

3.1.3 The Contractor shall perform the Work in accordance with the Contract Documents and submittals approved pursuant to Section 3.11.

3.2 SUPERVISION AND CONSTRUCTION PROCEDURES

3.2.1 The Contractor shall supervise and direct the Work using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless Contract Documents give other specific instructions concerning these matters.

3.2.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work under a contract with the Contractor.

3.2.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Designer in the Designer's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

3.2.4 The Contractor shall be responsible for inspection of portions of Work already performed under this Contract to determine that such portions are in proper condition to receive subsequent Work.

3.3 LABOR AND MATERIALS

3.3.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

3.3.2 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

3.3.3 Materials, equipment or items required for a complete job which are shown on the drawings but not mentioned in the specifications or materials, equipment or items required by the specifications but not shown on the drawings, shall be furnished and installed the same as though both shown on the drawings and required by the specifications.

3.4 WARRANTY

3.4.1 The Contractor warrants to the Owner and Designer that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents; that the Work will be free from defects not inherent in the quality required or permitted; and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Designer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

3.4.2 Except as otherwise specifically stated below, the Contractor shall guarantee his materials and workmanship against defect due to faulty materials or faulty workmanship or negligence for a period of twelve (12) months following Substantial Completion of the Work. Where the manufacturer's warranty on equipment or parts thereof exceeds twelve (12) months, the guarantee period on such equipment or parts thereof shall be extended to

include the full warranty of the manufacturer. The Contractor shall repair or replace such defective materials, equipment or workmanship to the full satisfaction of the Owner within the stipulated guarantee period without cost to the Owner.

3.5 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

3.6 PERMITS, FEES AND NOTICES

3.6.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract for Construction and which are legally required when bids are received or negotiations concluded.

3.6.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on performance of the Work.

3.6.3 It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Designer and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.

3.6.4 If the Contractor performs Work the Contractor knows or should have known it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Designer and Owner, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs.

3.7 ALLOWANCES

3.7.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities against which the Contractor makes reasonable objection.

3.7.2 Unless otherwise provided in the Contract Documents:

(1) materials and equipment under an allowance shall be selected promptly by the Owner to avoid delay in the Work;
(2) allowances shall cover the cost to the Contractor of materials and equipment delivered to the site and all required taxes, less applicable trade discounts;
(3) Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated

allowance amounts shall be included in the Contract Sum and not in the allowances;

(4) whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by a Change Order. The amount of the Change Order shall reflect (a) the difference between actual costs and the allowances under Clause 3.7.2. (2) and (b) changes in Contractor's costs under Clause 3.7.2.(3).

3.8 SUPERINTENDENT

The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing upon request.

3.9 CONTRACTOR'S CONSTRUCTION SCHEDULES

3.9.1 Promptly after being awarded the Contract, the Contractor shall prepare and submit for the Designer's review and comment a construction schedule for the Work. The schedule shall not exceed time limits provided in the Contract Documents. The Contract Documents shall be revised at appropriate intervals as required by the conditions of the Work and Project. The Contract Documents shall be related to the entire Project to the extent required by the Contract Documents. The Contract Documents shall provide for expeditious and practicable execution of the Work. If separate prime contracts are awarded by the Owner in connection with this Project, the Contractor shall additionally submit a Contractor's construction schedule for the Work to the General Contractor in order for the General Contractor to carry out its duties under Article 6.

3.9.2 The Contractor shall prepare and keep current, for the Designer's approval, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the Designer reasonable time to review submittals.

3.9.3 The Contractor shall conform to the most recent schedules.

3.10 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one record copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record changes and selections made during construction, and in addition approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Designer and shall be delivered to the Designer for submittal to the Owner upon completion of the Work.

3.11 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

3.11.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

3.11.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

3.11.3 Samples are physical examples, which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

3.11.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the Designer is subject to the limitations of Paragraph 4.1.6.

3.11.5 The Contractor shall review, approve and submit to the Designer Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals made by the Contractor which are not required by the Contract Documents may be returned without action.

3.11.6 The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed and approved or other appropriate action taken by the Designer. Such Work shall be in accordance with approved submittals.

3.11.7 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

3.11.8 The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Designer's review and approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Designer in writing of such deviation at the time of submittal and the Designer has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Designer's approval thereof.

3.11.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, product Data, Samples or similar submittals, to revisions other than those requested by the Designer on previous submittals.

3.11.10 Informational submittals upon which the Designer is not expected to take responsive action may be so identified in the Contract Documents.

3.11.11 When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Designer shall be entitled to rely upon the accuracy and completeness of such calculations and certifications.

3.12 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

3.13 CUTTING AND PATCHING

3.13.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

3.13.2 The Contractor shall not damage or endanger a portion of the work or fully or partially completed construction of the Owner or separate contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

3.14 CLEANING UP

3.14.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials.

3.14.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

3.15 ACCESS TO WORK

The Contractor shall provide the Owner and Designer access to the Work in preparation and progress wherever located.

3.16 ROYALTIES AND PATENTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of patent rights and shall hold the Owner and Designer harmless from loss unless a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a patent,

the Contractor shall be responsible for such loss unless such information is promptly furnished to the Designer.

3.17 INDEMNIFICATION

3.17.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Designer, Designer's consultants, and agents and employees of any of them from and against claims, damages, economic losses and expenses of any kind (including but not limited to fees and charges of engineers, attorneys, and other professionals and costs related to court action or arbitration), arising out of or resulting from performance of the Work under this Agreement, provided such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable unless caused in whole or part by the negligence of Owner. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.17.

3.17.2 In claims against any person or entity indemnified under this Section 3.17, by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Section 3.17, shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

3.17.3 The obligations of the Contractor under this Section 3.17, shall not extend to the liability of the Designer, the Designer's consultants, and agents and employees of any of them arising out of (a) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications, or (b) the giving of or the failure to give directions or instructions by the Designer, the Designer's consultants, and agents and employees of any of them provided such giving or failure to give is the primary cause of the injury or damage.

ARTICLE 4
ADMINISTRATION OF THE CONTRACT

4.1 DESIGNER'S ADMINISTRATION OF THE CONTRACT

4.1.1 The Designer will provide administration of the Contract as described in the Contract Documents and will be the Owner's representative during construction through final payment, and with the Owner's concurrence, from time to time during the correction period described in Paragraph 11.2. The Designer will advise and consult with the Owner. The Designer will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument in accordance with other provisions of the Contract.

4.1.2 The Designer will not have control over or charge of and will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility as provided in Paragraph 3.2. The Designer will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Designer will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons performing portions of the Work.

4.1.3 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate through the Designer. Communications by and with the Designer's consultants shall be through the Designer. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Designer.

4.1.4 Based on the Designer's inspections, observations and evaluations of the Contractor's Applications for Payment, the Designer will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

4.1.5 The Designer will have authority to reject Work which does not conform to the Contract Documents. Whenever the Designer considers it necessary or advisable for implementation of the intent of the Contract Documents, the Designer will have authority to require additional inspection or testing of the Work in accordance with Paragraphs 12.5.2 and 12.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Designer nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Designer to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.

4.1.6 The Designer will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Designer's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time in the Designer's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Designer's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Article 3. The Designer's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Designer, of any construction means, methods, techniques, sequences or procedures. The Designer's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

4.1.7 The Designer will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Paragraph 7.4.

4.1.8 The Designer will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, will receive and forward to the Owner for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

4.1.9 The Designer will interpret and decide matters concerning performance under and requirements of the Contract documents on written request of either the Owner or Contractor. The Designer's response to such requests will be made with reasonable promptness and within any time limits agreed upon. If no agreement is made concerning the time within which interpretations required of the Designer shall be furnished in compliance with this Paragraph 4.1.9, then delay shall not be recognized on account of failure by the Designer to furnish such interpretations until 15 days after written request is made for them.

4.1.10 Interpretations and decisions of the Designer will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Designer will endeavor to secure faithful performance by both Owner and Contractor and will not show partiality to either.

4.1.11 The Designer's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

4.1.12 If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Article 11.2 or persistently fails to carry out Work in accordance with the Contract Documents, the Designer may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Designer to stop the Work shall not give rise to a duty on the part of the Designer to exercise this right for the benefit of the Contractor or any other person or entity.

4.2 CLAIMS AND DISPUTES

4.2.1 A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be made pursuant to the Dispute Resolution Procedure set forth in Paragraph 4.4. The responsibility to substantiate Claims shall rest with the party making the Claim.

4.2.2 DECISION OF DESIGNER. Claims, including those alleging an error or omission by the Designer, shall be referred initially to the Designer for action as provided in Paragraph 4.4. A decision by the Designer shall be required as a condition precedent to mediation and litigation of a Claim between any party involved in this construction Project as to all such matters arising prior to the date final payment is due, regardless of whether such matters relate to execution and progress of the Work or the extent to which the Work has been completed. The decision by the Designer in response to a Claim shall not be a condition precedent to litigation in the event (1) the position of Designer is vacant, (2) the Designer has not received evidence or has failed to render a decision within agreed time limits, or (3) 45 days have passed after the Claim has been referred to the Designer.

4.2.3 TIME LIMITS ON CLAIMS. Claims by the Contractor must be made within 10 days after occurrence of the event giving rise to such Claim or within 10 days after the Contractor first recognizes the condition giving rise to the Claim, whichever is later. Claims must be made by written notice. An additional Claim made after the initial Claim has been implemented by Change Order will not be considered.

4.2.4 CONTINUING CONTRACT PERFORMANCE. Pending final resolution of a Claim, unless otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

4.2.5 WAIVER OF CLAIMS: FINAL PAYMENT. The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

(1) unsettled claims arising out of the Contract; or
(2) failure of the Work to comply with the requirements of the Contract Documents; or
(3) terms of special warranties required by the Contract Documents.

4.2.6 CLAIMS FOR CONCEALED OR UNKNOWN CONDITIONS. If conditions are encountered at the site which are (a) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (b) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 10 days after first observance of the conditions. The Designer will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Designer determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified the Designer shall so notify the Owner and Contractor in writing stating the reasons, Claims by either party in opposition to such determination must be made within 21 days after the Designer has given notice of the decision. If the Owner and Contractor cannot agree on an adjustment in the

Contract Sum or Contract Time, the adjustment shall be referred to the Designer for initial determination, subject to further proceedings pursuant to paragraph 4.4.

4.2.7 CLAIMS FOR ADDITIONAL COST. If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Paragraph 10.3. If the Contractor believes additional cost is involved for reasons including but not limited to (a) a written interpretation from the Designer, (b) a written order for a minor change in the Work issued by the Designer, (c) termination of the Contract by the Owner, Claim shall be filed in accordance with the procedure established herein. This Article and Article 7 shall be the exclusive means by which the Contractor may claim additional cost or damages from the Owner, and the Contractor hereby waives any and all right to claim additional cost or damages by any other remedy including, without limitation, quantum meruit, subrogation, or implied contract.

4.2.8 CLAIMS FOR ADDITIONAL TIME. If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary. Adverse weather conditions shall not be a basis for a Claim for additional time nor costs.

4.3 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, of any of the other party's employees or agents, or of others for whose acts such party is legally liable, written notice as such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 10 days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. If a Claim for additional cost or time related to this Claim is to be asserted, it shall be filed as provided in Subparagraphs 4.2.7 or 4.2.8.

4.4 DISPUTE RESOLUTION PROCEDURE

4.4.1 To prevent all disputes and litigation, it is agreed by the parties that any claim, question, difficulty or dispute arising from this Agreement or the construction process shall be first submitted to the Designer to address the issue. Upon review of the Claim, the Designer shall take one or more of the following preliminary actions within ten (10) days of receipt of a Claim: (1) request additional supporting data from the claimant, (2) submit a schedule to the parties indicating when the Designer expects to take action, (3) reject the Claim in whole or in part stating reasons for rejection, (4) recommend approval of the Claim by the other party, or (5) suggest a compromise. The Designer may also, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim.

4.4.2 If a Claim has been resolved, the Designer will prepare or obtain appropriate documentation.

4.4.3 If a Claim has not been resolved, the party making the Claim shall, within ten (10) days after the Designer's preliminary response, take one or more of the following actions: (1) submit additional supporting data requested by the Designer, (2) modify the initial Claim and resubmit it to the Designer, or (3) notify the Designer that the initial Claim stands and submit the Claim to the Durham County Manager for mediation pursuant to Paragraph 4.4.4, below.

4.4.4 The Durham County Manager, as mediator, shall address any properly submitted claim, question, difficulty or dispute arising from this Agreement or the construction process, which has not been satisfactorily resolved by the Designer. Such requests shall be made to the Durham County Manager in writing within ten (10) days after the Designer's preliminary response. The mediator shall notify Contractor in writing of the decision within thirty (30) calendar days from the date of the submission of the claim, question, difficulty or dispute, unless the mediator requires additional time to gather information or allow the parties to provide additional information. The mediator's orders, decisions and decrees shall be non-binding. Mediation, pursuant to this Section, shall be a pre-condition to initiating litigation concerning the dispute. During the pendency of any dispute and after a determination thereof, the parties to the dispute shall act in good faith to mitigate any potential damages including utilization of construction schedule changes and alternate means of construction.

4.4.5 The mediation session shall be private. Prior to commencement of mediation, if requested by either party or the mediator, the parties and the mediator shall execute a written confidentiality agreement in accordance with the provisions of North Carolina law. All such mediation sessions shall be held in Durham County, North Carolina.

4.4.6 If, as a result of mediation, a voluntary settlement is reached and the parties to the dispute agree that such settlement shall be reduced to writing, the mediator shall be deemed appointed and constituted an arbitrator for the sole purpose of signing the mediated settlement agreement. Such agreement shall be and shall have the same force and effect as an arbitration award, and judgement may be entered upon it in accordance with applicable law in any court of competent jurisdiction.

4.4.7 If the disputed issue cannot be resolved in mediation or either party disagrees with the results of the mediation, the parties may seek resolution in the General Court of Justice in the County of Durham and the State of North Carolina. If a party fails to comply in strict accordance with the requirements of this Article, the non-complying party specifically waives all of its rights provided hereunder, including its rights and remedies under State law.

4.4.8 The dispute resolution procedure set forth in this Section shall be made available to any party involved in this construction project including County, Contractor, Designer, Subcontractors as well as Sub-subcontractors and is a precondition to initiation of litigation concerning the dispute.

ARTICLE 5
SUBCONTRACTORS

5.1 DEFINITIONS

5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Designer the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work, including (1) Heating, ventilating, and air conditioning, (2) Plumbing, (3) Electrical, and (4) General. The Designer will promptly reply to the Contractor in writing stating whether or not the Owner or the Designer, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Designer to reply promptly shall constitute notice of no reasonable objection.

5.2.2 The Contractor shall NOT substitute any person or company listed in the Contractor's original Bid Proposal, except (1) of 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 work, or (2) with the approval of the Owner for good cause shown by the Contractor.

5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms and conditions of the Contract Documents and Contract for Construction, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these documents, assumes toward the Owner and Designer. Each subcontract agreement shall preserve and protect the rights of the Owner and Designer under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar

agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

ARTICLE 6
CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

6.1.1 The Owner reserves the right to perform construction or operations related to the project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site.

6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner- Contractor Agreement.

6.1.3 The General Contractor shall provide for coordination of the activities of each separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate Contractors and the General Contractor in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor and separate contractors until subsequently revised.

6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights which apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10 and 11.

6.1.5 The General Contractor shall be responsible for scheduling the work of all contractors; the maintenance of the progress schedule for all prime contractors for this project; and for the notification of the Designer of any changes in the progress schedule.

6.2 MUTUAL RESPONSIBILITY

6.2.1 The Contractor shall afford the Owner and separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

6.2.2 If part of the Contractor's Work depends on proper execution or results upon construction or operations by the Owner or a separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Designer apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor to report shall constitute an acknowledgment that the Owner's or separate Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

6.2.3 Costs caused by delays, by improperly timed activities, defective construction, or any other damages shall be borne by the party responsible therefor. The Owner shall not be liable nor responsible for any delays or damages to the Contractor caused by separate Contractors or the Designer.

6.2.4 The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate Contractors as provided in Paragraph 10.2.5.

6.2.5 Claims and other disputes and matters in question between the Contractor and a separate Contractor shall be subject to the provisions of Sections 4.2 and 4.4, provided the separate Contractor has reciprocal obligations.

6.2.6 The Owner and each separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Paragraph 3.13.

6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate Contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Paragraph 3.14, the Owner may clean up and allocate the cost among those responsible as the Designer determines to be just.

ARTICLE 7
CHANGES IN THE WORK

7.1 CHANGES

7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive, or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Designer; a Construction Change Directive requires agreement by the Owner and Designer

and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Designer alone pursuant to Paragraph 7.4.

7.1.3 Changes in the work shall be performed under applicable Provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

7.1.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are so changed in a proposed Change Order or Construction Change Directive that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

7.1.5 Overhead and profit shall not exceed 15% of the value of labor and material for work performed by any contractor or subcontractor. If the work is performed by a subcontractor, the prime contractor's overhead and profit shall not exceed 5%.

7.2 CHANGE ORDERS

7.2.1 A Change Order is a written instrument prepared by the Designer and signed by the Owner, Contractor, and Designer, stating their agreement upon all of the following:

(1) a change in the Work;
(2) the amount of the adjustment in the Contract Sum, if any; and
(3) the extent of the adjustment in the Contract Time, if any.

7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Paragraph 7.3.3.

7.3 CONSTRUCTION CHANGE DIRECTIVES

7.3.1 A Construction Change Directive is a written order prepared by the Designer and signed by the Owner and Designer, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
unit prices stated in the Contract Documents or subsequently agreed upon;

cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or as provided in Paragraph 7.3.6.

7.3.4 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Designer of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

7.3.5 A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

7.3.6 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Designer on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, and also under clause 7.3.3(3), the Contractor shall keep and present, in such form as the Designer may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Paragraph 7.3.6 shall be limited to the following:

costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;

costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and

additional costs of supervision and field office personnel directly attributable to the change.

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

7.3.8 If the Owner and Contractor do not agree with the adjustment in Contract Time or the method for determining it, the adjustment or the method shall be referred to the Designer for determination.

7.3.9 When the Owner and Contractor agree with the determination made by the Designer concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach

agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.

7.4 MINOR CHANGES IN THE WORK

The Designer will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be affected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 8
TIME

8.1 DEFINITIONS

8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

8.1.2 The date of commencement of the Work is the date established in the Agreement. The date shall not be postponed by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible.

8.1.3 The date of substantial Completion is the date certified by the Designer in accordance with Paragraph 9.9.

8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

8.2 PROGRESS AND COMPLETION

8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work. The Contractor and the Contractor's surety shall be liable for and shall pay the Owner such sums as shall be set forth in the Agreement between Owner and Contractor as liquidated damages each calendar day of delay until the work is substantially complete.

8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by the Contract for Construction to be furnished by the Contractor. The date of commencement of the work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by a notice to proceed given by the Designer, the Contractor shall notify the Owner and Designer in writing not less than five days before commencing the Work.

8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 If the Contractor is delayed at any time in progress of the Work by an act or neglect of the Owner or Designer, or of an employee of either, or of a separate Contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidably casualties or other causes beyond the Contractor's control, or by delay authorized by the Owner pending litigation, or by other causes which the Designer determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Designer may determine.

8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Paragraph 4.2.8.

8.3.3 Should the work be interrupted or hindered by the Owner or Designer, the Contractor shall be entitled to an extension of time pursuant to Paragraph 4.2 in an amount equal to such interruption or hindrance but such interruption or hindrance shall not constitute a claim for damages nor for loss of anticipated profits by the Contractor.

8.3.4 Should the work be delayed in whole by any act or acts of the Contractor, the Contractor shall not be entitled to an extension of time pursuant to Paragraph 4.2, nor shall such delay constitute a claim either for damages or for loss of anticipated profits by the Contractor. Should the work be delayed in part by any act or acts of the Contractor and in part by any act or acts of the Owner or Designer, the Contractor shall be entitled to an extension of time pursuant to Paragraph 4.2 in an amount equal to that portion of the delay for which the Contractor is not responsible, but such delay shall not constitute a claim either for damages or for loss of anticipated profits by the Contractor.

8.3.5 Should the work be delayed, interrupted or hindered, in whole or in part, by any act or acts of any separate prime contractors, the Contractor shall be entitled to an extension of time pursuant to Paragraph 4.2.8 in an amount equal to such delay, interruption or hindrance but such delay, interruption or hindrance shall not constitute a claim for damages nor for loss of anticipated profits by the Contractor.

ARTICLE 9
PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

9.2 SCHEDULE OF VALUES

Before the first Application for Payment, the Contractor shall submit to the Designer a Schedule of Values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Designer may require. This Schedule of Values, unless objected to by the Designer, shall be used as a basis for reviewing the Contractor's Applications for Payment.

9.3 APPLICATIONS FOR PAYMENT

9.3.1 At least twenty (20) days before the date established for each progress payment, the Contractor shall submit to the Designer an itemized Application for Payment for operations completed in accordance with the schedule of values. Such application shall be notarized, supported by such data substantiating the Contractor's right to payment as the Owner or Designer may require, such as copies of requisitions from subcontractors and material suppliers and reflecting retainage if provided for elsewhere in the Contract Documents.

9.3.2 Such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives but not yet included in Change Orders.

9.3.3 Such applications may not include requests for payment of amounts the Contractor does not intend to pay to a Subcontractor or material supplier because of a dispute or other reason.

9.3.4 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

9.3.5 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests, or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work.

9.3.6 Provided an Application for Payment is received by the Designer not later than the tenth (10th) day of a month, the Owner shall make payment to the Contractor not later than the thirtieth (30th) day of the month.

9.4 **RETAINAGE**

To ensure proper performance of this Contract, Owner shall retain five percent (5%) of the amount of each approved Application for Payment until the project work is 50% complete provided that the Contractor continues to perform satisfactorily, and any non-conforming work identified in writing prior to that date has been corrected by the Contractor and accepted by the Owner. If the Owner determines the Contractor's performance is unsatisfactory, the Owner may reinstate retainage in the amount of 5% for each subsequent periodic Application for Payment until the Contractor's performance becomes satisfactory. The project shall be deemed fifty percent (50%) complete when the Contractor's gross project invoices, excluding the value of materials stored off-site, equal or exceed fifty percent (50%) of the value of the contract, except the value of materials stored on-site shall not exceed twenty percent (20%) of the contractor's gross project invoices for the purpose of determining whether the project is fifty percent (50%) complete. Following 50% completion of the project, the Owner may also withhold additional retainage from any subsequent periodic payment, not to exceed 5%, in order to allow the Owner to retain 2½% total retainage through the completion of the project. Within sixty (60) days after the

submission of a final pay application, the Owner with written consent of the Surety shall release to the Contractor all retainage on payments held by the Owner if (1) the Owner receives a certificate of substantial completion from the architect, Designer or design consultant in charge of this Project, or (2) the Owner receives beneficial occupancy or use of the project. However, the Owner may retain sufficient funds to secure completion of the project or corrections to any work. If the Owner retains funds, the amount retained shall not exceed two and one half times the estimated cost of the work to be completed or corrected. Any reduction in the amount of retainage on payments shall be with the consent of the Contractor's Surety. Retainer provisions contained Contractor's subcontracts may not exceed the terms and conditions for retainage provided herein. Contractor is further required to satisfy the retainage provisions of N.C.G.S. 143-134.1(b2) with regard to subcontracts for early finishing trades (structural steel, piling, caisson, and demolition) and to coordinate the release of retainage for such trades from the retainage held by Owner from the Contractor pursuant to statute. Nothing herein shall prevent the Owner from withholding payment to the Contractor in addition to the amounts identified herein 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.

9.5 CERTIFICATES FOR PAYMENT

9.5.1 The Designer will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Designer determines is properly due, or notify the Contractor and Owner in writing of the Designer's reasons for withholding certification in whole or in part as provided in Paragraph 9.6.1.

9.5.2 The Designer's certification for payment shall constitute a representation to the Owner, based on the Designer's inspections at the site and on the data comprising the Contractor's Application for Payment, that the Work has progressed to the point indicated and that the inspections of the construction, repairs, or installations have been conducted with the degree of care and professional skill and judgment ordinarily exercised by a member of his profession; and that to the best of his knowledge and in the professional opinion of the Designer, the Contractor has fulfilled the obligations of such plans, specifications, and contract. The Designer's certification for payment shall be signed and sealed by the Designer and presented to the Owner. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion and to specific qualifications expressed by the Designer. The issuance of a Certificate for Payment shall further constitute a representation by the Designer, that the Contractor is entitled to payment in the amount certified.

9.6 DECISIONS TO WITHHOLD CERTIFICATION

9.6.1 The Designer may decide not to certify payment and may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the

Designer's opinion, the representations to the Owner required by Paragraph 9.5.2 cannot be made. If the Designer is unable to certify payment in the amount of the Application, the Designer will notify the Contractor and Owner as provided in Paragraph 9.5.1. If the Contractor and Designer cannot agree on a revised amount, the Designer will promptly issue a Certificate for Payment for the amount for which the Designer is able to make such representations to the Owner. The Designer may also decide not to certify payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Designer's opinion to protect the Owner from loss due to:

(1) defective Work not remedied;

(2) third party claims filed or reasonable evidence indicating probable filing of such claims;

(3) failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;

(4) reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

(5) damage to the Owner or another contractor;

(6) reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or persistent failure to carry out the Work in accordance with the Contract Documents.

9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

9.7 PROGRESS PAYMENTS

9.7.1 After the Designer has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Designer.

9.7.2 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in similar manner.

9.7.3 The Designer will furnish to a Subcontractor, upon request and if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action

taken thereon by the Designer and Owner on account of portions of the Work done by such Subcontractor.

9.7.4 Neither the Owner nor Designer shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

9.7.5 Payment to material suppliers shall be treated in a manner similar to that provided in Paragraphs 9.7.2, 9.7.3, and 9.7.4.

9.7.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

9.8 FAILURE OF PAYMENT

The Contractor shall not stop the Work for the failure of the Designer to issue a Certificate of Payment, or the Owner to make timely payment.

9.9 SUBSTANTIAL COMPLETION

9.9.1 Substantial Completion is the stage in the progress of the Project when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents, so the Owner can occupy or utilize the Work for its intended use.

9.9.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Designer a comprehensive list of items to be completed or corrected. The Contractor shall proceed promptly to complete and correct items on the list. Failure to include an item or such list does not alter the responsibility for the Contractor to complete all Work in accordance with the contract Documents. Upon receipt of the Contractor's list, the Designer will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Designer's inspection discloses any item, whether or not included on the Contractor's list, which is not in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Designer. The Contractor shall then submit a request for another inspection by the Designer to determine Substantial Completion. When the Work or designated portion thereof is substantially complete, the Designer will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate.

9.9.3 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Designer, the Owner shall make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof as provided in the Contract Documents.

9.10 PARTIAL OCCUPANCY OR USE

9.10.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is authorized by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Designer as provided under Subparagraph 9.9.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Designer.

9.10.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Designer shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

9.10.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

9.11 FINAL COMPLETION AND FINAL PAYMENT

9.11.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Designer will promptly make such inspections and, when the Designer finds the Work acceptable under the Contract Documents and the Contract fully performed, the Designer will promptly issue a Final Certificate for Payment stating that to the best of the Designer's knowledge, information and belief, and on the basis of the Designer's observations and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in said Final Certificate is due and payable. The Designer's Final Certificate for Payment will constitute a further representation that the conditions listed in Paragraph 9.11.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

9.11.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Designer (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the

Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract for Construction to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5) if required by the Owner, other or additional data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances rising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

9.11.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Designer so confirms, the Owner shall, upon application by the Contractor and certification by the Designer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for work not fully completed and accepted is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Designer prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

9.11.4 Acceptance of final payment by the Contractor, Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10
PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract and construction of the Project.

10.1.2 In the event the Contractor encounters on the site material reasonably believed to be asbestos or polychlorinated biphenyl (hereinafter PCB) which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and Designer by phone and in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of the Owner and Contractor if in fact the material is asbestos or PCB and has not been rendered harmless.

The Work in the affected area shall be resumed in the absence of asbestos or PCB, or when it has been rendered harmless, by written agreement of the Owner and Contractor, or in accordance with final determination by the Designer.

10.1.3 The Contractor shall not be required to perform without consent of Owner and Designer any Work relating to asbestos or PCB.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

(1) employees on the working on the Project and other persons who may be affected thereby;

(2) the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

(3) other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury, or loss.

10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including erecting necessary barricades or other temporary walls and structures as required during the period of construction, posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.

10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

10.2.5 The Contractor shall promptly remedy damage and loss to property referred to in Paragraphs 10.2.1.(2) and (3), caused in whole or in part by the Contractor, Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Paragraphs 10.2.1.(2) and (3), except damage or loss attributable to acts or omissions of the Owner or Designer and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Article 3. All costs to repair any damage and loss to property referred to in Paragraphs

10.2.1.(2) and (3), shall be the sole responsibility of the Contractor and such repair or replacement shall be performed expeditiously without cost to the Owner.

10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's Superintendent, required under Paragraph 3.8, unless otherwise designated by the Contractor in writing to the Owner and Designer.

10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

10.2.8 Existing utilities have been identified and described in the Contract Documents insofar as information is reasonably available, however, it is the Contractor's responsibility to verify such information and to preserve all existing utilities whether shown in the Contract Documents or not. If utility conflicts are encountered by the Contractor during construction, Contractor shall file sufficient notice to the owners of the utilities so that they may make the necessary adjustments, as well as the Designer or Designer.

10.3 EMERGENCIES

In an emergency affecting the safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Paragraphs 4.2.7, 4.2.8 and Article 7.

ARTICLE 11
UNCOVERING AND CORRECTION OF WORK

11.1 UNCOVERING OF WORK

11.1.1 If a portion of the Work is covered contrary to the Designer's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Designer, be uncovered for the Designer's observation and be replaced at the Contractor's sole expense without change in the Contract Time.

11.1.2 If a portion of the Work has been covered which the Designer has not specifically requested to observe prior to its being covered, the Designer may request to see such Work and it shall be uncovered by the Contractor. If such Work is not in accordance with the Contract Documents, the Contractor shall pay such costs unless the condition was caused by the Owner or a separate contractor in which event the Owner or separate contractor shall be responsible for payment of such costs. If such work is in accordance with the Contract Documents, the Owner, by appropriate Change Order, shall be charged with the cost of uncovering and replacement.

11.2 CORRECTION OF WORK

11.2.1 The Contractor shall promptly correct Work rejected by the Designer or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear any and all costs of correcting such rejected Work, including additional testing and inspections and compensation for the Designer's services and expenses made necessary thereby.

11.2.2 If, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Paragraph 9.10.1 or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This period of one year shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the work. This obligation under this Paragraph 11.2.2 shall survive acceptance of the Work under the Contract and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

11.2.3 The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

11.2.4 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Paragraph 2.2. If the Contractor does not proceed with correction of such nonconforming Work within a reasonable time fixed by written notice from the Designer, the Owner may remove it and store the salvageable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten days after written notice, the Owner may upon ten additional days written notice sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Designer's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Sum shall be reduced by the deficiency. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

11.2.5 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

11.2.6 Nothing contained in this Section 11.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the time period of one year as described in Paragraph 11.2.2, relates only to the specific obligation of the Contractor to correct the Work, and has no

relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the work.

11.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be affected whether or not final payment has been made.

ARTICLE 12
MISCELLANEOUS PROVISIONS

12.1 GOVERNING LAW. This Contract for Construction shall be governed by and in accordance with the laws of the State of North Carolina. All actions relating in any way to this Contract, shall be brought in the General Court of Justice in the County of Durham and the State of North Carolina, after exhausting the dispute resolution procedure set forth in Section 4.4, herein.

12.2 SUCCESSORS AND ASSIGNS. The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

12.3 WRITTEN NOTICE. Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the business address listed in the Contract for Construction.

12.4 RIGHTS AND REMEDIES. Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

12.5 WAIVER OF RIGHTS. No action or failure to act by the Owner or Designer shall constitute an obligation or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

12.6 COMPLIANCE WITH LAWS. Contractor represents that it is in compliance with all Federal, State, and local laws, regulations or orders, as amended or supplemented. The implementation of this contract will be carried out in strict compliance with all Federal, State, or local laws regarding discrimination in employment.

12.7 TESTS AND INSPECTIONS

12.7.1 Tests, inspections, and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and the Owner shall bear the costs of tests, inspections, and approvals. Should any retest be necessary due to the failure of the Work to pass the first test or for any other reason whatsoever, the Contractor shall bear all related costs of retests, inspections or re-inspections, and approvals. The Contractor shall give the Designer timely notice of when and where tests and inspections are to be made so the Designer may observe such procedures.

12.7.2 If the Designer, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Paragraph 12.5.1, the Designer will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Designer of when and where tests and inspections are to be made so the Designer may observe such procedures.

12.7.3 If such procedures for testing, inspection or approval under Paragraphs 12.5.1 and 12.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs made necessary by such failure including those of repeated procedures and compensation for the Designer's services and expenses.

12.7.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Designer.

12.7.5 If the Designer is required by the Contract Documents to observe tests, inspections, or approvals, the Designer will do so promptly and, where practicable, at the normal place of testing.

12.7.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

12.8 COMMENCEMENT OF STATUTORY LIMITATION PERIOD

As between the Owner and Contractor:

Before Substantial Completion. As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall

commence to run, and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;

Between Substantial Completion and Final Certificate for Payment. As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the Final Certificate for Payment, any applicable statute of limitations shall commence to run, and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the Final Certificate for Payment; and

After Final Certificate for Payment. As to acts or failures to act occurring after the relevant date of issuance of the Final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any warranty provided under Paragraph 3.4, the date of any correction of the Work or failure to correct the Work by the Contractor under Section 11.2 or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

ARTICLE 13
TERMINATION OR SUSPENSION OF THE CONTRACT

13.1 TERMINATION BY THE CONTRACTOR

13.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 180 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor, for any of the following reasons:

issuance of an order of a court or other public authority having jurisdiction;
an act of government, such as a declaration of national emergency, making material unavailable; because the Designer has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Paragraph 9.6.

13.1.2 If one of the above reasons exists, the Contractor may, upon seven (7) additional days written notice to the Owner and Designer, terminate the Contract and recover from the Owner payment for work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, not including overhead, profit, or damages.

13.2 TERMINATION BY THE OWNER FOR CAUSE

13.2.1 The Owner may terminate the Contract if the Contractor:

persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or otherwise is in substantial breach of a provision of the Contract Documents.

13.2.2 When any of the above reasons exist, the Owner, upon certification by the Designer that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days written notice, terminate employment of the Contractor and may, subject to any prior rights of surety:

take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor; and
finish the Work by whatever reasonable method the Owner may deem

expedient.

13.2.3 When the Owner terminates the Contract for one of the reasons stated in Paragraph 13.2.1, the Contractor shall not be entitled to receive further payment.

13.2.4 If the unpaid balance of the Contract Sum does not cover the cost of finishing the Work, the Contractor shall pay the difference to the Owner. The amount to be paid to the Owner, shall be certified by the Designer, upon application, and this obligation for payment shall survive termination of the Contract.

13.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

The Owner may, without cause, order the Contractor in writing to suspend, delay, or interrupt the Work in whole or in part for such period of time as the Owner may determine.

13.4 BANKRUPTCY

13.4.1 The bankruptcy of the Contractor shall not terminate this Contract until such time that it is specifically rejected by the Trustee or Contractor in bankruptcy. During the election period the Contractor has to assume or reject this Contract, the Contractor shall continue to perform its Work under the Contract.

13.4.2 In the event the Contractor in Bankruptcy assumes the Contract, the Contractor shall apply progress payments to all of its unpaid obligations on this project before using any of these monies for either administrative expenses of the bankruptcy or as general assets of the estate.

13.5 **SECURITY OF NON-PUBLIC RECORDS**

Pursuant to N.C.G.S. § 132-1.7 entitled, "Sensitive Public Security Information", public records, as defined in N.C.G.S. § 132-1, shall not include information containing specific details of public security plans and arrangements or the detailed plans and drawings of public buildings and infrastructure facilities. Therefore, all information provided, received, gathered or obtained by Contractor containing specific details of public security plans and arrangements or the detailed plans and drawings of public buildings and infrastructure facilities shall be held confidential and shall be used by the Contractor only for the purpose of fulfilling the terms of this Agreement. All plans and drawings shall be returned to the County, or otherwise destroyed at the direction of the County, upon termination or expiration of this Agreement. Any breach of this paragraph by Contractor shall result in the immediate termination of this contract.

END OF GENERAL CONDITIONS OF THE CONTRACT

0005 – Special Conditions

SPECIAL CONDITIONS

PROJECT: DURHAM COUNTY ADMINISTRATION BUILDING I
COUNTY LEGAL DEPATMENT – SUITE RENOVATION

SCOPE OF WORK: The work consists of Reconfiguration of 732 square feet of office space in the DCo Administration I Building Legal Department. The work also includes electrical and sprinkler design modification as needed.

PROJECT DESCRIPTION: Work on this project shall be covered by a Single Prime Contract. See technical specification sections 011100 Summary of Work (Work Covered by Contract) for details.

BASE CONTRACT: The Work includes furnishing of all materials and labor necessary for the completion of the Project: Durham County Administration I Building County Legal Department Lawyer Suite Renovation as shown on the plans and as outlined in these specifications. The scope includes all work indicated or implied by the drawings or specifications. It includes all items that may not be specifically shown but are required for a complete and finished job or may be required by codes or regulations.

SPECIAL NOTE: NOT APPLICABLE

LOCATION:

200 East Main Street
Durham, NC 27701

DURHAM COUNTY'S REPRESENTATIVE(S):
Dan Nosbusch – Project Manager
Peri Manns – Assistant Director, Durham County Engineering and Environmental Services
Durham County Engineering and Environmental Services
201 East Main Street, 5th Floor
Durham, North Carolina 27701
Telephone: (919) 560-0735 or (919) 560-7963
Fax: (919) 560-0740

ARCHITECT/ENGINEER:
J. Paul Young, AIA, Project Architect
Susan O. Straw, Associate, Project Manager
DTW ARCHITECTS & PLANNERS, LTD.
3333 Durham-Chapel Hill Blvd., Suite D100
Durham, North Carolina 27707
Telephone: (919) 317.4020 Fax: (919) 317.4023

CONTRACTOR USE OF PREMISES:

Access to the site shall be from Mangum Street and Dillard Street. Keep Mangum Street and Dillard Street clear at all times; do not use the road for parking unless otherwise permitted by the Durham County General Services and/or Engineering Departments and/or Sheriff's Department. See Section 011400 – Work Restrictions.

CONTRACT COMPLETION TIME/SCHEDULE: Contract completion time for all work on this project is for 120 calendar days from the Notice to Proceed. Failure to complete the work within the designated time period will result in the assessment of liquidated damages in the amount of Five Hundred & 00/100 $500.00 per calendar day.

WORK SCHEDULE: Within **ten (10) days** from the Contract Award, the Contractor shall submit a **schedule of work** for the installation of all the work under this contract to the Owner for approval.

DURHAM COUNTY SMOKE-FREE POLICY:

This notice is to advise all contractors, vendors and consultants providing services for the Renovations of the Durham County Administration Building that the Durham County Board of County Commissioners has recently adopted a **"Smoke Free" Policy effective August 1, 2012**. The ordinance prohibits smoking on all County property to include sidewalks that are owned, leased, maintained or occupied by the City or County of Durham and abut the grounds of the City of Durham and Durham County. The policy applies to County construction sites, the entire building and grounds of the site, including any abutting sidewalks, which are owned, leased or maintained by the County or City of Durham. The contractor is to advise all employees, subcontractors, vendors and consultants visiting the site of this policy.

END OF SPECIAL CONDITIONS

0006 – Affidavit of Compliance (E-Verify)

STATE OF NORTH CAROLINA

COUNTY OF DURHAM

AFFIDAVIT OF COMPLIANCE
with N.C. E-Verify Statutes

I, _____ (hereinafter the "Affiant"), being duly authorized by and on behalf of _____ (hereinafter "Contractor") after first being duly sworn hereby swears or affirms as follows:

1. Contractor understands that E-Verify is the federal E-Verify program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law in accordance with Article 2 of Chapter 64 of the North Carolina General Statutes; and

2. Contractor understands that an "Employer", as defined in NCGS§64-25(4), is required by law to use E-Verify to verify the work authorization of its employees through E-Verify in accordance with NCGS§64-26(a). The term "Employer" does not include State agencies, counties, municipalities, or other governmental bodies.

3. Contractor is a person, business entity, or other organization that transacts business in this State and that employs 25 or more employees in the state of North Carolina. (Mark Yes or No)

a. YES _____

b. NO _____

4. Contractor will ensure compliance with E-Verify to the extent applicable and will ensure compliance by any subcontractors subsequently hired by Contractor to perform work under Contractor's contract with Durham County.

This ____ day of _____, 20__.

_____
Signature of Affiant

Print or Type Name: _____

State of _____

County of _____

Signed and sworn to (or affirmed) before me, this the _____

day of _____, 20__.

My Commission Expires:

_____ _____

Notary Public

(Affix Official/Notarial Seal)

0007 – Bid Form

BID FORM

GENERAL CONSTRUCTION CONTRACT

PROPOSAL
TO THE
COUNTY OF DURHAM

Durham County Administration I Building
County Legal Department - Suite Renovation

DURHAM, NORTH CAROLINA

BID FROM: _____

_____

_____

1. The undersigned BIDDER agrees, if this Bid is accepted, to enter into an agreement with OWNER, in the form included in the Bidding Documents, to perform and furnish the work as specified or indicated in the Bidding Documents for the Bid Price and within the Bid Times indicated in this Bid in accordance with the other terms and conditions of the Contract Documents.

2. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

   a) This Bid will remain subject to acceptance for ninety (90) days after the day of Bid opening;
   b) The Owner has the right to reject this bid;
   c) Accompanying this proposal is a certified check (or bid bond) for $_____, which represents not less than five (5) percent of the aggregate amount of the proposal. Said check, or the full amount of the bond, shall become the property of County and be retained by the County in the event of withdrawal of the bid after the public opening or should the undersigned fail to execute a contract with the County and give satisfactory surety within fifteen (15) days after the award. Otherwise, said check or bid bond, to be returned to the undersigned. The undersigned agree, if awarded the contract, to deliver satisfactory surety bond in the amount equal to not less than 100 percent (100%) of the contract within fifteen (15) days after Notice of Award;
   d) BIDDER will sign and submit the Agreement with the Bonds and other documents within 15 days after the date of the Owner's Notice of Award;
   e) BIDDER has examined copies of all the Bidding Documents.
   f) BIDDER has visited the site and become familiar with the general and local site conditions;
   g) BIDDER is familiar with federal, state, and local laws and regulations;

h) **BIDDER certifies that no federal excise or state sales taxes have been included in this bid**;

i) BIDDER has correlated the information known to BIDDER, information and observations obtained from visits to the site, reports and drawings identified in the Bidding Documents and additional examinations, investigations, tests, studies and data with the Bidding Documents;

j) BIDDER certifies that this proposal is made in good faith and without collusion or connection with any other person bidding on the same work, or that any official or employee of the County of Durham will be admitted to any share or part of the contract or any benefits that may arise therefrom if the contract is awarded to this company;

k) BIDDER acknowledges receipt of the following **Addenda**, which have been considered in the preparation of this Bid:

No: _____ Dated: _____

No: _____ Dated: _____

No: _____ Dated: _____

No: _____ Dated: _____

Dated in _____ this _____ day of _____, 20___.

3. BIDDER will complete the work in accordance with the Contract Documents for the following price(s):

SINGLE PRIME CONTRACT:

Base Bid Lump-Sum Price $_____

_____

Base Lump Sum Price In Words

UNIT PRICES: Unit prices are gross, inclusive of all adjustments, profit or overhead.

ITEM	(Detailed Descriptions in Section 012000)	PRICE	UNIT
01	Access Door 18x18, ceiling mounted, UL 1 hr. gypsum edge, In place.	$_____	EA

Unit prices to be used for computation of authorized added or omitted work.

Pursuant to N.C.G.S. 143-128(d), all bidders shall identify on their bid the contractors they have selected for the subdivisions or branches of work for:

(1) Electrical _____ Lic. #_____
_____ Lic. #_____

(2) General _____ Lic. #_____
_____ Lic. #_____

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. The terms, conditions, and requirements of each contract between the contractor and a subcontractor performing work under a subdivision or branch of work listed in this subsection shall incorporate by reference the terms, conditions, and requirements of the contract between the contractor and the County.

4. BIDDER agrees that the Work will be substantially complete and ready for final payment in accordance with the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

5. The following documents are attached to and made a condition of the Bid:
   (a) Required Bid security in the form of _____
   _____:

6. BIDDER acknowledges the provisions in the General Conditions for Liquidated Damages of **Five Hundred & 00/100** (**$500.00)** per calendar day for Final Completion.

SUBMITTED ON _____, 20_____.

SIGNATURE OF BIDDER:

North Carolina Contractor's License Number _____

If an Individual: _____

as: _____

If a Partnership: _____

by: _____, partner

If a Corporation: _____

(a _____Corporation)

by: _____ Attested By: _____ (SEAL &

Title: _____ Title: _____ATTEST)

Business Address of Bidder: _____

_____

If Bidder is a joint venture, other party must sign below.

North Carolina Contractor's License Number _____

If an Individual: _____

_____

Doing business as: _____

If a Partnership: _____

by: _____

Title: _____

If a Corporation: _____

(a _____Corporation)

by: _____ Attested By: _____ (SEAL &

Title: _____ Title: _____ ATTEST)

We have the following necessary and suitable equipment in good condition and ready for use on this work.

_____

_____

_____

0008 – Special Notice

SPECIAL NOTICE

NORTH CAROLINA SALES TAX

The Committee Substitute for Senate Bill No. 78, passed by l961 Legislature, requires that contractors pay North Carolina Sales Tax on materials and equipment purchased for construction of municipal work, and further provides that those taxes on certain items are refundable to municipalities under submission of proper evidence by the Owner to the North Carolina Department of Revenue. Reference is made to "Sales and Use Tax Regulation 42".

BIDDER WILL NOT INCLUDE REFUNDABLE NORTH CAROLINA SALES TAX IN HIS OR HER LUMP-SUM BID. The Contractor will be reimbursed at the time each monthly estimate is paid for refundable North Carolina Sales Taxes paid during any preceding month, provided he or she submits to the Owner information which will make it possible to show the sales tax as a separate item on the estimate. The tax may be shown at the bottom of the estimate in the following manner.

"Total of refundable N.C. Sales Tax paid on the above estimate amounted to $_____."

To substantiate the payment of the sales tax indicated, the CONTRACTOR MUST IN ADDITION,

> Submit a SWORN NOTARIZED statement itemizing the tax, showing each amount and to whom paid, and certifying that the articles purchased were used in the work performed for the Owner. Receipts for these amounts must be included with the estimate. Such receipts should include all taxes paid by the prime contractor and any of his subcontractors.

The above must accompany each estimate for payment and is required by the Owner in making claims for tax refunds.

Every person/business who purchases any taxable tangible personal property, taxable services or certain digital property for storage, use, or consumption in North Carolina (NC) for business use from out-of-state vendors upon which the tax has not been fully paid must register with the NC Department of Revenue and remit the balance of tax due on such purchases based on NC's sales and use tax rate. Out-of-state contractors are required to register for sales and use tax purposes with the State of NC. Registration Application, Form NC-BR, must be completed and mailed to the NC Department of Revenue. Out-of-state contractors should also seek a Certificate of Exemption or Certificate of Resale Form from their state's Department of Revenue office when purchasing taxable tangible personal property from their local state to be stored, used, or consumed in NC provided their state participates in the Streamlined Sales Tax Agreement. Out of state sales tax is not

reimbursable by the state of North Carolina. For additional information on North Carolina regarding sales and use tax, please contact the NC Department of Revenue.

0009 –Non-Collusion Affidavit

NON-COLLUSION AFFIDAVIT

STATE OF NORTH CAROLINA
COUNTY OF DURHAM

_____, being first duly sworn, deposes and says that:

1. He/She is the_____of _____, the bidder that has submitted the attached bid;

2. He/She is fully informed respecting the preparation and contents of the attached bid and of all pertinent circumstances respecting such bid;

3. Such bid is genuine and is not a **collusive** or **sham** bid;

4. Neither the said bidder nor any of its officers, partners, owners agents, representatives, employees, parties of interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly, with any other bidder, firm or person to submit a **collusive** or **sham** bid in connection with the contract for which the attached bid has been submitted or to refrain from bidding in connection with such contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other bidder, firm or person to fix the price or prices in the attached bid or of any other bidder, or to fix any overhead, profit or cost element of the bid price of any other bidder or to secure through collusion, conspiracy, connivance or unlawful agreement any advantage against the County of Durham or any person interested in the proposed contract; and

5. The price or prices quoted in the attached bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

_____
TITLE

Subscribed and sworn before me,
this_____day of_____, 20___.

(SEAL)

_____
Notary Public

My Commission Expires_____

0010 – Performance Bond

PERFORMANCE BOND

DATE OF EXECUTION: _____

NAME OF PRINCIPAL: _____
(CONTRACTOR) _____

NAME OF SURETY: _____
_____

NAME OF CONTRACTING BODY: COUNTY OF DURHAM

AMOUNT OF BOND: _____

CONTRACT NUMBER _____

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 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, successors and assigns, 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, numbered 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 as well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements as 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 thus 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.

_____ (SEAL) _____ (SEAL)
Principal Surety

_____ _____
Name and Title Name and Title

Executed in _____counterparts. _____
Name of Principal (Contractor)

_____ By_____

Witness (Print)

_____

(Signature)

Title: _____

(Owner, Partner, or Corp.
Pres. or Vice President)

Attest: (Corporation)

By _____

(Print)

_____

(Signature)

Title: _____ _____

(Corporate Seal)

(Corp. Sec. Or Assist. Sec.)

_____

(Surety Company)

Witness: By: _____

(Print)

By: _____ _____

(Print) (Signature)

_____

(Signature)

Title: _____

(Attorney-in-Fact)

Countersigned:

_____

_____

N.C. Licensed Resident, Agent

_____

_____ (Surety Corporate Seal)

_____

Name and Address - Surety Agency

_____

_____

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

0011 – Payment Bond

PAYMENT BOND

DATE OF EXECUTION: _____

NAME OF PRINCIPAL: _____
(CONTRACTOR) _____

NAME OF SURETY: _____
_____

NAME OF CONTRACTING BODY: COUNTY OF DURHAM

AMOUNT OF BOND: _____

CONTRACT NUMBER: _____

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 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, successors and assigns, 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, numbered as shown above and hereto attached:

NOW THEREFORE, if the PRINCIPAL shall promptly make payment make payment to all persons supplying labor and 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 thus 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.

_____ (SEAL) _____(SEAL)
Principal Surety

_____ _____
Name and Title Name and Title

Executed in _____counterparts. _____
Name of Principal (Contractor)
_____ By_____
Witness (Print)
_____

(Signature)

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

Attest: (Corporation)

By _____
(Print)

_____
(Signature)

Title: _____ _____
(Corporate Seal)
(Corp. Sec. Or Assist. Sec.)

_____
(Surety Company)

Witness: By: _____
(Print)

By _____ _____
(Print) (Signature)

_____
(Signature)

Title: _____
(Attorney-in-Fact)

Countersigned:
_____

_____
N.C. Licensed Resident, Agent

_____
_____ (Surety Corporate Seal)

_____
Name and Address - Surety Agency
_____

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

0012 – Project Procedure Forms

COUNTY OF DURHAM
County Engineer
Durham County Engineering Department
201 E. Main Street, 5th Floor
Durham, NC 27701

EMERGENCY TELEPHONE NUMBERS

Project Name _____ Project No. _____

The following are the business and home telephone numbers where project key personnel can be reached at all times. In addition, the emergency telephone numbers of other vital agencies are listed.

	Business	Residence
Contractor's Project Manager	_____	_____
Contractor's Superintendent	_____	_____
Owner/A&E Project Manager	_____	_____
Owner/A&E Resident Project Representative	_____	_____

OTHER EMERGENCY TELEPHONE NUMBERS

OSHA Representative ..... _____

Fire ..... _____

Ambulance ..... _____

Doctor ..... _____

Hospital ..... _____

Police ..... _____

Gas Company ..... _____

Electric Company .... _____

Water Company ..... _____

Telephone Company ..... _____

Insurance Carrier ..... _____

Other ..... _____

Other ..... _____

All key personnel should have a copy of this information, and a copy should be posted in each field office in a prominent location.

COUNTY OF DURHAM
County Engineer
Durham County Engineering Department
201 E. Main Street, 5th Floor
Durham, NC 27701

REQUEST FOR PAYMENT FOR MATERIALS ON HAND

Project & Location: _____Project No. _____ Estimate No._____

Item No.	Material Description	Previous Units Stored	Units Received	Units Installed	Balance Units Stored	Unit Price	Materials Stored Cost

In accordance with the provisions of the General Conditions of the Contract, request is made for payment of materials on hand for the above listed materials.

AFFIDAVIT

The materials listed above have been purchased exclusively for use on the above-referenced project. The material is separate from the other like materials and is physically identified as our property for use on Contract No. _____. The Owner may enter upon the premises for inspection, checking or auditing, or for any other purpose as you consider necessary. It is expressly understood and agreed that this information and Affidavit is furnished to the Owner for the purpose of obtaining payment for the above materials before they are delivered to, or incorporated into, the project described above, and that the storage thereof at the location shown shall not relieve the Contractor of full responsibility for the security and protection of all materials until acceptance by the Owner of the completed project.

Contractor by:_____Title:_____Date:_____

COUNTY OF DURHAM
County Engineer
Durham County Engineering Department
201 E. Main Street, 5th Floor
Durham, NC 27701

CONSENT OF SURETY FOR FINAL PAYMENT

Project Name _____

Location _____

Project No. _____ Contract No. _____

Type of Contract _____

Amount of Contract _____

In accordance with the provisions of the above-named contract between the Owner and the Contractor, the following named surety:

_____

_____

on the Payment Bond of the following named Contractor:

_____

_____

hereby approves of final payment to the Contractor and further agrees that said final payment to the Contractor shall not relieve the Surety Company named herein of any of its obligations to the following named Owner as set forth in said Surety Company's bond:

_____

_____

In Witness Whereof, the Surety Company has hereunto set its hand and seal this ____ day of _____20__

_____
(Name of Surety Company)

_____
(Signature of Authorized Representative)

(Affix corporate Seal here)

Title _____

COUNTY OF DURHAM
County Engineer
Durham County Engineering Department
201 E. Main Street, 5th Floor
Durham, NC 27701

CONTRACTOR'S CERTIFICATION OF COMPLETION

Date _____

Project_____

Job No. _____

Contract No. _____

Owner _____

Attn: Resident Project Representative

From: _____
(Firm or Corporation)
_____

This is to certify that I, _____ am an authorized official of

_____

working in the capacity of _____

and have been properly authorized by said firm or corporation to sign the following statements pertaining to the subject contract:

I know of my own personal knowledge and do hereby certify that the work of the contract described above has been performed, and materials used and installed in every particular, in accordance with, and in conformity to, the contract, drawings and specifications.
The contract work is now complete in all parts and requirements and ready for final inspection.

I understand that neither the determination by the Engineer-Architect that the work is complete nor the acceptance thereof by the Owner shall operate as a bar to claim against the Contractor under the terms of the guarantee provisions of the contract documents.

By _____

Title _____

For _____

Distribution:
1. Project Manager
2. Field Office
3. File

COUNTY OF DURHAM
County Engineer
Durham County Engineering Department
201 E. Main Street, 5th Floor
Durham, NC 27701

MONTHLY PAYMENT ESTIMATE SUMMARY

Project Title		
Contractor		
Estimate No. **Period to**	**Contract Price**	**Date**

Description

	Previous	This Month	To Date
Total Contract Items……..	$_____	$_____	$_____
Change Orders Attached……	$_____	$_____	$_____
Materials On-hand……	$_____	$_____	$_____
Gross Estimate……	$_____	$_____	$_____
Less 10% Retainage……	$_____	$_____	$_____
Less Previous Payments……	$_____	$_____	$_____
Net Estimate……	$_____	$_____	$_____

Approved for Payment……. $_____

N.C. Sales Taxes applying to this estimate and not included in this estimate. …… $_____

% Time Elapsed	**% Work Completed**

Contract Completion Date

Notice to Proceed Received by Contractor……. _____

***Contract Completion Time** ……. _____

Contract Completion Date ……_____

COUNTY AUTHORIZATION LIMIT _____

***As amended by Changed Order No.**

Submitted by (Signature & Title)	**Administrative Review – Final Payment**
Approved by (Signature & Title)	**Approved by - Final Payments**

ANY REQUEST FOR TIME EXTENSION WITH THIS PAYMENT? YES ( ) NO ( )

COUNTY OF DURHAM
County Engineer
Durham County Engineering Department
201 E. Main Street, 5th Floor
Durham, NC 27701

CHANGE ORDER # _____ Date _____

PROJECT TITLE**:** _____

PROJECT NO: _____ CONTRACT NO: _____ CONTRACT DATE: _____

The following changes are hereby made to the Contract Documents:

Justification:

CHANGE TO CONTRACT PRICE:

Original Contract Price	$ _____
Current Contract Price, as adjusted by previous change orders	$ _____
The Contract Price due to this change order will remain at	$ _____
The new Contract Price due to this change will be	$ _____

CHANGE TO CONTRACT TIME:

Original Contract time/date	_____
Contract time as amended by previous change orders	_____
This change order Contract will be (increased) (decreased) by	_____
Revised date of completion of all work under the Contract will be	_____

RECOMMENDED:

Project Manager_____ Date_____

APPROVALS:
To be effective this order must be approved by the Owner if it changes the scope or objective of the project, or as may be required under the terms of the General Conditions of the Contract.

		County of Durham
Project Engineer	Contractor	Owner
Signature/Title	Signature/Title	Signature/Title
Date	Date	Date

This instrument has been pre-audited in the manner required by the local Government Budget and Fiscal Control Act.

_____
Durham County Chief Financial Officer

COUNTY OF DURHAM
County Engineer
Durham County Engineering Department
201 E. Main Street, 5th Floor
Durham, NC 27701

FINAL WAIVER OF LIEN

To All Whom It May Concern:

WHEREAS, the undersigned has been employed by (A) _____
_____
to furnish labor and material for B) _____ work, under a contract (C) _____
for the improvement of the premises described as (D) _____
_____in the _____(City-Village) of _____
County of _____, State of _____
of which _____is the Owner.
NOW, THEREFORE, this _____ day of _____ 20___.

For and in consideration of the sum (E) $_____
Dollars paid simultaneously herewith, the receipt whereof is hereby acknowledged by the undersigned, the undersigned does hereby waive and release any lien rights to, or claim of lien with respect to and on said above-described premises, and the improvements thereon and on the monies or other considerations due or to become due from the Owner, on account of labor, services, materials, fixtures, apparatus or machinery heretofore or which may hereafter be furnished by the undersigned to or for the above described premises by virtue of said contract.

(F) _____ (SEAL)
(Name of sole ownership, corporation or partnership)

(Affix Corporation Seal here)

_____ (SEAL)
(Signature of Authorized Representative)

TITLE: _____

INSTRUCTIONS FOR FINAL WAIVER

(A) Person or Firm with whom you agreed to furnish either labor, or services, or materials, or both.
(B) Fill in nature and extent of work; strike the word labor or the word materials if not in you contract.
(C) If you have more than one contract on the same premises, describe the contract by number if available, date and extent of work.
(D) Furnish an accurate enough description of the improvement and location of the premises so that it can be distinguished from any other property.
(E) Amount shown should be the amount actually received and equal to total amount of contract as adjusted.
(F) If waiver is for a corporation, corporate name should be used, corporate seal affixed and title of officer signing waiver should be set forth; if waiver is for a partnership, the partnership name should be used, partner should sign and designate himself as partner.

0013 – Vendor Application/W-9 Form

Vendor Application and W9 Form | Durham County

Form **W-9**
(Rev. October 2007)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give form to the requester. Do not send to the IRS.

Print or type See **Specific Instructions** on page 2.

Name (as shown on your income tax return)

Business name, if different from above

Check appropriate box: ☐ Individual/Sole proprietor ☐ Corporation ☐ Partnership
☐ Limited liability company. Enter the tax classification (D=disregarded entity, C=corporation, P=partnership) ▶
☐ Other (see instructions) ▶

☐ Exempt payee

Address (number, street, and apt. or suite no.)

Requester's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on Line 1 to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number

or

Employer identification number

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here **Signature of U.S. person ▶** **Date ▶**

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),

2. Certify that you are not subject to backup withholding, or

3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

The person who gives Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States is in the following cases:

- The U.S. owner of a disregarded entity and not the entity,

- The U.S. grantor or other owner of a grantor trust and not the trust, and
- The U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person, do not use Form W-9. Instead, use the appropriate Form W-8 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.

2. The treaty article addressing the income.

3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.

4. The type and amount of income that qualifies for the exemption from tax.

5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity not subject to backup withholding, give the requester the appropriate completed Form W-8.

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,

2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),

3. The IRS tells the requester that you furnished an incorrect TIN,

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See the instructions below and the separate Instructions for the Requester of Form W-9.

Also see *Special rules for partnerships* on page 1.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Name

If you are an individual, you must generally enter the name shown on your income tax return. However, if you have changed your last name, for instance, due to marriage without informing the Social Security Administration of the name change, enter your first name, the last name shown on your social security card, and your new last name.

If the account is in joint names, list first, and then circle, the name of the person or entity whose number you entered in Part I of the form.

Sole proprietor. Enter your individual name as shown on your income tax return on the "Name" line. You may enter your business, trade, or "doing business as (DBA)" name on the "Business name" line.

Limited liability company (LLC). Check the "Limited liability company" box only and enter the appropriate code for the tax classification ("D" for disregarded entity, "C" for corporation, "P" for partnership) in the space provided.

For a single-member LLC (including a foreign LLC with a domestic owner) that is disregarded as an entity separate from its owner under Regulations section 301.7701-3, enter the owner's name on the "Name" line. Enter the LLC's name on the "Business name" line.

For an LLC classified as a partnership or a corporation, enter the LLC's name on the "Name" line and any business, trade, or DBA name on the "Business name" line.

Other entities. Enter your business name as shown on required federal tax documents on the "Name" line. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on the "Business name" line.

Note. You are requested to check the appropriate box for your status (individual/sole proprietor, corporation, etc.).

Exempt Payee

If you are exempt from backup withholding, enter your name as described above and check the appropriate box for your status, then check the "Exempt payee" box in the line following the business name, sign and date the form.

Generally, individuals (including sole proprietors) are not exempt from backup withholding. Corporations are exempt from backup withholding for certain payments, such as interest and dividends.

Note. If you are exempt from backup withholding, you should still complete this form to avoid possible erroneous backup withholding.

The following payees are exempt from backup withholding:

1. An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2),

2. The United States or any of its agencies or instrumentalities,

3. A state, the District of Columbia, a possession of the United States, or any of their political subdivisions or instrumentalities,

4. A foreign government or any of its political subdivisions, agencies, or instrumentalities, or

5. An international organization or any of its agencies or instrumentalities.

Other payees that may be exempt from backup withholding include:

6. A corporation,

7. A foreign central bank of issue,

8. A dealer in securities or commodities required to register in the United States, the District of Columbia, or a possession of the United States,

9. A futures commission merchant registered with the Commodity Futures Trading Commission,

10. A real estate investment trust,

11. An entity registered at all times during the tax year under the Investment Company Act of 1940,

12. A common trust fund operated by a bank under section 584(a),

13. A financial institution,

14. A middleman known in the investment community as a nominee or custodian, or

15. A trust exempt from tax under section 664 or described in section 4947.

The chart below shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 15.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 9
Broker transactions	Exempt payees 1 through 13. Also, a person registered under the Investment Advisers Act of 1940 who regularly acts as a broker
Barter exchange transactions and patronage dividends	Exempt payees 1 through 5
Payments over $600 required to be reported and direct sales over $5,000[1]	Generally, exempt payees 1 through 7[2]

[1] See Form 1099-MISC, Miscellaneous Income, and its instructions.

[2] However, the following payments made to a corporation (including gross proceeds paid to an attorney under section 6045(f), even if the attorney is a corporation) and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, and payments for services paid by a federal executive agency.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited liability company (LLC)* on page 2), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local Social Security Administration office or get this form online at *www.ssa.gov*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/businesses* and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting *www.irs.gov* or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: *A disregarded domestic entity that has a foreign owner must use the appropriate Form W-8.*

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, and 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). Exempt payees, see *Exempt Payee* on page 2.

Signature requirements. Complete the certification as indicated in 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account [1]
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor [2]
4. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee [1]
b. So-called trust account that is not a legal or valid trust under state law	The actual owner [1]
5. Sole proprietorship or disregarded entity owned by an individual	The owner [3]
For this type of account:	**Give name and EIN of:**
6. Disregarded entity not owned by an individual	The owner
7. A valid trust, estate, or pension trust	Legal entity [4]
8. Corporate or LLC electing corporate status on Form 8832	The corporation
9. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
10. Partnership or multi-member LLC	The partnership
11. A broker or registered nominee	The broker or nominee
12. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name and you may also enter your business or "DBA" name on the second name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

[4] List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships* on page 1.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, social security number (SSN), or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

Call the IRS at 1-800-829-1040 if you think your identity has been used inappropriately for tax purposes.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to *phishing@irs.gov.* You may also report misuse of the IRS name, logo, or other IRS personal property to the Treasury Inspector General for Tax Administration at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: *spam@uce.gov* or contact them at *www.consumer.gov/idtheft* or 1-877-IDTHEFT(438-4338).

Visit the IRS website at *www.irs.gov* to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons who must file information returns with the IRS to report interest, dividends, and certain other income paid to you, mortgage interest you paid, the acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA, or Archer MSA or HSA. The IRS uses the numbers for identification purposes and to help verify the accuracy of your tax return. The IRS may also provide this information to the Department of Justice for civil and criminal litigation, and to cities, states, the District of Columbia, and U.S. possessions to carry out their tax laws. We may also disclose this information to other countries under a tax treaty, to federal and state agencies to enforce federal nontax criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism.

You must provide your TIN whether or not you are required to file a tax return. Payers must generally withhold 28% of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to a payer. Certain penalties may also apply.

0015-Technical Specifications

DIVISION 1

GENERAL REQUIREMENTS

SECTION 011100 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Project consists of Durham County Administrative I Building – County Legal Dept. – Lawyer Suite Renovation.

1. Project Location: **200 East Main Street, Durham, NC 27701**
2. Owner: **County of Durham Engineering & Environmental Services**
   201 East Main Street, 5th Floor
   Durham, NC 27701

B. Architect Identification: The Contract Documents, dated **August 1, 2025**, were prepared for this Project by **DTW Architects & Planners, Ltd., 3333 Durham Chapel Hill Blvd., Suite D100, Durham, NC 27707**.

The Work consists of County Legal Dept. Lawyer Suite Renovation. The Work includes electrical and sprinkler design for modification as needed as indicated on drawings.

1.3 CONTRACT**[S]**

A. Project will be constructed under a general construction single contract.

1.4 WORK SEQUENCE

A. The Work shall be conducted in **(1)** phase.
1. Work for this phase shall be substantially complete (Issuance of Certificate of Occupancy) within **120 days** of **Notice to Proceed.**

Final Completion of Owner / Architect Punchlist……..**15 Calendar Days from SC**

1.5 USE OF PREMISES

A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

1.6 WORK UNDER OTHER CONTRACTS

A. Cooperate fully with separate contractors so work may be carried out smoothly, without interfering with or delaying work under this Contract.

1.7 OWNER-FURNISHED PRODUCTS

A. Owner will furnish items as indicated on drawings. The Work includes providing support systems to receive Owner's equipment and any plumbing, mechanical, and electrical connections as required.

1. Owner will arrange for and deliver Shop Drawings, Product Data, and Samples to Contractor.
2. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule.
3. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.
4. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
5. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.
6. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.
7. Contractor shall review Shop Drawings, Product Data, and Samples and return them to **Architect** noting discrepancies or anticipated problems in use of product.
8. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.
9. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
10. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them.

1.8 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 2015 Edition format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

    a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011100

SECTION 011150: ALTERATION PROCEDURES

PART 1: GENERAL

1-01: Work Included: The work described herein includes Reconfiguration of 732 sq. ft. of office space for the County Legal Dept. Lawyer Suite as outlined on the drawings and specified herein for the Durham County Administration I Building Lawyer Suite Renovation.

1-02: Existing Utilities: General Contractor shall coordinate Utility Companies for disconnecting, removal, relocating or stubbing out of existing services (gas, power, telephone) to locations as shown on drawings.

1-03: Standards: Except as modified by governing codes and these specifications, comply with all applicable provisions and requirements of ANSI A10.2, Safety Code for Building Construction, OSHA and NFPA 101.

1-04: Schedules: Before beginning any work, the General Contractor shall submit for review by the Owner, A/E and other Subcontractors, an abbreviated schedule showing the start and finish dates for the work. Outline shall conform to schedule defined in the Contract Documents.

1-05: Existing Conditions: Prior to beginning any demolition activities of work, the Owner, and General Contractor shall inspect the premises and agree upon the disposition of the overall extent and process of building and site demolition. The Owner shall salvage any items of building and site equipment and furnishings to be reused prior to the Contract Start Date.

1-06: Related Work and Precautions: The General Contractor shall notify **"North Carolina 811"** (800.632.4949 or www.nc811.org) prior to the start of excavation for location of unknown underground utilities. Locations of known utilities are indicated on drawings. Refer to Section 024000 for site demolition requirements. Utilities in areas of work shall be protected during excavating and backfilling operations.

PART 2: PROCEDURES

2-01: Protection:

a) The Owner, A/E, or their agents, employees or representatives are not responsible for the means, methods, techniques, sequences or procedures utilized by the General Contractor or Subcontractors in the execution of the work, or for safety precautions and programs in connection with the work. General Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work.

b) General Contractor shall exercise extreme caution for the safety of, and shall provide protection to prevent injury, damage or loss to:

1) All Construction Personnel on County property.

2) All the Work and all the materials and equipment to be incorporated therein, whether stored on or offsite and under care of the General Contractor or Tiered Subcontractors, machinery, and equipment.

3) All Property on the grounds or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

c) General Contractor shall give all notices and comply with all applicable laws, ordinances, permits, rules, regulations and lawful orders of any public authority having local jurisdiction bearing on the safety of persons or property or their protection from damage, injury or loss.

d) The General Contractor shall erect passageways, guard fences, temporary lighting and other facilities required for protection by applicable safety regulations and providing access to the existing site facilities.

e) The General Contractor shall erect and maintain, as required by the existing conditions and progress of the work, all safeguards for safety and protection, including posting danger signs and other warning devices against hazards, promulgating safety regulations and notifying Owners and Users of adjacent utilities.

f) The storage of explosives or other hazardous materials will not be permitted on property. When hazardous materials or equipment must be used for the execution of the work, the General Contractor shall exercise the utmost care and shall expedite such activities under the supervision of properly qualified personnel.

g) The General Contractor shall promptly remedy at his own cost and expense all damage or loss to any property caused in whole or in part by the General Contractor or Tiered Subcontractors or anyone directly or indirectly employed by them, or by anyone for whose acts any of them may be liable and for which the General Contractor is responsible. The General Contractor shall perform corrective restoring as required by the Owner and A/E, or shall make good such damage in a manner satisfactory to the Owner. In case of failure on the part of the General Contractor to make good the corrective actions required to restore the damaged property, the Owner may, upon two (2) calendar days written notice to the General Contractor, proceed with the corrective action required and the cost thereof will be deducted from moneys due or to become due the General Contractor under the terms of the Contract.

h) Prior to beginning demolition operations, make explorations and probes as necessary to ascertain required protective measures. Give particular attention to shoring and bracing requirements for adjacent construction to remain; consult with the Structural Engineer if questionable structural conditions exist. Prevent dust and dirt from rising and spreading through the existing building by wetting demolished masonry, concrete, plaster and other debris. Protect unaltered portions of the existing building affected by demolition operations by erecting temporary dust proof partitions as shown on drawings.

i) It shall be the responsibility of the General Contractor to provide temporary fire protection. Requirements may consist of 10 lb. min. ABC Fire Extinguishers, fire blankets, water hoses or a combination of devices as specified and located by the Fire Marshal assigned to this project.

j) The General Contractor shall protect all utilities encountered while performing the work, whether indicated on the Contract Drawings or not. Maintain all utilities in service until scheduled to be moved (or abandoned), tested and made ready for use. Exercise extreme care around utilities being excavated and restore any utilities damaged by personnel or machine to the same condition or better as existed prior to starting the work, at no cost to the Owner.

2-02: Emergencies:

a) In any emergency affecting the safety of persons or property, General Contractor shall act at his discretion to prevent threatened damage, injury or loss. The General Contractor shall notify the Owner and the Architect of the situation and all actions taken immediately thereafter.

b) If, in the opinion of the General Contractor, immediate action is not required, the General Contractor shall notify the Owner and Architect of the emergency situation and proceed in accordance with the Owner's instructions. However, if any loss, damage, injury or death occurs that could have been prevented by the General Contractor's immediate action, the General Contractor shall be held liable for all costs, damages, claims, actions, suits, attorney's fees and all other expenses arising from the emergency. Any additional compensation or extension of contract time claimed by the General Contractor on account of emergency work shall be determined in accordance with the General and Special Conditions.

c) Prior to demolition, make explorations as necessary to discover any hazardous materials or materials which, if released, would cause environmental contamination. Upon discovery of suspicious material, immediately notify the Owner and Architect for instructions as to procedure.

d) Should any toxic or hazardous material be accidentally released, immediately notify the Owner and Architect. Take immediate action to seal off area from airborne contamination by erecting dust proof partitions. With dikes or earth berms, physically contain liquid contamination from entering into storm drains, sewers, adjacent waterways or streets. If an underground fuel line, vent or tank is encountered, stop work and notify the Fire Marshal for instructions. If an underground septic system, grease trap, holding tank or cesspool is encountered, stop work and notify the Durham County Health Department for instructions.

PART 3: EXECUTION

3-01: Workmanship: Demolition and alteration work shall be conducted as shown on drawings. General Contractor shall be responsible for all cutting, fitting or patching that is required to complete the work of fitting old components with new components or to penetrate existing construction. Cut existing construction to a reasonable dimension in order to fit new material or equipment in place and minimize patching; where adjacent

construction is damaged unnecessarily, it shall be the responsibility of the General Contractor to restore the material to a condition matching the original as close as possible, at no additional cost to the Owner. See respective M/E/P drawings for UL penetration details.

3-02: Cleaning Up: The General Contractor shall be responsible at all times for keeping the premises free from accumulation of waste materials or rubbish caused by his work. At the completion of the work, all waste materials and rubbish, tools, construction equipment, machinery and surplus materials shall be removed from the site. If the General Contractor fails to clean up during or at the completion of the work, the Owner may do so as provided in the General and Special Conditions, and the cost thereof shall be withheld from moneys due the General Contractor.

3-03: Adjoining Surfaces: Where new and existing surfaces adjoin and are detailed for a flush condition, clean existing surface free from dirt, grease, loose paint, etc. before refinishing. Cut out embedded anchorage and attachment items as required to properly restore and repair existing substrate prior to refinishing.

3-04: Existing Equipment: (Ref: Demolition Drawings)

a) Materials or items not designated on the drawings or removed in accordance with 1-05 above shall become the property of the General Contractor and shall be removed from the property or refinished for use in new facility.

b) Materials or items on the contract drawings to remain in place shall be protected from damage or loss due to the progress of the work as described under Part 2-01: Protection above.

c) Materials or items removed under a) shall be inspected, repaired and refinished as required to good working order prior to reinstallation.

END OF SECTION 011150

SECTION 011400 - WORK RESTRICTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 USE OF PREMISES

A. Use of Building: Limit use of premises to work in areas indicated. Do not disturb portions of building beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to areas as shown on drawings.
2. Driveways, Entrances and elevators: The primary contractor entrance will be the existing loading dock. The one larger elevator can be used for staff and material deliveries. The contractor will be responsible for installing protective covering in the elevator.

    a. Schedule deliveries to minimize use of existing loading dock.
    b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

3. There will be time when electrical or life safety system work will need to be done in areas outside of the specified Phase construction areas. This work will need to be done after regular working hours, Monday thru Friday, 8:00 a.m. to 5:00 p.m. and will need to be coordinated with the Owner.

4. Durham County staff will be occupying the areas under construction throughout the project. Access for County staff will need to be maintained from 8:00 a.m. to 5:00 p.m., Monday through Friday. The building also has public meetings during the day and evenings. Access for the public and staff for these meetings will need to be maintained.

5. The existing HVAC system will need to be operational in the occupied areas of the building throughout all construction phases. Notify the owner and design team prior to any shutdowns required.

6. The existing plumbing system will need to be operational in occupied areas throughout all construction phases. Contractor to notify the owner and design team of any required temporary shutdowns.

7. The existing life safety system will need to be operational in occupied areas throughout all construction phases. Contractor to notify the owner and design team of any required temporary shutdowns.
8. Dust protection barriers must be used in any areas where county staff are located and there is work being done. This especially applies to renovations on Fifth Floor and any

work that must be completed outside of the Phase construction areas. See Phasing Drawings.

1.3 OCCUPANCY REQUIREMENTS

A. Partial Owner Occupancy: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.

1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
2. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
3. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will provide, operate, and maintain mechanical and electrical systems serving occupied portions of building.
4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.

END OF SECTION 011400

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing allowances.

1. Certain materials and equipment are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:

1. Lump-sum allowances.
2. Unit-cost allowances.
3. Contingency allowances.
4. Testing and inspecting allowances.
5. Quantity allowances.

C. Related Sections include the following:

1. Division 1 Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
2. Division 1 Section 012000 "Unit Prices" for procedures for using unit prices.
3. Division 1 Section 014000 "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.4 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.5 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.6 TESTING AND INSPECTING ALLOWANCES

A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.

B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure.

C. Costs of services not required by the Contract Documents are not included in the allowance.

D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

1.7 UNUSED MATERIALS

A. Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, prepare unused material for storage by Owner when it is not economically practical to return the material for credit. If directed by Architect, deliver unused material to Owner's storage space. Otherwise, disposal of unused material is Contractor's responsibility.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

Allowance No. 1: RENOVATION CONTINGENCY
Allowance Amount = $5,000.00

END OF SECTION 012100

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 012100 "Allowances" for products selected under an allowance.
2. Section 012300 "Alternates" for products selected under an alternate.
3. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

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

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit one (1) electronic (pdf) copy of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work

specified.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of Architects, Engineers and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.

d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

B. Related Sections include the following:

1. Division 1 Section 012000 "Allowances" for procedural requirements for handling and processing allowances.
2. Division 1 Section 012000 "Unit Prices" for administrative requirements for using unit prices.
3. Division 1 Section 016000 "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: **Architect** will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by **Architect** are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within **time specified in Proposal Request** or **10 days**, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

C. Proposal Request Form: For Change Order proposals, use forms provided by Owner.

1.5 ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, base each Change Order proposal on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within [**21**] days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than [**21**] days after such authorization.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on forms provided by the Owner.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Sections include the following:

3. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
4. Section 013200 "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule of Values and Submittals Schedule.

1.3 DEFINITIONS

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

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:

a. Application for Payment forms with Continuation Sheets.
b. Submittals Schedule.

2. Submit the Schedule of Values to Owner through Construction Project Manager at earliest possible date but no later than seven (7) days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the Schedule of Values:

a. Project name and location.
b. Name of Architect

c. Architect project number.
d. Contractor's name and address.
e. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

a. Related Specification Section or Division.
b. Description of the Work.
c. Name of subcontractor.
d. Name of manufacturer or fabricator.
e. Name of supplier.
f. Change Orders (numbers) that affect value.
g. Dollar value.

1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing if required.

6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

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

9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Designer and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. The Designer will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to Designer by a method ensuring receipt within 24 hours. Each copy shall include waivers of lien, sub-contractor’s report, and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of Values.
3. Contractor's Construction Schedule (preliminary if not final).
4. Products list.
5. Submittals Schedule (preliminary if not final).
6. List of Contractor's staff assignments.
7. List of Contractor's principal consultants.
8. Copies of building permits.
9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
10. Initial progress report.
11. Report of preconstruction conference.
12. Certificates of insurance and insurance policies.
13. Data needed to acquire Owner's insurance.
14. Initial settlement survey and damage report if required.
15. Results from all required testing.

H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final, liquidated damages settlement statement.
10. As-built documentation, warranties & manuals.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Coordination Drawings.
4. Administrative and supervisory personnel.
5. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.

C. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 1 Section 013200 "Construction Progress Documentation" for preparing and submitting the Contractor's Construction Schedule.
2. Division 1 Section 017000 "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Division 1 Section 017700 "Closeout Procedures" for coordinating Contract closeout.

1.3 COORDINATION

A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

C. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.

E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Indicate relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Refer to Division 23 Section 230500 "Basic Mechanical Materials and Methods" and Division 26 Section 260500 "Basic Electrical Materials and Methods" for specific Coordination Drawing requirements for mechanical and electrical installations.

B. Staff Names: Within **15** days of starting construction operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

1. Include special personnel required for coordination of operations with other contractors.

1.6 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within **3** days of the meeting.

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than **15** days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

a. Tentative construction schedule.
b. Phasing.
c. Critical work sequencing.
d. Designation of responsible personnel.
e. Procedures for processing field decisions and Change Orders.
f. Procedures for processing Applications for Payment.
g. Distribution of the Contract Documents.
h. Submittal procedures.
i. Preparation of Record Documents.
j. Use of the premises.
k. Responsibility for temporary facilities and controls.
l. Parking availability.
m. Office, work, and storage areas.
n. Equipment deliveries and priorities.
o. First aid.
p. Security.
q. Progress cleaning.
r. Working hours.

C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and

installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related Change Orders.
    d. Purchases.
    e. Deliveries.
    f. Submittals.
    g. Review of mockups.
    h. Possible conflicts.
    i. Compatibility problems.
    j. Time schedules.
    k. Weather limitations.
    l. Manufacturer's written recommendations.
    m. Warranty requirements.
    n. Compatibility of materials.
    o. Acceptability of substrates.
    p. Temporary facilities and controls.
    q. Space and access limitations.
    r. Regulations of authorities having jurisdiction.
    s. Testing and inspecting requirements.
    t. Required performance results.
    u. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements.
4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at **weekly** intervals. Coordinate dates of meetings with preparation of payment requests.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Change Orders.
14) Documentation of information for payment requests.

3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

E. Coordination Meetings: Conduct Project coordination meetings at **weekly** intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to Combined Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
b. Schedule Updating: Revise Combined Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
c. Review present and future needs of each contractor present, including the following:

1) Interface requirements.
2) Sequence of operations.

3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Change Orders.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200: CONSTRUCTION PROGRESS DOCUMENTATION

PART 1: GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's Construction Schedule.
2. Submittals Schedule.
3. Weekly construction reports.
4. Field condition reports.
5. Construction photographs.

B. Related Sections include the following:

1. Section 012900 "Payment Procedures" for submitting the Schedule of Values.
2. Section 013300 "Submittal Procedures" for submitting schedules and reports.
3. Section 014000 "Quality Requirements" for submitting a schedule of tests and inspections.
4. Section 017700 "Closeout Procedures" for submitting Project Record Documents at Project closeout.

1.3 DEFINITIONS

A. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.

1.4 SUBMITTALS

A. Qualification Data: For firms and persons specified in "Quality Assurance" Article and in-house scheduling personnel to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

B. Submittals Schedule: Submit one (1) electronic (pdf) copy of schedule. Arrange the following information in a tabular format:

1. Scheduled date for first submittal.
2. Name of subcontractor.
3. Description of the Work covered.
4. Scheduled date for Owner’s Representative final release or approval.

C. Contractor's Construction Schedule: Submit two (2) printed copies of initial schedule large enough to show entire schedule for entire construction period.
   a. Submit an electronic copy of schedule, in MS Project, MS Excel, or MS Word format, on CD-R, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.

D. Weekly Construction Reports: Submit one (1) electronic (pdf) copy at monthly pay applications.

E. Field Condition Reports: Submit one (1) electronic (pdf) copy at time of discovery of differing conditions.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

   1. Secure time commitments for performing critical elements of the Work from parties involved.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

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

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Submit proposed construction schedule to Architect within seven days of date established for the Notice to Proceed. Provide updated Construction schedules with each pay application.
   1. Indicate each significant construction activity separately.
   2. Monitor construction and update schedule for reporting progress. Indicate an estimated completion for each activity.
   3. Note the critical path on the schedule.

2.3 REPORTS

A. Weekly Construction Reports: Prepare a weekly construction report recording the following information concerning events at Project site and submit relevant copies with pay applications:

   1. List of subcontractors at Project site.
   2. List of separate contractors at Project site.
   3. Approximate count of personnel at Project site.
   4. High and low temperatures and general weather conditions.
   5. Accidents.

6. Meetings and significant decisions.
7. Unusual events (refer to special reports).
8. Stoppages, delays, shortages, and losses.
9. Orders and requests of authorities having jurisdiction.
10. Change Orders received and implemented.
11. Construction Change Directives received.
12. Services connected and disconnected.

PART 3 - EXECUTION

3.1 CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule with each pay application.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. As the Work progresses, indicate Actual Completion percentage for each activity.
3. Distribution: Distribute copies of approved schedule to Architect and Owner.

3.2 CONSTRUCTION PHOTOGRAPHS

A. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.
B. Preconstruction Photographs: Before starting construction, take color photographs of Project site and surrounding properties from different vantage points. Show existing conditions adjacent to property.
C. Periodic Construction Photographs: Take photographs weekly, coinciding with cutoff date associated with each pay application. Select vantage points to best show staus of construction and progress since last photographs were taken. Provide hard copies or electronic copies to Construction Project Manager with pay applications.
D. Final Completion Construction Photographs: Take photographs after date of Substantial Completion for submission as Project Record Documents.

END OF SECTION 013200

SECTION 013216: CONSTRUCTION PROGRESS SCHEDULE

PART 1: GENERAL

1-01: Work Included: This sections includes the labor and related services necessary to develop, report and update project scheduling as proposed herein.

1-02: Objectives: The primary objective of the construction schedule is to insure the adequate planning, scheduling and execution of the construction activities so that they proceed in an orderly manner within the Contract Time.

1-03: Services: The General Contractor, in collaboration with the other Subcontractors, shall provide a schedule, as defined in the Owner's General Conditions and in this Section. This schedule shall provide the basis for monitoring the individual progress of the Prime Contractor to detect problems early in order to institute corrective actions, and to be a mechanism for monitoring such corrective actions.

1-04: Pre-Bid Conference: Each Bidder shall review and analyze the proposed Start/Completion Dates, determine the feasibility of activity duration and sequences as outlined, and access the interface requirements as they relate to the Prime Contract. Discussion of problems, conflicts, or alternative approaches will be a primary agenda item in order to issue timely addenda regarding any changes in the dates or sequence of the work.

1-05: Notice To Proceed: Following the Notice to Proceed and in accordance with the General and Supplementary Conditions, the Prime Contractor shall submit within 15 days of Notice to Proceed, to the Owner and A/E a preliminary schedule, in precedence format, for the scope of construction/renovation work. The preliminary schedule shall reflect proposed activity duration of the Prime Contractor, proposed testing and inspection duration, proposed occupancy dates based on separate permits, and proposed punchlist duration; the duration shown shall be given in calendar days and shall extend no later than the project's required completion date.

PART 2: PRODUCTS

2-01: Schedule Distribution: Following a review and correction process by all parties, the General Contractor shall distribute digital copies of the completed schedule as follows:

Owners Representative
Durham County Fire Marshal
Building Inspections
Architect
MEP Engineer
Electrical Subcontractor

2-02: Start/Completion Dates: The Owner and A/E make no warranty, either express or implied, as to the reasonableness or feasibility of the following time required to complete the work.

The issuance of the Certificate of Occupancy to the Prime Contractor shall be the date of Substantial Completion, certified by the local Inspections Office that construction is sufficiently complete, in accordance with the Contract Documents, so that the Owner can occupy the space for its intended use.

"Substantial Completion" shall be defined as the date of Final Inspection and Issuance of the Certificate of Occupancy along with a dated punchlist issued by the Architects.

Anticipated construction schedule is as follows:

COMMENCEMENT OF CONTRACT .....**Upon Owner's Notice to Proceed (Anticipated NTP – TBD)**

Substantial Completion (Issuance of Certificate of Occupancy). **120 Calendar Days from NTP**

Final Completion of Owner / Architect Punchlist……..**15 Calendar Days from SC**

2-03: Construction Progress Schedule: The schedule shall be a diagram designed to illustrate the following:

a) The order and inter dependencies of the General Contractors' activities and the major points of interface, including specified points of inspection and occupancy dates based on separate permits as outlined above.

b) General sequence of operations of the work with time limits specified as "Early/Late \Start", "Early/Late Finish", "Actual Start/Finish" and "Float Time".

c) Work to be started and completed by the Owner or Separate Contractors.

2-04: Schedule Maintenance: The General Contractor shall have control of and maintain the overall Project Schedule as update information is submitted from the other Subcontractors. Once a month at one of the Construction Progress Meetings, the General Contractor shall submit updated progress data consisting of:

a) Actual start dates of activities in process.
b) Estimated duration of activities in process.
c) Actual finish dates of activities completed.
d) Actual or anticipated deviations from the schedule.
e) Solutions for alleviating the effects of deviations.

At approximately 50% completion of the Work, the General Contractor shall again distribute copies of the computerized schedule diagram, accurately reflecting the current progress of the work, to all parties who received the initial diagram.

PART 3: EXECUTION

3-01: Schedule Alteration: The intent of this section is to set forth the required completion dates of the work and to which the General Contractor is required to adhere. In the event that the General Contractor desires to change their plan of construction, the proposed change must be submitted to the Owner and A/E for review. The changes must be accompanied by a written description of the reasons for changing, and method of maintaining adherence to activity duration already in process and the impact of the rescheduling. No schedule alteration shall be undertaken by the General Contractor unless approval in writing is issued by the Owner. The General Contractor shall issue revised data, following approval from the Owner, at the next regularly scheduled progress meeting.

3-02: Extensions of Time: If the General Contractor or Sub Contractor requests an extension of time as a part of a change request in the contract, he shall submit a written statement as described in the paragraph above. Any request for time extension shall include a schedule impact narrative and "fragnet" of activities detailing which activities are affected by the change and to what degree.

The time extension request shall be forwarded to the General Contractor for schedule forecasting predicting the actual Project Completion Dates.

Extensions of time shall be considered as required by the General and Supplementary Conditions and compliance with these specifications; the Owner shall not be held responsible or liable to the General Contractor for any schedule deviation due to failure of the Owner to grant time extensions under the Contract Documents should the General Contractor fail to substantially comply with the submission and justification requirements as described above. The General Contractor's failure to perform in accordance

with the Construction Schedule shall not be excused, nor be chargeable to the Owner, because the General Contractor has submitted time extension requests.

3-03: Coordination: General Contractor shall coordinate his work fully with that of the other Sub Contractors and shall cooperate fully with the Owner and A/E in maintaining orderly progress toward completion of the work as scheduled. The Owner shall be responsible for keeping the General Contractor fully aware of schedules for Work by Subcontractors (e.g. asbestos removal) and delivery dates for Owner-furnished equipment to be installed by General Contractor and delivery dates of movable equipment to be stored in the building. Failure of such equipment to arrive on schedule shall not be justification for an adjustment to the contract time. Failure of subcontractors to meet their schedules shall be considered cause for an extension of time only if the delay is considered by the Owner and A/E as unreasonable in its direct impact on the progress of the work, in accordance with the requirements of the Contract.

3-04: Float Time: Float Time is defined as the amount of time between the earliest start date and the latest start date or between the earliest finish date and the latest finish date in a chain of construction activity duration. Float Time is not for the exclusive use of benefit of the General Contractor or the Owner. It shall be assumed that the progress of the work shall proceed according to the early start dates; apportionment of float time by the General Contractor shall be reviewed by the Owner and A/E in accordance with the needs of the project. The General Contractor acknowledges that any delays affecting paths of activities containing float time, will not have any affect upon the Start/Completion Dates, provided that the actual delay does not exceed the float time associated with these activities.

3-05: Contractors Guarantees: General Contractor guarantees that he will not:

a) Misrepresent to the Owner the planning, scheduling or execution of the work.

b) Prepare schedules, updates, revisions or reports for the work which do not accurately reflect the intent of the General Contractor as to:

1) Sequences of activities.
2) Duration of activities.
3) Responsibility of activities.
4) Resources availability.
5) Labor availability or efficiency.
6) Completion of any item of work or activity.
7) Completion dates.
8) Delays or problems encountered or expected.
9) Subcontractor delay claims.
10) If applicable, the float time available.

END OF SECTION

SECTION 013300: SUBMITTALS

PART 1: GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

B. Related Sections include the following:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment.
2. Section 017700 "Closeout Procedures" for submitting warranties Project Record Documents and operation and maintenance manuals.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Designer's responsive action.

B. Informational Submittals: Written information that does not require Designer's approval. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Owner's Representative reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Owner's Representative receipt of submittal.

1. Initial Review: Allow seven (7) days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Designer will advise Contractor when a submittal being processed must be delayed for coordination.
2. If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Allow seven (7) days for processing each resubmittal.

4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

C. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Construction Project Manager.
3. Include the following information on label for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name and address of Owner.
    d. Name and address of Contractor.
    e. Name and address of subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Unique identifier, including revision number.
    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Other necessary identification.

D. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

E. Additional Copies: Unless additional copies are required for final submittal, and unless Designer or Construction Project Manager observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.

1. Submit One (1) electronic (pdf) copy of submittal to Owner’s Representative.

F. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Designer will discard submittals received from sources other than Contractor.

1. Transmittal Form: Provide locations on form for the following information:
    a. Project name.
    b. Date.
    c. Destination (To:).
    d. Source (From:).
    e. Names of subcontractor, manufacturer, and supplier.
    f. Category and type of submittal.
    g. Submittal purpose and description.
    h. Submittal and transmittal distribution record.
    i. Remarks.
    j. Signature of transmitter.

G. Use for Construction: Use only final submittals with mark indicating action taken by Designer connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

1. Number of Copies: Submit one (1) electronic (pdf) copy of each submittal, unless otherwise indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's written recommendations.
b. Manufacturer's product specifications.
c. Manufacturer's installation instructions.
d. Manufacturer's catalog cuts.
e. Standard product operating and maintenance manuals.
f. Compliance with recognized trade association standards.
g. Compliance with recognized testing agency standards.
h. Notation of coordination requirements.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Include the following information, as applicable:

a. Notation of dimensions established by field measurement.
b. Identification of products.
c. Fabrication and installation drawings.
d. Roughing-in and setting diagrams.
e. Schedules.
f. Design calculations.
g. Pressure loss calculations.
h. Compliance with specified standards.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 11 by 17 inches.

3. Number of Copies: Submit one (1) electronic (pdf) copy of each submittal, unless prints are required for operation and maintenance manuals. Submit five (5) prints where prints are required for operation and maintenance manuals. Architect will retain two (2) prints; remainder will be returned.

D. Samples: Prepare physical units of materials or products, including the following:

1. Comply with requirements in Section 014000 "Quality Requirements" for mockups.

2. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
3. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Owner's Representative sample where so indicated. Attach label on unexposed side that includes the following:

    a. Description of Sample including any certificates and pertaining assurances.
    b. Product name or name of manufacturer.
    c. Sample source.

5. Submit Samples for review of kind, color, pattern, material, warranty, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
    a. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.

6. Number of Samples for Initial Selection: Submit one (1) full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
7. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit one (1) electronic (pdf) copy of each submittal, unless otherwise indicated. Designer and Construction Project Manager will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Test and Inspection Reports: Comply with requirements in Section 014000 "Quality Requirements."

B. Construction Schedule: Comply with requirements in Section 013200 "Construction Progress Documentation."

C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.

E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project; include evidence of installation experience.

F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with all requirements. Include evidence of manufacturing experience where required.

G. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.

H. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

I. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.

J. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

K. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.

L. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

M. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Section 017700 "Closeout Procedures".

N. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

O. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a

product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:

1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

P. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

Q. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

R. Construction Photographs and Videotapes: Comply with requirements in Division 1 Section 013200 “Construction Progress Documentation.”

S. Material Safety Data Sheets: Submit information directly to Owner.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Designer.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 OWNER’S REPRESENTATIVE

A. General: Designer will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Designer will review each submittal, make marks to indicate corrections or modifications required, and return it.

C. Informational Submittals: Designer will review each submittal and will not return it, or will reject and return it if it does not comply with requirements.

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities.
2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-control services required by Owner or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Owner.

C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.4 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Description of test and inspection.
3. Identification of applicable standards.
4. Identification of test and inspection methods.
5. Number of tests and inspections required.

6. Time schedule or time span for tests and inspections.
7. Entity responsible for performing tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

C. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Ambient conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

D. Manufacturer Qualifications: A firm with then (10) years documented experience in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.

E. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.

F. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.

1.6 QUALITY CONTROL

A. Owner's Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
2. Cost for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor and the Contract Sum will be adjusted by Change Order.

B. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with the Owner's Representative and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Owner, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
5. Do not perform any duties of Contractor.

F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014100: REGULATORY REQUIREMENTS

PART 1: GENERAL

In addition to regulatory requirements of governing authorities, codes, ordinances, industry requirements and association requirements noted in or reasonably implied from these specifications, the following shall become a part of the Contract Documents:

A) North Carolina State Building Code - Latest Editions.
B) City of Durham Zoning Ordinance - Latest Edition.
C) UL fire Resistance Rating - Latest Edition.
D) FM Engineering Corporation - Latest Edition.
E) NFPA 101 Life Safety Standards - Latest Edition.

PART 2: SPECIFIC REFERENCES

2-01: Fire Lanes and Public Roadway access to the existing site buildings and temporary parking areas shall be clearly marked and maintained during the construction period by the Contractor. All access shall be approved by the Durham County Fire Marshal's Office.

2-02: NCSBC - Chapter 6, 702.1.6: Corridor partitions, smoke-stop partitions, horizontal exit partitions, exit enclosures, and fire walls shall be effectively and permanently identified with signs or stenciling in a manner acceptable to the local building authority. Identification shall be located above any decorative ceiling and in concealed spaces. Suggested wording shall read:

"1-HOUR FIRE BARRIER – PROTECT ALL OPENINGS"
"1-HOUR FIRE PARTITION – PROTECT ALL OPENINGS"

(Verify with Fire Marshall and Building Inspector prior to starting).

2-04: NCSBC - Chapter 6 and NFPA 101 (if needed)
Smoke doors in Corridor shall have a permanently installed sign mounted on the face of each door in the open position. Suggested wording shall read:

"IN CASE OF FIRE, SMOKE DOORS WILL CLOSE AUTOMATICALLY.
DO NOT BLOCK".

END OF SECTION

SECTION 014126: PERMITTING AND GOVERMENTAL REVIEW REQUIREMENTS

PART 1: GENERAL

The following local agencies provide permitting authority and oversite for this project site. This list is not inclusive. It is the General Contractor's responsibility to understand all agencies that will require drawing reviews for this specific project:

A) City of Durham – Inspections (building except Fire Marshal)
B) County of Durham – Fire Marshal

PART 2: PERMITS

2-01: Permitting Process and Contractor Responsibilities:

A) General Contractor shall be the lead in the permit application process.
B) General Contractor shall contact the permitting and reviewing authorities having jurisdiction for this project and ascertain the required permits and forms before submitting. No additional compensation shall be awarded by the owner to meet the submittal requirements of any state, county or city review entity.
C) General Contractor shall either:
    a. Obtain and pay for all permits and approvals required for the work described on the drawings and herein as part of the base bid contract.
    b. Obtain and pay for all permits and approvals as required for their portion of the work and direct sub-contractors to obtain and pay permits as required for the sub-contractor's portion of the work as part of the base bid contract.
D) General Contractor shall provide all documentation, both digital and paper, as required for any part of any permitting process as part of the base bid contract.
E) Contractor shall make any paper copies of drawings, forms, submittals and specifications required by the governmental review agencies as part of the base bid contract including any forms provided by the governmental review agencies
F) General Contractor shall make all sub-contractors aware of the requirements in this section before submitting for permits.

2-02: Permits Required: The following permits may or may not be required for this project. This list is no inclusive. It is the General Contractor's responsibility to ascertain all required permits for this project. Additional permits may be required by State, County or City entities beyond those listed below.

A) Building Specific Permits:
    a. Building Permit, Mechanical Permit, Electrical Permit, Fire Alarm Permit, Fire Marshal Review Permit

2-03: Reviews for Certificate of Occupancy:

A) The General Contractor shall ascertain requirements and costs for ALL onsite reviews (building and site) required by governmental agencies and include all costs for onsite reviews in the base bid cost of the project.
B) The General Contractor shall coordinate all onsite reviews and inspections by all governmental agencies within the contract timeline. It is imperative that the General Contractor have a complete working understanding of the flow and sequence of all required reviews for a competed CO.

END OF SECTION 014100

SECTION 014200 – REFERENCES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. “Reviewed”: The term "reviewed," when used in conjunction with Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract

D. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and “permitted" have the same meaning as "directed."

E. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

F. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

G. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

H. "Install": Operations at project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

I. "Provide": Furnish and install, complete and ready for the intended use.

J. “Installer”: An installer is Contractor or another entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Abbreviations and Names: Abbreviations and acronyms are frequently used in the Specifications and other Contract Documents to represent the name of a trade association, standards-developing organization, authorities having jurisdiction, federal government agency, stage agency or other entity in the context of referencing a standard or publication. Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
2. ICC - International Code Council; www.iccsafe.org.
3. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

C. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. ASA - Acoustical Society of America, http://asa.aip.org
2. ACCA - Air Conditioning Contractors of America, http://acca.org
3. ADC – Air Diffusion Council, http://flexibleduct.org
4. AMCA - Air Movement and Control Association International, http://amca.org
5. AHRI – Air-Conditioning, Heating and Refrigeration Institute, http://www.ahrinet.org
6. AA – Aluminum Association, http://www.aluminum.org
7. AAMA – American Architectural Manufacturers Association, http://www.aamanet.org
8. ABMA - American Bearing Manufacturers Association, http://www.americanbearings.org
9. AGA – American Gas Association, http://www.aga.org
10. AISC – American Institute of Steel Construction, http://www.aisc.org

11. ALI – American Ladder Institute, http://www.americanladderinstitute.org
12. ANSI – American National Standards Institute, http://www.ansi.org
13. ASNT – American Society for Nondestructive Testing, http://www.asnt.org
14. ASHRAE - American Society of Heating, Refrigeration and Air-Conditioning Engineers, http://www.ashrae.org
15. ASME – American Society of Mechanical Engineers, http://www.asme.org
16. AABC - Associated Air Balance Council, http://www.aabc.com
17. ASTM – American Society for Testing and Materials, http://www.astm.org
18. CISCA – Ceilings and Interior Systems Construction Association, http://www.cisca.org
19. CFSEI - Cold formed Steel Engineers Institute, www.cfsei.org
20. CSI - Construction Specifications Institute, www.csinet.org
21. ICC – International Code Council, www.iccsafe.org
22. MHIA - Material Handling Industry of America, www.mhia.org
23. MSS – Manufacturers Standardization Society of the Valve and Fittings Industry Inc., www.mss-hq.org
24. NAAMM - National Association of Architectural Metal Manufacturers, www.naamm.org
25. NEMA - National Electrical Manufacturers Association, www.nema.org
26. NFPA – National Fire Protection Association, http://www.nfpa.org
27. NRCA – National Roofing Contractors Association, http://www.nrca.net
28. NAIMA - North American Insulation Manufacturers Association, www.naima.org
29. PMCA – Plumbing and Mechanical Contractors Association, http://www.pmcaoregon.com
30. SMACNA – Sheet Metal and Air-Conditioning Contractors' National Association, http://www.smacna.org
31. SPRI - Single Ply Roofing Industry, www.spri.org
32. SSPC - Society for Protective Coatings, http://www.sspc.org
33. SPFA - Spray Polyurethane Foam Alliance, www.sprayfoam.org
34. SDI - Steel Deck Institute, http://www.sdi.org
35. USGBC – U.S. Green Building Council, http://www.usgbc.org
36. UL – Underwriters Laboratories, http://www.ul.com

D. Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Information is subject to change and is up-to-date as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from Department of Defense Single Stock Point; http://dodssp.daps.dla.mil.
3. DOE – U.S. Department of Energy, www.eere.energy.gov
4. DSCC - Defense Supply Center Columbus; (See FS).
5. FED-STD - Federal Standard; (See FS).
6. FS - Federal Specification; Available from Department of Defense Single Stock Point; http://dodssp.daps.dla.mil.
   a. Available from Defense Standardization Program; www.dsp.dla.mil.
   b. Available from General Services Administration; www.gsa.gov.
   c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
7. MILSPEC - Military Specification and Standards; (See DOD).
8. USAB - United States Access Board; www.access-board.gov.
9. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 014500: QUALITY CONTROL

PART 1: GENERAL It shall be the responsibility of the General Contractor to schedule periodic meetings between the, subcontractors, suppliers, foremen, inspectors and other parties involved with the daily progress of the work. Cooperation among all parties is expected for timely completion of the project.

PART 2: CRITICAL EVENTS The General Contractor shall exercise control over the project regarding events such as site demolition, steel erection and installation of Equipment, during which no other activity can take place in a given area. For areas to be inspected and covered up, 48-hour notice must be given to Local Inspectors and A/E.

PART 3: COOPERATIVE ARRANGEMENTS

A) Safety
Because of the nature of work taking place in an active restrictive setting, the Owner and Architect advise the Contractor to establish a Safety Committee, consisting of the Job site Superintendents for each subcontractor, to monitor job site safety, report violations, and maintain protective devices and warnings in accordance with OSHA guidelines. Access around the existing site by Fire Department must be maintained during the construction time period.

B) Cleanup
Since the accumulation of trash and debris can contribute to unsafe and unclean site conditions, the Owner and Architect advise that the Safety Committee described in Paragraph A) be responsible for coordinating the removal and storage of debris at remote locations until it can be safely removed from the site. Cleaning of site and building shall be done daily with scheduled intervals (preferably weekly) for large-scale cleanup and removal of debris from the workplace.

Coordinate material separation for recycling. Maintain a cardboard recycling program, masonry materials recycling program and coordinate with the City of Durham solid waste department for recycling program for gypsum board and other reusable building products.

END OF SECTION 014500

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes requirements, as necessary, for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.

B. Temporary utilities may include, but are not limited to, the following:

1. Temporary utilities, support facilities, and security and protection facilities.
2. Lighting.

C. Support facilities include, but are not limited to, the following:

1. Project identification and temporary signs.
2. Construction aids and miscellaneous services and facilities.
3. Portable Toilet.

D. Security and protection facilities may include, but are not limited to, the following:

1. Environmental protection.
2. Tree and plant protection.
3. Site enclosure fence.
4. Security enclosure and lockup.
5. Barricades, warning signs, and lights.

1.3 USE CHARGES

A. General: Cost or use charges for temporary facilities are not chargeable to Owner and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:

1. Owner's construction representatives.
2. Occupants of Project.
3. Testing agencies.
4. Personnel of authorities having jurisdiction.

1.4 SUBMITTALS

A. Implementation and Termination Schedule: Within fifteen (15) days of date established for submittal of Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility.

1.5 QUALITY ASSURANCE

A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.

1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

A. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:

1. Keep temporary services and facilities clean and neat.
2. Relocate temporary services and facilities as required by progress of the Work.

PART 2 - EXECUTION

2.1 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Locate sanitary facilities for easy access.

B. Project Identification and Temporary Signs: Prepare Project identification and other signs in sizes indicated. Install signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.

2.2 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.

B. Stormwater Control: Provide earthen embankments and similar barriers in and around excavations and sub-grade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains if determined necessary by the Owner.

2.3 OPERATION, TERMINATION, AND REMOVAL

A. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.

B. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

END OF SECTION 015000

SECTION 016000 – PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 012100 "Allowances" for products selected under an allowance.
2. Section 012500 "Substitution Procedures" for requests for substitutions.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within **15** days of receipt of request, or **seven** days of receipt of additional information or documentation, whichever is later.

    a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weather tight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Engineer will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

C. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of Architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017000 - EXECUTION REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Related Sections include the following:

1. Division 1 Section 013300: "Submittals".
2. Division 1 Section 017700: "Closeout Procedures"

1.3 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - EXECUTION

2.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning Work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, verify the location and points of all elements to remain and to be demolished. Verify all salvageable material with the Owner.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
2. Furnish location data for Work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions: Examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
   a. Description of the Work.
   b. List of detrimental conditions, including substrates.
   c. List of unacceptable installation tolerances.
   d. Recommended corrections.
2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine floors and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

2.2 PREPARATION

A. Existing Utility Information: Obtain information necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Do not proceed with utility interruptions without Owner's written permission.

C. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

E. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

2.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly. Architect is not responsible if descrepancies are noted by the Contractor but are not reported to the Architect prior to construction.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
   1. Establish benchmarks and control points to set lines and levels at each stage of construction and elsewhere as needed to locate each element of Project.
   2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
   3. Inform installers of lines and levels to which they must comply.
   4. Check the location, level and plumb, of every major element as the Work progresses.
   5. Notify the Architect when deviations from required lines and levels exceed allowable tolerances.
   6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Owner.

E. Use of Architect's CAD drawings is at Contractor's own risk. Architect is not responsible if discrepancies are discovered but not reported.

F. The Contractor shall demolish and replace any work that does not meet the intentions of the drawings or that has unresolved discrepancies that are not brought to the Architect's attention prior to construction.

2.4 FIELD ENGINEERING

A. Identification: Existing benchmarks, control points, and property corners are noted in the drawings.
B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
   1. Do not change or relocate existing benchmarks or control points without prior written approval of Owner. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Owner before proceeding.
   2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
C. Benchmarks: Establish and maintain a minimum of two (2) permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
   1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
   2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
   3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

2.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
   1. Make vertical work plumb and make horizontal work level.
   2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
E. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
   1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Landscape Architect.
F. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
G. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

2.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
   1. Comply with current requirements in National Fire Protection Association (NFPA) 241 for removal of combustible waste materials and debris.
   2. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.
   1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period to the extent possible for normal events.

2.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If required, a factory-authorized service representative shall inspect field-assembled components and equipment installation.

2.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

2.9 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
   1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

END OF SECTION 017000

SECTION 017413: CLEANING UP

PART 1: GENERAL

1.1 General

a) The requirements specified in this section are in addition to those described in the General and Special Conditions.

b) All debris and waste materials shall become the property of the Contractor, and shall be removed from the site as it accumulates and so as to comply with anti-pollution laws.

c) Burning or burying of rubbish and waste materials on the project site is not permitted.

d) Disposal of volatile fluid wastes such as mineral spirits, oil, or paint thinner in storm or sanitary sewer systems is not permitted, nor shall such materials be deposited anywhere on the project site.

PART 2: MATERIALS

2.1 Materials

The Contractor shall:

a) Use only cleaning materials recommended by the manufacturer of surfaces to be cleaned.

b) Use cleaning materials only on surfaces recommended by the cleaning material manufacturer.

PART 3: EXECUTION

3.1 Execution during Construction

a) The Contractor shall provide suitable containers and locate on site for collection of waste materials, rubbish, and debris.

b) The Contractor shall not allow mud, earth droppings and dust from movement of vehicles to accumulate for more than one half day before removal from paved areas. At no time shall any accumulation be allowed which will create a hazard to safety or bad public relations.

PART 4: FINAL CLEANING

4.1 Final Cleaning

a) At completion of construction and just prior to acceptance, the Contractor shall conduct a final inspection of the site. The Contractor shall remove grease, oil, dirt, stains, and other foreign materials within contract limits that are not part of the finished construction.

b) The Contractor shall repair, patch and touch up any marred surfaces to match adjacent finishes.

END OF SECTION 017413

SECTION 017419: CONSTRUCTION WASTE MANAGEMENT & DISPOSAL

PART 1: GENERAL

1-01: Waste Management Goals: The goal for this project in regards to construction waste management is to recycle or salvage for reuse 75 percent by weight of the total waste generated by this project. This specifically includes reducing the amount of waste that is typically deposited at landfills. This shall include the diverting and recycling of project waste, but is not specifically limited to: land clearing debris (trees, mulch, etc.), wood used during construction (including dimensional lumber, OSB, etc.), concrete, brick, concrete masonry units, asphalt, cardboard, paper, paint, glass, plastics, carpet, aluminum beverage cans, etc.

PART 2: WASTE MANAGEMENT PLAN

2-01: Waste Prevention Measures:

a. Each major material supplier will be sent a letter requiring cooperation in planning for minimal or take-back packaging, such as crates, pallets, and boxes. All major suppliers and subcontractors will be required to deliver materials only when they are ready for installation.

b. A storage container will be provided in the early stages to allow for small material storage, as deemed necessary.

c. As construction progresses specific areas of the project site will be used for subcontractor storage.

2-02: Communication Plan:

a. Details of the Waste Management Plan shall be developed by the Contractor and will be presented to all subcontractors at the on site preconstruction meeting. All subcontractors will be provided a copy of the project Waste Management Plan and be required to abide by it.

b. Waste prevention and recycling activities will be discussed during the weekly project coordination meetings.

c. All recycling containers will be labeled in English and Spanish to identify the recyclable materials and their appropriate containers.

d. If recycling methods and container locations change as construction progresses, the Waste Management Coordinator will notify subcontractors and update the site logistics plan accordingly.

2-03: Land Clearing and Grubbing Materials:

a. All land clearing of trees and brush materials will be removed by grading / clearing contractor. Any merchantable timber will be removed from site and sent to Pruitt Lumber in Louisburg, NC or approved timber recycler. Chip material will be removed from site and sent to B&B Chip Mill in New Hill, NC. or approved chip recycler. Each logging truck on average can remove 25 logs per load. Mulch to be stockpiled onsite for reuse on this project. All stumps and miscellaneous wood products will be ground/chipped and sent to an approved recycling site.

2-04: Off Site Separation of Waste Materials:

Contractor will contract with Waste Industries, LLC or equal to provide roll off trash containers for depositing of all construction waste that is generated during demolition and construction activities. Waste Managing subcontractor will haul these containers to their facility, for sorting and will then haul to the designated recycling center listed below:

a. Clean Wood and Sheetrock - McGill Environmental - 634 Christian Chapel road, New Hill, NC 27526 (919.362.1161).

b. Metal - Raleigh Metal Processors - 2310 Garner Road, Raleigh, NC 27610 (919.828.5426).

c. Cardboard - CRA - 1815 Capital Boulevard, Raleigh, NC 27602 (919.829.1311)

d. Concrete, Brick, Block & Asphalt - Ground at Waste Industries site and used for Landfill cover or Non-Dot Roadbed.

PART 3: PROCEDURE

3-01: Monthly Records and Reporting

a. On a monthly basis, Waste Managing subcontractor will generate a report which includes the following: Customer Name, ID #, Hauler, Date Dumpster Pulled, Material Received Ticket #, Gross Weight, Tare Weight, Net Weight, Total Tons, % Wood recycled, % Dry Wall recycled, % Ferrous Material recycled, % Aggregate/Dirt recycled, % Cardboard recycled, % Non Ferrous recycled and % Landfilled. In addition to the Waste Managing subcontractor's monthly report, Contractor will prepare a monthly report to be submitted with the Pay Application that will include the following: monthly amount in tons of each type of material recycled, monthly amount in tons of each type of material land filled, identity of the recycling center, total cost in tipping fees, and total project to date amounts of recycled and land filled material.

b. A sample of the monthly Recycled Material Log will be developed by Contractor.

c. At the completion of the project, Contractor will issue a cumulative report showing all items reported in the monthly reports summarized in a final accounting tab.

3-02: Estimated Quantities

Contractor shall estimate the tons of materials to be diverted from landfills and recycles. Categories shall include:

a. Concrete
b. Asphaltic Concrete
c. Brick / Block
d. Metals
e. Clean Wood and Sheetrock

Please note that these are estimated quantities only. Contractor will endeavor to limit the amount of materials to landfill and recycle as much as possible. Contractor cannot determine the amount of waste to be actually generated, but estimate the amount based on projects of similar scope and size.

END OF SECTION

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - **GENERAL**

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Inspection procedures.
   2. Project Record Documents.
   3. Operation and maintenance manuals.
   4. Warranties.
   5. Instruction of Owner's personnel.
   6. Final cleaning.

B. Related Sections include the following:
   1. Division 1 Section 013200: "Construction Progress Documentation" for submitting Final Completion construction photographs and negatives.
   2. Division 1 Section 017000: "Execution Requirements" for progress cleaning of Project site.
   3. Division 2 for specific closeout and special cleaning requirements for products of those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
   1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
   2. Advise Owner of pending insurance changeover requirements.
   3. Submit 2 copies of specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
   4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   5. Prepare and submit (1) Project Record Documents, (3) operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information as indicated herein.
   6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
   7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
   8. Submit changeover information related to the Owner’s occupancy, use, operation, and maintenance.
   9. Complete final cleaning requirements, including touchup painting.
   10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
   11. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Designer will either proceed with inspection or notify Contractor of unfulfilled requirements. Designer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by the Designer, that must be completed or corrected before certificate will be issued.
   1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
   2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
   1. Submit a final Application for Payment according to Division 1 requirements.
   2. Submit certified copy of Designers Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Owner. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Designer and Construction Project Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Designer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
   1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit (3) three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
   1. Include the following information at the top of each page:
      a. Project name.
      b. Date.
      c. Name of Owner
      d. Name of Contractor.
      e. Page number.

1.6 PROJECT RECORD DOCUMENTS

A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Owner's reference during normal working hours.

B. Record Drawings: Maintain and submit **one original and one electronic (pdf) copy** of blue- or black-line white prints of Contract Drawings and Shop Drawings.
   1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
      a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
      b. Accurately record information in an understandable drawing technique.

c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.

2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
3. Mark important additional information that was either shown schematically or omitted from original Drawings.
4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

C. Record Specifications: Submit (2) copies of Project's Specifications, including addenda and contract modifications. Mark copies to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Note related Change Orders, Record Drawings, where applicable.

D. Miscellaneous Record Submittals: Assemble (2) copies of miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.7 OPERATION AND MAINTENANCE MANUALS

A. Assemble two (2) complete sets and one (1) electronic (pdf) copy of operation and maintenance data indicating the operation and maintenance of each piece of equipment. Include operation and maintenance data required in individual Specification Sections and as follows:
1. Maintenance Data:
a. Manufacturer's information, including list of spare parts.
b. Name, address, and telephone number of Installer or supplier.
c. Maintenance procedures.
d. Maintenance and service schedules for preventive and routine maintenance.
e. Maintenance record forms.
f. Sources of spare parts and maintenance materials.
g. Copies of maintenance service agreements.
h. Copies of warranties and bonds.

B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.8 WARRANTIES

A. Submittal Time: Submit written warranties on request of Owner for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
   1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
   2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
   3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
   1. Provide instruction at mutually agreed-on times.
   2. Schedule training with Owner with at least 10 days' advance notice.

B. Develop an instruction session that includes training for all equipment as required by individual Specification Sections. Include instruction for the following:
   1. Review of documentation.
   2. Adjustments.
   3. Maintenance.
   4. Repair.

3.2 FINAL CLEANING

A. Cleaning: Comply with manufacturer's written instructions.
   1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
      a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
      b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
      c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface and apply a layer of mulch.
      d. Remove tools, construction equipment, machinery, and surplus material from Project site.
      e. Clean exposed exterior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

f. Remove labels that are not permanent.
g. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
   1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
h. Leave Project clean and ready for occupancy.

B. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

PART 4: GUARANTEE

A. Neither the final certificate of payment nor any provision in the Contract Documents nor partial or entire occupancy of the premises by the Owner shall constitute an acceptance of Work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship.
B. The Contractor shall remedy any defects in the Work, and pay all expenses for any damage to other Work resulting there from, which shall appear within a period of one (1) year from the date of final acceptance of the work unless a longer period is specified elsewhere. The Owner shall give notice of observed defects with reasonable promptness. Mechanical equipment that carries a manufacturer’s warranty will be considered guaranteed for the extent of the warranty only.
C. The Contractor shall submit to the Owner’s Representative, before final acceptance, two (3) copies of all warranties, guaranties, and surety bonds on the Work, as required in the Contract Documents. All such documents shall show the name of the Project, location, and name of the Owner.

END OF SECTION 017700

SECTION 017800: CONTRACT CLOSEOUT

PART 1: GENERAL

Following Substantial Completion and prior to Final Payment of retainage, the Contractor shall furnish to the Architect/Engineer the documents required for certifying completion of the work.

PART 2: DOCUMENTS REQUIRED

2-01: As-built Prints, (1) hard copy (1 Digital Copy), Operation and Maintenance Manuals (1 Digital Copy) (2 bound sets)

2-02: Name and address of Prime Contractor and major subcontractors.

2-03: (Final) Application & Certificate for Payment, AIA G702 (4 copies) with 4 copies of final application, schedule of values, and copies of the certificate of occupancy issued by local inspection department to be included in the submittal binder.

2-04: Consent of Surety to Final Payment, AIA G707 or Owners Form (4 copies).

2-05: Contractor's Affidavit of Payment of Debts and Claims, AIA G706 (4 copies).

2-06: Contractors Affidavit of Release of Liens, AIA G706A (4 copies).

2-07: Letter certifying that no materials containing asbestos or Lead have been used in the construction of this project.

2-08: Contractors Warranty Letter for specific items identified in the Contract Documents and a general building guaranty for Materials and Labor.

2-09: All above items except AS-Built prints shall be contained in 3-ring binders, clearly labeled with project name, having dividers labeled as to contents of addressed section.

END OF SECTION

DIVISION 2

EXISTING CONDITIONS

SECTION 024000: DEMOLITION

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions, Special Conditions and Division 1 contain requirements relevant to the work covered by this Section.

1-02: Work Included: This section includes the labor, material, to provide demolition as shown on drawings and as listed below:

a) Interior Demolition:
Areas to be demolished include, but are not limited to:
- Walls, doors, flooring, ceilings and other items as indicated on drawings.
- PME demolition as indicated on drawings.
*Note interior demolition is minimal.

1-03: Standards: Except as modified by governing codes and these specifications, comply with all applicable provisions and recommendations of ANSI A10.2, Safety Code for Building Construction. New Construction. Extreme care is needed to preserve existing.
1-04: Utility Companies: Notify A/E of work required by Utility Companies not designated on plans. Work by Utilities shall include disconnecting, removal and reinstallation of respective piping or conduit to point of metering, service entrance or designated valve. No work shall be done to any existing lines without Utility Company knowledge and approval.

PART 2: PROTECTION

2-01: "North Carolina 811": Prior to commencing any work, notify **"North Carolina 811"** (1.800.632.4949 or www.nc811.org) for establishment of all known underground utility lines. Maintain all site markings in good condition, except in case of removal.

2-02: Discovery of Hazardous or Contaminated Material: Make explorations and probes as necessary to ascertain any required protective measures before proceeding with demolition and removal. Should any toxic or contaminated material be discovered, immediately notify the Owner and the Architect/Engineer. If material in liquid form is disturbed, take precautions to contain material with earthen dike or berm in order to prevent run-off into adjacent waterways, sewer easements, storm water systems and public streets. If any underground storage tank or container is encountered, stop work immediately in vicinity and notify the Owner's Project Manager.

2-03: Provide, erect and maintain barriers, warning signs and other items as required for proper protection of workmen engaged in demolition operations, the general public and adjacent construction.

2-04: Take necessary precautions to prevent mud and debris from being deposited on corridors, sidewalks or parking areas. Maintain all temporary entranceways into the site in good condition until more permanent paving and drainage systems are in place.

2-05: Provide temporary fire protection measures in accordance with Durham County Fire Marshal requirements.

PART 3: WORKMANSHIP

3-01: Demolition and hauling work shall be performed to the extent shown on drawings. Perform required work, particularly work involving removal of subsurface items, with extreme care.

PART 4: CONSTRUCTION WASTE MANAGEMENT

4-01: The General Contractor will establish a construction waste management plan of all construction and demolition. The project goal is to send 50% of non-hazardous construction and demolition to be diverted from disposal at the landfill or incinerators.

END OF SECTION

DIVISION 5

METALS

SECTION 054000: COLD-FORMED METAL FRAMING

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install metal studs, channels, plates and angles for stud wall assemblies, soffits and fascias, with related accessories and specialties, called for on the drawings and specified herein.

1-03: Examination of Adjacent Work: Framing Subcontractor must examine areas to receive metal stud systems and report defects to Architect and Prime Contractor prior to installing material. Installation of metal components shall be considered as acceptance of surfaces to which system is attached.

1-04: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names, types, patterns, etc., are used. Equal products of other manufacturers will be acceptable, provided that request for substitutions are accompanied by supporting technical literature, samples, and performance data for comparative evaluation. Manufacturers approved for use include:

UNIMAST INC.	Schiller Park, Il.	847-928-3400
DIETRICH INC.	Rock Hill, SC	803-324-4144
DALE INDUSTRIES	Dearborn, MI	313-846-9400

PART 2: PRODUCTS

2-01: Soffits: Studs for exterior and interior soffit supports shall be 18-gauge galvanized steel equal to UNIMAST SN studs. Widths shall be as noted on drawings.

2-02: Interior Partitions: Studs shall be channel type, roll-formed from galvanized steel not lighter than 18-gauge, equal to UNIMAST ST studs. Runners shall be formed of 20-gauge, galvanized steel into channel shapes to receive stud widths as noted on drawings.

2-03: Fasteners: Secure studs to runners with fasteners equal to USG Type S-12 Pan Head; length shall be not less than 3/8". Fasteners for attaching studs to structural steel members shall be equal to Teks/4 self-drilling fasteners, not lighter than #12 diameter x lengths to suit field conditions. Fasteners for all other framing conditions shall be equal to USG Type S-12 Pan Head x length to suit field conditions for proper thread penetration.
Fasteners shall be capable of withstanding 193 pounds single shear and 200 pounds bearing load without exceeding allowable design stress after installation.

PART 3: EXECUTION

3-01: Qualification of Mechanics: Work specified in this section shall be performed by mechanics experienced and skilled in erection of metal stud system components.

3-02: Installation: Cut components accurately to proper angles to fit tightly against abutting members. Framing members shall be held firmly in position until properly fastened. Track members shall be secured to concrete with powder-driven fasteners and to structural steel with self-tapping screws or by approved welding methods. Space members typically at 16" centers elsewhere. Locate fasteners 2" from ends and at 16" centers elsewhere. Locate studs accurately, seated squarely in track with stud web and flange abutting track web, plumbed or aligned, and securely attached to flanges or webs of both upper and lower tracks. Splices in studs will not be permitted.

3-03: Stud Partition Erection: Locate runners and align accurately in accordance with details and partition layouts. Attach runners to concrete with powder-driven fasteners capable of withstanding 193 pounds single shear and 200 pounds bearing force when driven into structural head or base without exceeding allowable design stress in runner or structural support. Locate fasteners 2" from each end and at 24" on centers elsewhere. Attach ceiling runners to metal deck, structural framing or other structural elements as detailed.

3-04: Blocking and Reinforcement: Position studs plumb and vertical in runners; space 16" on centers. Provide additional studs and supplementary back-up framing members where required to support shelving, equipment or accessories, at door openings, corners, etc.
Secure studs supporting shelving, equipment or accessories adjacent to openings, at partition intersections, and at corners, to floor and ceiling runner flanges with USG Pan Head screws. Headers over openings shall be cut-to-length sections of runners with web bent at each end and secured to support with 2 minimum pan head screws. Jack studs shall be placed at vertical panel joints extending from headers to ceiling runners. Provide bracing to structure, reinforcing, and back-up members for attachment of equipment and accessories as shown on drawings for a rigid assembly.

3-05: Cutouts: Effective cross section of studs shall not be damaged by any trade. Sizes of cutouts in studs shall be carefully sized to permit passage of conduit or other mechanical equipment; reinforce studs as required or directed by Architect/Engineer.

END OF SECTION

DIVISION 6

WOOD & PLASTICS

SECTION 060573: PRESSURE TREATED LUMBER

PART 1: GENERAL

1-01: Work Included: This section includes the treatment of wood to prevent decay. Species and grades of materials to be treated are specified in Section 061000: Rough Carpentry.

1-02: Materials to be treated:

a. Sole plates for shoring, walls and partitions.
b. Furring attached to concrete or masonry for attachment of gypsum wallboard.
c. Nailers and blocking required for attachment or support of roofing and flashing materials, and roof accessories.

PART 2: PRODUCTS

2-01: Decay Treatment: Members to be treated with preservative to prevent decay shall be treated with Wolman E (CBA, Type A). Minimum net retention of 0.20 pounds per cubic foot; or, with Osmose NW 100, minimum net retention of 0.25 pounds per cubic foot. After treatment, members listed shall be air seasoned or kiln dried to a maximum moisture content of 15 percent. They shall be stored at the job site under a water-proof and weatherproof covering and shall be elevated off the floor or ground a minimum of 12 inches.

PART 3: TREATMENT

Members listed shall be treated at an approved processing plant and shall be identified with type of treatment and processor's name.

Materials to be treated shall be cut to finish sizes and shapes in so far as practicable; unavoidable field cuts shall be heavily brush coated with a concentrated solution of the preservative specified. After treatment, members listed shall be air seasoned or kiln dried to a maximum moisture content of 15 percent.

END OF SECTION

SECTION 062000: FINISH CARPENTRY AND MILLWORK

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install finish carpentry and millwork with accessories and specialties as shown on drawings and specified herein. For hardware and plastic laminate requirements, see Section 123216 - Plastic Laminate Casework. For countertop requirements, see Drawings.

1-03: Delivery and Storage: Do not deliver millwork and interior finish materials until building is dry; store material in areas protected from extreme variations in humidity or temperature, and from staining or physical damage. For a period of 10 days prior to and during placing of interior finish, provide sufficient heat to produce temperature of not less than 68 degrees F. Maintain this temperature until occupancy of facility by Owner.

1-04: Shop Drawings: Submit one (1) electronic (pdf) copy minimum of shop drawings for items covered by this section for review by Architect; do not deliver material to site prior to receipt of approved drawings. Millwork contractor shall establish and maintain field dimensions.

1-05: Moisture Content: All finish lumber and trim shall be kiln dried to a maximum moisture content of 12%.

1-06: Quality Control: Items covered by this section shall conform generally to the Architectural Woodwork Institute's Quality Standards for Premium Grade Work.

PART 2: PRODUCTS

2-01: Other Finish Wood:

a) **Plywood: (**thickness and finish noted on drawings) Plywood shall bear APA Grade marks conforming with requirements of U.S. Products Standard PSI for Construction and Industrial Plywood.

b) **Solid Wood**: Finish wood at areas indicated on the drawings to be natural finish Red Oak shall be select Red Oak boards or Red Oak veneer plywood with solid edge band. See drawings for requirements.

2-02: Millwork Furnishings:

a) Reference numbers on drawings for similar products.
b) The Contractor shall furnish and install all cutouts, fillers, scribes, finished ends, finished backs and tops as required for a complete finished product.
c) Finished base shall be furnished and installed by the Contractor.
d) All millwork components shall be 3/4" thick unless otherwise noted.
e) All shelves and exposed edges shall be banded with solid oak edge band of 1/2" min. thickness.

2-03: Fabrication:

a) General: Fabricate millwork including solid plastic to dimensions, profiles and details shown on drawings. Standards shall meet or exceed AWI Premium Grade standards.

b) Joinery: Wood Components shall be joined to ends using 6 dowels min. at each joint of 24" deep. All dowels shall be industrial grade hardwood laterally fluted with chamfered ends and minimum diameters of 10 mm. Internal components such as fixed horizontals, rails and verticals shall be doweled in place. Dowels shall be securely glued and cabinets clamped under pressure during assembly to assure secure joints and cabinet squareness.

PART 3: EXECUTION

3-01: Finish Carpentry and Millwork:
Members shall be accurately cut and fitted. Exterior corners shall be mitered; interior corners coped. Joints shall be made to conceal shrinkage as much as possible.

Set exposed heads of nails; countersink exposed screw heads unless detailed otherwise. Members shall be securely attached to each other and to supports. Surfaces shall be in flat planes, properly aligned with adjacent materials, plumb and square. Millwork shall be sanded as necessary to remove irregularities and machine marks. Work shall be left free of blemishes and defects, ready to receive finishes.

Use premium veneer material exposed to view. Finish exposed fasteners as described above. Fit all hardware to operate smoothly and correctly. Softwood members may be used for internal blocking and bracing. Red Oak base and millwork furnishings, indicated on drawings, shall be furnished and installed by Millwork Contractor. Finish all millwork with 3 coats of approved natural matte finish (see Section 099000). Contact Architect to verify finish schedule and provide a sample of suggested natural finish for final approval by the Owner.

END OF SECTION

DIVISION 8

OPENINGS (DOORS & WINDOWS)

SECTION 081100: METAL DOORS AND FRAMES

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions, Special Conditions and Division 1 contain requirements relevant to work covered by this Section.

1-02: Scope of Work: This section includes labor, materials, equipment, and related services necessary to furnish and install the following:

Hollow metal doors (swinging, flush, glazed, louvered).
Hollow metal frames (for single doors, doors w/transoms and/or sidelights, and for (multiple or combination openings).
Labeled hollow metal doors and frames.
Hollow metal panels.
Hollow metal fillers, closures, or covers.

1-03: Shop Drawings Submit one (1) electronic (pdf) copy of shop drawings showing elevations and details of each door and frame type; location in the building for each item; conditions at openings with various wall thickness and materials; typical and special details of construction; methods of assembling section; type of shop primer with dry mil thickness; locations and installation requirements for hardware; size, shape, and thickness of materials. Materials shall not be delivered to site until drawings have been reviewed by Architect. Doors and frames shall be manufactured by same manufacturer.

1-04: Storage: Doors and frames shall be stored at the site under cover, above grade, in a manner which will prevent physical injury or damage due to moisture. Care shall be taken to avoid creating a humidity chamber by not properly venting the area covered.

1-05: Substitutions: For purposes of establishing type and quality of materials required for work in this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings and performance data for comparative evaluation 10 days prior to receipt of Bids. Products approved for use shall include:

Steelcraft ., Cincinnati, Ohio.,800.930.8585.
Windsor Republic Doors & Frames, McKenzie Tenn.800.733.3667
Curries Co.. Mason City, Iowa 515.423.1334.

1-06: Hardware Locations: Unless dimensioned otherwise on drawings, the location of hardware on doors and frames shall be as follows:

Hinges: Top - 9+-"to max 11 3/4" from bottom of frame head to centerline of hinge.
Bottom - 10 3/8" to 13" from bottom of frame to centerline of hinge.
Intermediate - centered between top and bottom hinges, equally spaced.
Unit and Integral Type of Locks and Latches - 39-40" from bottom of frame to centerline of knob, lever, or strike.
Deadlocks - 48" from bottom of frame to centerline of cylinder.
Panic Hardware - 39-40" from bottom of frame to centerline of crossbar.
Door Pulls - 42" from bottom of frame to center of grip.
Push-Pull Bars - 42" from bottom of frame to centerline of bar.
Arm Pulls - 41 1/4" from bottom of frame to centerline. of lower base
Push Plates - 41 1/4" from bottom of frame to centerline of plate.
Roller Latches - 38" from bottom of frame to centerline.

1-07: Clearances Provide edge clearances as follows:

Between doors and frame, at head and jambs - 1/8".
At door sills without thresholds - 3/8" max. above fin. fl.
At door sills with thresholds - 3/4" max. above fin. fl.
Between meeting edges of pairs of doors - 1/8".

Note that "finished floor" is defined as the top surface of the floor except that when resilient flooring or carpet is used - when it then becomes the top of the concrete slab. Where the carpet exceeds 1/2" in depth, allow 1/4" clearance max. above the top of the carpet.

PART 2: PRODUCTS

2-01: Hollow Metal Frames

a) **Material**:

1) Frames for exterior openings shall be made of commercial grade cold-rolled steel conforming to ASTM A366-68, not less than 14 gauge, and shall have a zinc coating of not less than 0.60 oz. per sq.ft.

2) Frames for interior openings shall be made of either commercial grade cold-rolled steel conforming to ASTM A366-68 or commercial grade hot-rolled and pickled steel conforming to ASTM A569-66T. Metal thickness shall be not less than 16 gauge for frames in openings 48" or less in width, and not less than 14 gauge for frames in openings over 48" in width.

b) **Design and Construction**:

1) A knocked down frame is acceptable in this case in order to minimize the damage to the existing wall.

2) All finished work shall be strong and rigid, neat in appearance, square, true and free of defects, warpage or buckling. Moulded members shall be clean cut, straight and uniform in profile throughout their lengths.

3) Jamb depths, trim, profile and backbends shall be as scheduled by the Architect and as shown on approved shop drawings.

4) Corner joints shall have all contact edges closed tight, with trim faces mitered and stops butted. The use of gussets will not be permitted. Joints shall be patched with a manufacture approved compound and

5) Minimum depth of stops shall be 5/8". Cut-off (sanitary or hospital type) stops, where scheduled, shall be capped at 90 degrees at heights shown on approved shop drawings, and all jamb joints below cut-off stops shall be ground and filled smooth, making them imperceptible. Do not cut off stops on frames for sound-proof, light-proof or lead-lined doors.

6) When shipping limitations so dictate, fabricate frames for large openings in sections designed for splicing in the field by others.

7) Frames for multiple or special openings shall have mullion and/or rail members fabricated from closed tubular shapes having no visible seams or joints.
All joints between faces of abutting members shall be securely welded and finished smooth.

8) Hardware Reinforcements:

a) Frames shall be mortised, reinforced, drilled and tapped at the factory for fully templated mortised hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware is to be applied, frames shall have reinforcing plates only; all drilling and tapping shall be done by General Contractor.

b) Minimum thickness of hardware reinforcing plates shall be as follows:

Hinge & pivot	-	7 gauge, 1-1/4" x 10".
Strike	-	12 gauge.
Flush bolt	-	12 gauge.
Closer	-	12 gauge.
Surface-mounted	-	12 gauge.

Hold-open arms - 12 gauge.
Surface panic - 12 gauge.

9) Floor Anchors:
a) Securely weld floor anchors inside each jamb for anchorage to floor.
b) Where scheduled or specified, provide adjustable floor anchors capable of not less than 2" height adjustment.
c) Minimum thickness of floor anchors shall be 14 gauge.

10) Jamb Anchors
a) Frames to be installed in masonry walls shall be provided with adjustable jamb anchors of the T-Strap type, not less than 16 gauge.
The number of anchors provided on each jamb shall be as follows:
Frames up to 90" high - 3 anchors.
Frames 90" to 96" high - 4 anchors.
Frames over 96" high - 1 anchor for each 24" or fraction thereof
b) Frames to be installed in stud partitions shall be provided with steel anchors of suitable design, not less than 18 gauge thickness, securely welded inside each jamb as follows:
Frames up to 90" high - 4 anchors.
Frames 90" to 96" high - 5 anchors.
Frames over 96" high - 5 anchors + 1 additional for each 24" or fraction thereof over 96".

c) **Frames to be anchored** to previously placed concrete, masonry or structural steel shall be provided with anchors of suitable design and quantity as shown on approved shop drawings. Fasteners for such anchors shall be provided by General Contractor.

11) Frames to be installed in masonry wall openings more than 48" in width shall have any angle or channel stiffener welded into the head. Such stiffeners shall not be less than 12 gauge steel and not longer than the opening width, and shall not be used as lintels or load-bearing members.

12) Dust cover boxes for mortar guards of not thinner than 26 gauge steel shall be provided at all hardware mortises on frames to be set in masonry or plaster partitions.

13) Provide all frames with a steel spreader temporarily attached to the feet of both jambs to serve as a brace during shipping and handling.

14) Loose glazing stops of cold-rolled steel, not less than 20 gauge thickness, shall be butted at corner joints and secured to the frame with countersunk cadmium or zinc-plated screws. Secure glazing stops to interior side of frame or the locked room side for interior frames.

d) **Finish**: After fabrication, remove all tool marks and surface imperfections, and dress smooth exposed faces of all welded joints. Chemically treat frames to insure maximum paint adhesion and coat all accessible surfaces with a rust-inhibitive primer, which should be fully cured before shipment.

2-02: Hollow Metal Doors

a) **Materials**: Doors shall be made of commercial quality, level, cold-rolled steel conforming to ASTM A366-68, free of scale, pitting or other surface defects. Face sheets for interior shall be not less than 16 gauge; face sheets for exterior doors shall be not less than 14 gauge and shall have a zinc coating of not less than 0.60 ounces per square foot.

b) **Design and Construction**:

1) All doors shall be custom made, of the sizes and types shown on approved shop drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces of vertical edges. Minimum door thickness shall be 1-3/4".

2) All doors shall be rigid and neat in appearance, free from warpage and buckle. Corner bends shall be true and straight, bent to the minimum radius for the gauge metal being used.

3) Face sheets shall be stiffened by continuous vertical formed sections of steel spanning the interior space between door faces. These stiffeners shall be not less than 22 gauge, spaced not more than 6" apart and be securely fastened to face sheets by spot welds not more than 5" o.c. Spaces between stiffeners shall be sound-deadened and insulated the full height of the door with an inorganic noncombustible material.

4) Door faces shall be joined at their vertical edges by a continuous weld extended the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.

5) Top and bottom edges of doors shall be closed with a continuous recessed steel channel not less than 16 gauge, extending the full width of the door and spot welded to both faces. Exterior doors shall have an additional flush closing channel at their top edges and, where required for attaching weatherstripping, a flush closure also at their bottom edges. Openings shall be provided in the bottom closure of exterior doors to permit the escape of any entrapped moisture.

6) Edge profiles shall be provided on both vertical edges of doors as follows:

- Single-acting swing doors - beveled 1/8" in 2".
- Double-acting swing doors - rounded on 2-1/8" radius.

7) All hardware supplied for single-acting doors shall be designed for beveled edges as specified.

8) Hardware Reinforcement

a) Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated and approved hardware only. Where surface-mounted hardware (or hardware requiring adjustment in the field such as top and bottom pivots, floor closers, etc.) is to be applied, doors shall have reinforcing plates only; all drilling and tapping shall be done by General Contractor.

b) Minimum gauges for hardware reinforcing plates shall be as follows:

- Hinge & Pivot reinforcements - 7 gauge.
- Reinforcements for lock face, flush bolts, concealed holders, concealed or surface-mounted closers - 12 gauge.
- Reinforcement for all other surface-mounted hardware - 16 gauge.

9) Glass Mouldings & Stops

a) Where specified or scheduled, doors shall be provided with hollow metal mouldings to secure glazing by others in accordance with glass opening sizes shown on approved shop drawings.

b) Fixed mouldings shall be securely welded to the door on the security side.

c) Loose stops shall be not less than 20 gauge steel with butt corner joints, secured to the framed opening by cadmium or zinc-coated countersunk fasteners. Snap-on attachments will not be permitted.

c) **Finish:** After fabrication all tool marks and surface imperfections shall be dressed, filled and sanded as required to make all faces and vertical edges smooth, level and free in irregularities. Doors shall then be chemically treated to insure maximum plant adhesion and shall be coated on all exposed surfaces with a rust inhibitive primer, which is fully cured before shipment.

2-03: Hollow Metal Panels Hollow metal panels shall be made of the same materials, constructed and finished in the same way as specified for hollow metal doors.

2-04: Labeled Doors and Frames

a) Labeled doors and frames shall be provided for those openings requiring fire protection ratings as determined and scheduled by the Architect. Such doors and frames shall be constructed as tested and approved by Underwriters' Laboratories using the most current standards.

b) If any door or frame specified to be fire-rated cannot qualify for appropriate labeling because of its design, size, hardware or other reason, the Architect shall be notified before fabrication of that item begins.

c) Fire doors or frames that do not qualify for labeling will be furnished non-labeled. However, if material specified as fire-rated and labeled can be obtained from any source, no consideration will be given to those manufacturers who are not authorized to fabricate and label such items.

PART 3: EXECUTION

3-01: Site Storage and Protection

a) The General Contractor shall be responsible for seeing that any scratches or disfigurement caused by shipping or handling are promptly cleaned and touched up with a rust-inhibitive primer, and that materials are properly stored above ground on timbers or pallets in a dry location, and covered to protect them from damage.

b) Doors shall have their wrappings or coverings removed upon delivery at the building site and shall be stored, preferably inside, in a vertical position, spaced by blocking to permit air circulation around them.

3-02: Prior to installing frames, the General Contractor shall check frames and correct for rack, twist and out-of-square. Set frames plumb and level, in alignment until permanently built into the wall.

3-03: Frames shall be secured to structure as indicated or noted. Floor knees shall be attached to concrete with two powder-actuated fasteners at each jamb. Masonry anchors shall be built-in, and frames filled with mortar as wall is laid up. Frames in dry wall areas shall be filled with grout. Frames shall be installed plumb, square, and in proper alignment with adjacent wall surfaces. Protection shall be provided against physical damage and surface contamination, which might prevent acceptable application of field applied finish.

3-04: Hardware Installation: The manufacturer's representative for the locking devices and closing devices must inspect and approve, in writing, the installation of their products. Hardware installed incorrectly must be reported to the architect prior to the architect's final punch list.

END OF SECTION

SECTION 081400: WOOD DOORS

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install wood doors as called for by drawings (Door Schedule) and as specified herein. See the following sections for related work:

Section 081100 Metal Doors & Frames
Section 087000 Finish Hardware
Section 088000 Glass & Glazing
Section 099000 Painting

1-03: Submittals : Submit one (1) Digital set shop drawings scheduled to show door elevations, construction, swing, label, undercut and applicable hardware locations. Show dimensions and detail openings for glass lites, louvers and grilles. Submit actual veneer samples of doors to be factory finished with the standard finishes available, or a color sample will be furnished by the Architect to manufacturer for duplication.

1-04: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names, types, patterns, etc., are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, and performance data for comparative evaluation 10 days prior to receipt of bids. Products approved for use include:

ALGOMA HARDWOOD, INC., Algoma WI (800.558.8032)
WEYERHAEUSER, INC., Jackson MS (601.981.9611)
MOHAWK DOORS, North Umberland, PA (570.473.3557)

1-05: Delivery, Storage and Handling: No doors shall be delivered to the building until weatherproof storage space is available. Store doors in an area having controlled temperature and humidity range 30-60%. Stack doors flat and off the floor, supported to prevent warpage. Protect doors from damage and direct exposure to sunlight. Wrap factory finished doors individually in polybags to protect finish from damage. Damaged doors shall be repaired or replaced at no cost to Owner.

1-06: Quality Standards

1) Production of wood doors shall conform with requirements of:
AWI, Sections 1300 & 1500.
NWWDA, IS-1 Series.
NEMA
NFPA

All doors shall be the product of the same manufacturer to insure uniformity of quality and appearance throughout the project.

2) Labeled wood doors for this project shall be "B" Label 1-1/2 hour (90 minute), 1 hour 60 minutes, or 1/3 hour (20 minutes) as listed on drawings. Underwriters Laboratories or Warnock Hersey Rating for Fire Doors. All doors in one hour rated corridors shall be labeled. Closure hardware is required in rated corridors. Discrepancies between architectural drawings and procedures and limitations set forth by testing agencies shall be brought to the Architect's attention at the submission of shop drawings. Provide each fire-rated door with a label permanently attached to either the hinge stile or top rail, showing testing agency approval for classification scheduled.

3) Non-labeled wood doors shall meet construction requirements for 1/3 hour (20 minute) UL or Warnock Hersey Rating for Fire Doors.

4) One door may be randomly selected by the Architect for destruction testing to ascertain if the manufacturer has complied with specifications, if quantities warrant.

1-07: Moisture Content: Wood used in door construction shall be thoroughly seasoned, kiln-dried, with moisture content not less than 5% and not greater than 8%.

1-08: Warranty: All work in this section shall be warranted from the date of Certificate of Compliance against defects in material and workmanship, including the following:

- Delamination in any degree.
- Warp or twist of 1/4" or more in any 3.5'x7.0' section of door.
- Telegraphing of any part of core assembly through face to cause surface variation of 0.01" or more in a 3" span.
- Any defect which may in any way impair or affect performance of door for the intended purpose. Replacement under this warranty shall include hanging, installation of hardware and finishing.

Periods of warranty after date of installation:

- Interior solid or mineral core - Life of installation
- Exterior solid core - 5 year
- Interior hollow core - 5 year.

Doors must be stored, finished, hung and maintained per manufacturer's recommendations set forth in their limited warranty.

1-09: Certification: Veneer faced wood doors to have Smart Wood Certificate approved by the Rain Forest Alliance and/or be approved and certified by the FSC (Forest Steward Council).

PART 2: PRODUCTS

2-01: General: Doors shall be of sizes, thickness, and types listed in Door Schedule and shown on drawings. Door manufacturer shall coordinate hardware, door, louver and glazing schedules with door and frame shop drawings. Door manufacturer shall supply to General Contractor printed instructions and recommendations for installation; 2 copies shall be submitted to Architect before installation is begun. Verify proper clearance for door swing and threshold height installation at floor finish transitions (refer to Finish Schedule and Door sill Details).

2-02: Wood Doors:

A. Doors shall be Premium Grade Natural Plain Sliced Red Oak veneer faced architectural units equal to Masonite Architectural ASPI3-0 Series, color to match existing wood doors. Doors shall be composed of particleboard core with stiles and rails bonded to core under side pressure with high frequency method of cure and veneered with hardwood plies.

2-03: Physical Requirements

1) Thickness - 1-3/4"

2) Maximum Size – pre-fit or stock sizes up to 4'-0" x 8'-0", labeled (90 min.) up to 4'-0" x 8'0" max. for singles.

3) Core Construction - solid particleboard core shall conform to Type I density (28-30 pcf), Class 1, Commercial Standard #236-66. Provide core reinforcement material for surface mounted closers and exit devices as required.

4) Stiles (dimensions given are min. sizes allowed after factory trimming to book size or pre-fitting) - 1-3/8" min. 2-ply edge strips glued to core; outer 5/8" ply species compatible with face veneer. Lamination to core on 4 sides shall conform with AWI 1300 - G-3, Spec. Symbol PC-5, PC-7 or PC-HPL.

5) Rails (dimensions given or min. sizes allowed after factory trimming to book size or pre-fitting) - 1-3/8" min. 2-ply mill-option hardwoods.

6) Cross Bands - thoroughly oven-dried hardwoods, 1/16" minimum thickness extending full width of door and laid with grain at right angles to face veneers.

7) Adhesives - cross bands and faces shall be laminated to cores with Type I, Melamine Fortified Urea Glue using hot plate process; edge bands shall be laminated to cores with Type II water-resistant glue using high frequency method.

2-04: Cutouts for Lights and Louvers: Edge of any opening shall be no closer than 5" to edge or top of door and no closer than 8" to bottom of door. Where kick plates occur, edge of cutout shall be 2" above kick plate. There shall be not less than 5" between any light/louver cutout and any hardware or lock cutout. See Door Schedule Drawings for cutout dimensions.

2-05: Pre-finishing: Door shall have factory-finished faces, details and stiles; rails shall be sealed. Finish shall be equal to catalyzed conversion varnish equal to A.W.I. Section 1500 System #3, Premium Grade.
*Door finishes to match existing doors. Existing doors are Masonite Architectural ASPI3-0 Series, Red Oak Plain Sliced Veneer, Toast Color
2-06: Pre-machining: Doors shall be sized and machined at the factory to receive all required hardware other than surface mounted items. After hanging, maximum clearance shall be 1/8" each side and top; bottom clearance for labeled (90 min.) door shall be 1/4" over non-combustible sill, if any, or 1/2" over non-combustible floor.

PART 3: EXECUTION
3-01: General: Installation of doors shall be coordinated with application of finish hardware. Manufacturer's recommendations shall be followed in hanging doors. Surfaces shall be protected against physical damage, stain, discoloration or other injury, until project is accepted by Owner and Architect.

3-02: Machining and Fitting: All wood doors shall be machined by the manufacturer for cutouts, hinges, locks and other hardware requiring routing or mortising. Any required rabbeting to properly hang doors shall be performed by the manufacturer prior to finishing. Size doors to allow 1/8" clearance at tip and each side, and 3/4" at bottom (unless specified otherwise). Do not pre-drill for surface-applied hardware.

3-03: Installation of Hardware: General Contractor shall install hardware according to approved hardware schedule. Install hardware with full-threaded wood screws furnished by hardware manufacturer. Drill proper size pilot hole for all screws. Securely anchor hardware in correct position and alignment. Adjust hardware and door for proper function and smooth operation, proper latching, without force or excessive clearance.

3-04: Installation of Fire Doors: Fire-rated doors shall be installed according to the requirements of the labeling agency and NFPA #80 and #101.

3-05: Factory Finishing: Manufacturer shall pre-finish wood doors according to AWI Quality Standards Section 1500 Specification for System #3. Satin and semi-gloss finish will be standard unless specified otherwise. Finish samples shall be approved by the Architect prior to manufacturing or finishing of wood doors in the factory.

3-06: Hardware Installation: The manufacturer's representative for the locking devices and closing devices must inspect and approve, in writing, the installation of their products. Hardware installed incorrectly must be reported to the architect prior to the architect's final punch list.

END OF SECTION

SECTION 083000: SPECIAL DOORS - ACCESS DOORS

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install access doors in areas shown on drawings and as specified herein.

1-03: Substitutions: For purposes of establishing type and quality of materials required for work in this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, and performance data for comparative evaluation 10 days prior to receipt of Bids. manufacturers approved for use include:

Access Doors
Milcor limited Partnership
Birmingham Ornamental Iron Co.
Bilco Co.

All Glass Entrance Doors
PRL Glass Systems
Old Castle
Virginia Glass Products, Martinsville, VA (800.368.3011)
Press Glass, Stoneville, NC (336.573.2393)

1-04: Coordination: Work in this section shall be coordinated with work of Mechanical, Plumbing and Electrical Contractors, and with installation of contiguous drywall ceilings, soffits and walls.

1-05: Submittals: Submit one (1) electronic (pdf) copy minimum of shop drawings for review; drawings shall show details of construction and materials for each type of access door required. Also include schedule of doors showing location, fire rating, type and finish.

PART 2: PRODUCTS

2-01: General: Fire rated frame and panel assembly shall be manufactured under Factory Inspection Service of Underwriter's Laboratories, Inc. and shall display UL 1-1/2 hour "B" Label. Use in access doors in rated walls.

2-02: Access Door (Milcor style DW): Frame shall be 16-gauge steel with 14-gauge steel panel. Provide galvanized steel drywall bead surrounding frame with drywall flange. Steel shall have chemically bonded prime coat of baked-on electrostatic powder. Hinges shall be concealed, spring type, opening to 175 degrees. Locks shall be flush, screwdriver operated, with metal cam. See Drawings for sizes. Note rated frames needed only in rated walls.

PART 3: EXECUTION

Install access panels in ceilings and walls where noted or indicated (verify with PHACE Drawings). Frames shall be attached to materials at openings in accordance with manufacturer's instructions. Fire rated access doors must be installed in strict accordance with manufacturer's instructions to allow self-closing mechanisms to operate freely without undue stress to adjacent materials. Panels shall be installed level and plumb, in proper alignment with adjacent ceilings and walls. Panels shall be finish painted in field as per requirements of Section 099000.

END OF SECTION

SECTION 087000: FINISH HARDWARE

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions, Special Conditions and Division 1 contain requirements relevant to the work covered by this section.

1-02: Work Included: This section includes furnishing of finish hardware, except hardware specified under other sections as follows:

Section 083000 Access Doors

1-03: Hardware Schedule: Prime Contractor shall submit one (1) electronic (pdf) copy of complete hardware schedule for review before hardware is ordered. Upon receipt of approval from Contractor, Supplier shall box each item of hardware separately, with each box labeled to denote contents and position in building as scheduled. Additional schedules shall be furnished for use on site.

1-04: Keying: Supplier will coordinate master keying with Durham County Maintenance key shop, and keying groups with a representative of Maintenance Dept. Supplier to furnish Architect and Contractor with schedule of groups which are to be keyed alike and which are to be keyed differently; he will also determine number of keys per lock. For Bidding purpose all interior keyed locks shall be supplied with three (3) keys for specific lock. Match existing keyway and setup. Cylinders for use on this project shall be by Best Lock Corp. (Indianapolis, Indiana) as required by Owner. Best Security Level for Key System shall be currently highest requiring written authorization for duplication and shall be duplicated only under Best Locks supervision. Verify core system standards with the Durham County representative.

Locks, magnetic releases, electronic latch releases and interconnection with fire alarm system shall be provided by General Contractor and manual disconnects or key releases shall be coordinated with hardware supplier, installer and Best keying system.

1-05: Substitutions: For purposes of establishing type and quality of material specified for use on this project, manufacturer's names and brand names are used. Equal products of other manufacturers will not be accepted as the owner has other facilities that use the same hardware and desires to standardize their systems. Manufacturer's approved for use: See Durham County Door Hardware Specification Guideline.

PART 2: PRODUCTS

2-01: General: Hardware for doors and frames shall be made to templates and furnished with machine screws to metal and wood screws to wood. The Prime Contractor shall coordinate Hardware Supplier with Hollow Metal Manufacturer and Door Suppliers to exchange schedules and furnish templates promptly.

2-02: Products shall be the manufacturer's numbers and models as indicated on the Durham County Door Hardware Specification Guideline below.

Description	**Manufacturer**	**Model / Series**	**Finish**
Hanging Devices			
Mortise Hinge	Stanley	FBB199 Drs over 36" as required	US32D
		FBB191 Drs. Up to 36"	US32D
		FBB168 Interior Drs over 36"	US26D
		FBB179 Interior Drs. up to 36"	US26D
		• NRP (Non Removable Pin) at Reverse bevel locked Doors.	
Alternate	No Substitution		
Alternate	McKinney		
Alternate	Hager		

Continuous Hinge	Stanley	Geared: 661 (Standard Duty) / 661 HD (Heavy Duty) • Use full Mortise units for all new construction projects.	AL
Alternate	No Substitution		
Securing Devices			
Mortise Lock Set	Best	45H x 14H	626
	Lock Function	Lock Type	
	AB	Entrance Lock or Office	
	R	Classroom Function	
	INL, IND	Intruder Function	
	D	Storeroom Function	
	N	Passage	
	L	Privacy	
		• Provide lock functions as required for project as appropriate	
Alternate	No Substitution		
Mortise Deadbolt	Best	48H Series	626
Alternate	No Substitution		
Cylindrical Lock Set	Best	93K x 14D	626
	Lock Function	Lock Type	
	AB	Entrance Lock or Office	
	R	Classroom Function	
	D	Storeroom Function	
	IN	Intruder Function	
	N	Passage	
	L	Privacy	
		• Provide lock functions as required for project as appropriate	
Alternate	No Substitution		
Electrified Lock	Best	45HW x 14H	626
		93KW x 14D	626
	Lock Function	Lock Type	
	DEU	Electrically unlocked (Fail Secure)	
	DEL	Electrically locked (Fail Safe)	
Alternate	No Substitution		
Cylinders	Best	Mortise 1E74 x RP3 x cam required	626
		Rim 1E72 x RP	626
		• Provide as necessary to operate locking hardware	
Alternate	No Substitution		
Key System	Best	Removable/Interchangeable Core 7-pin Best “Patented CorMax” Existing key system. 2 keys per lockset. • Provide “Serialization” of keys All Cylinder and cores must be manufactured by BEST.	626

Description	Manufacturer	Model / Series	Finish
Alternate	No Substitution		
Exit Device	Precision	2100 Rim Series	630
		• Mullion KR822	
		2700 Concealed Vertical Rod Series (wood doors)	630
		2800 Concealed Vertical Rod Series (metal doors)	630
		• "CD" Cylinder dogging at all non rated devices	
		• Use Escut. with Round Pull 1700 C Series where applicable	
		• Use Escut. with Lever 4900 Series where applicable	
		• Lever handle shall match lockset design	
		• "SNB" Sex Nuts and Bolts at label doors as required	
		• Provide "FL" Fire rated devices at label openings	
		• Provide "LBR" Less Bottom Rod devices as required	
		• Provide "ELR" Electric Latch Retraction as required	
		• Provide "RQE" Request to Exit feature as required	
		• Use rim devices wherever possible. Where not possible, use Concealed Vertical Rod devices x LBR on metal leaves.	
Alternate	Sargent		
Alternate	Von Duprin		
Flush Bolts	Trimco	3917 (Manual (metal doors)	626
		3915 (Manual (wood doors)	626
		3810 (Automatic) (metal doors)	626
		3815 (Automatic (wood doors)	626
		• Use automatic flush bolts where required by fire code or IBC	
		• Provide coordinator and brackets as required to meet fire door requirements	
		• Dust Proof strike as required	
Alternate	ABH		
Alternate	Baldwin		
Alternate	Burns		
Coordinator	Trimco	3094 Series	600
		Mounting brackets as required	
Alternate	ABH		
Alternate	Baldwin		
Alternate	Burns		
Closing Device			
Closer	Stanley	D-4550/D-4551 Series	689
		• Provide standard duty Parallel arms interior/low traffic	
		• Provide heavy-duty EDA.CS Parallel arms on all PA applications	
		• All door frames to be reinforced	
		• "SN" Sex Nuts and Bolts at label doors as required	
Alternate	Norton		
Alternate	LCN		

Description	Manufacturer	Model / Series	Finish
Automatic Operators			
Electro-Mechanical			
Automatic Operator	Stanley	D-4990 Low Energy Heavy-Duty • Provide at ADA required locations	689
Actuation	Stanley	Push Plate CL4163 Push Plate Type	630
Alternate	Norton		
Alternate	LCN		
Stops & Holders			
Door Stop	Trimco	1211 Floor stop	626
		1270WV (Concave)/1270WX (Convex Wall Stop • Allow for maximum swing of doors	630
Alternate	ABH		
Alternate	Baldwin		
Alternate	Burns		
Overhead Stops	ABH	9000 Series	630
Alternate	Rockwood		
Accessories			
Offset Pull	Trimco	1191-3 10” CTC • All Exterior doors	630
Alternate	ABH		
Alternate	Baldwin		
Alternate	Burns		
Straight Pull	Trimco	1195-2 10” CTC	630
Alternate	ABH		
Alternate	Baldwin		
Alternate	Burns		
Push Plate	Trimco	1001-3 4” x 16”	630
Alternate	ABH		
Alternate	Baldwin		
Alternate	Burns		
Kick Plate	Trimco	KO050 10” x 2” LDW x B4E (Single doors)	630
Alternate	ABH		
Alternate	Baldwin		
Alternate	Burns		
Mop Plates	Trimco	KM050 4” high x 1” LDW x B4E	630
Alternate	ABH		
Alternate	Baldwin		

Alternate	Burns	

Description	Manufacturer	Model / Series	Finish
Threshold	National Guard	425 (1/2" x 5" Saddle threshold • Furnished as detailed on drawings, if shown	
Alternate	Zero		
Alternate	Reese		
Door Sweep	National Guard	601 A (brush) (interior) C627 A (brush) (exterior)	
Alternate	Zero		
Alternate	Reese		
Smoke/Fire Seal	National Guard	9750 B (verify color) • Coordinate use of Intumescent Seals with wood door mfr.	
Alternate	Zero		
Alternate	Reese		
Sound Seal	National Guard	• Use double row of 9750 for Sound Seal as required • Coordinate use for sound seal with sound rated doors	
Alternate	Zero		
Alternate	Reese		
Light Seal	National Guard	107 NA (at head and jambs) Door bottom and threshold as required • Used at Dark Rooms	
Alternate	Zero		
Alternate	Reese		
Weather Seal	National Guard	9002 A (silicone) (at head and jambs) 9600 A (brush) (at head and jambs)	
Alternate	Zero		
Alternate	Reese		
Miscellaneous			
Key Control Software	Best	Keystone 600N (if existing, upgrade may be required)	
Door Position Switch	SDC	MC-4M • Provide at all electrified openings	
Alternate	Rutherford		
Pad Lock	Best	41B722 T M18	
Alternate	No Substitution		

Key Cabinet	Lund	1200 Wall mounted series, Dual key tag • Capacity 50% over lock quantity
Alternate	No Substitution	

Description	Manufacturer	Model / Series	Finish
Power Transfer	ABH	PT1000	
Alternate	SDE		
Power Supply	Precision	ELR 150 Series	
Alternate	SDC		
Fire Dept. Lock Box	Knox Box	3200 – As required	
Access Control			
Access Control		Coordinate electro-mechanical hardware requirements such as Locks and electrified Exits with Access Control Supplier.	

2-03: Hardware Sets: Required Hardware for this project shall be as follows:

HW SET 1:

Each to Receive:	3 hinges
Door B01	1 mortise lock
	1 set mutes

PART 3: EXECUTION

Installation of hardware is specified in Section 081000 and Section 081400.

END OF SECTION

SECTION 088000: GLAZING

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment and related services necessary to furnish and install glass in partitions, existing exterior curtain walls, interior hollow metal windows, door vision panels and sidelights, with related accessories and specialties as called for by drawings and specified herein. Related products specified elsewhere include the following: Framed Mirrors - Section 102800.

1-03: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names, types, patterns, etc., are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, and performance data for comparative evaluation 10 days prior to receipt of Bids. Manufacturers approved for use include:

Libbey-Owen-Ford Company
PPG Industries
Hordis Company

Spandrel Glass Manufacturers include:
Viracon Glass, Owatonna, MN. (800.533.2080)
Precision Glass Bending, Greenwood, AR. (800.543.8796)
AFGD, Inc., Atlanta, GA (800.766.2343)

"Break-in Type" Safety Glass Manufacturers include:
Viracon Glass, Owatonna, MN. (800.533.2080)
AFGD, Inc., Atlanta, GA (800.766.2343)
Old Castle Glass, Rockhill Specialty Manufacturing, Rockhill, SC (866-653-2278)
USA Security, Carrolition Texas, (800-237-8899)

1-04: Reference Standards

1) ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
2) ASTM E84 - Surface Burning Characteristics of Building Materials.
   ASTM C1036- Standard Specifications for Flat Glass
3) SIGMA No. 64-7-2 - Specification for Sealed Insulating Glass Units.

1-05: Quality Assurance: Conform to Flat Glass Marketing Association (FGMA) Glazing Sealing Systems Manual for glazing installation methods.

1-06: Submittals: Submit one (1) electronic (pdf) copy of product data of each type of glass being furnished under this section. Include data on glazing sealant, gaskets, or compounds being used in various locations. Submit color chart for selection by Architect of color of proposed glazing sealants. Submit sealed glass unit manufacturer's certificate indicating units meet or exceed specified requirements.

1-07: Warranty: Provide 5-year manufacturer's warranty for sealed glass units covering seal failure, interpane misting or dusting, and replacement of same.

PART 2: PRODUCTS

2-01: General: Glass shall be furnished with labels showing strength and quality shall be attached to each piece of glass; or, if glass is not cut to size by Supplier but furnished unlabeled from local stock, Contractor shall submit an affidavit stating quality, thickness, type and manufacturer of glass furnished.

2-02: Types of Glass:

1) 1/4" thick clear tempered glass, equal to L.O.F., at all interior hollow metal frames, at all interior wood lights. Note: Use Sagano 3M Fasara Interior Design Film as shown on drawings.

2) 1/4" thick tempered glass mirror, silver backed.

3) 1/2" clear tempered glass equal to LOF sidelites at Doors 104, 105.

4) 1/4" thick clear tempered glass at new aluminum frames – Alternate G-5. Note: Use Sagano 3M Fasara Interior Design Film as shown on Sheet A28A.

2-03: Glazing Compound, Tapes, and Gaskets: Glazing compound shall be an approved polysulfide or silicone compound. Tapes and gaskets shall be butyl or polybutylene. Compounds for Fire Rated Glazing System shall be as approved for specific product and rated in accord with assembly.

PART 3: EXECUTION

3-01: Installation of Glass: Glazing procedures shall conform to manufacturer's recommendations. Glazing operations shall be carried on only when temperature is 40 degrees F., or above. Surfaces of glass and metal members, which retain glass shall be clean and dry. Glass shall be cut to provide adequate bite, with room for expansion and contraction and perimeter clearance sufficient to avoid point loading. Glass shall have edges clean cut and cushioned to prevent contact with hard materials during and after installation. At completion of work, glass shall be free of cracks, scratches, and other defects not permitted by specifications. Defective glass shall be removed and replaced with new glass at not cost to the Owner.

END OF SECTION

DIVISION 9

FINISHES

SECTION 092116: GYPSUM WALLBOARD

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install gypsum wallboard for interior finish and backerboard substrate related accessories and specialties called for on drawings and specified herein. Metal studs are specified in Section 054000.

1-03: Examination of Adjacent Work: Areas in which drywall systems are to be installed shall be examined by Drywall Subcontractor; defects which should be corrected before installation of drywall materials shall be reported to General Contractor and Architect. Drywall materials shall not be installed until work of other trades is in compliance with applicable requirements of Appendix A of ANSI Standard A97.1. Installation of drywall components shall constitute acceptance of substrate material by Subcontractor.

1-04: Delivery and Storage of Materials: Materials shall be delivered in original packages, containers, or bundles bearing name of manufacturer and fire rating. All materials shall be kept dry by storing inside building under roof. Wallboard shall be neatly stacked flat, with care taken to prevent undue sagging, or damage to edges, ends or surfaces. Damaged materials will not be accepted.

1-05: Humidity and Temperature Control: Application of wallboard shall not begin until building has approached as closely as possible the moisture content it will reach in service. Ventilation shall be provided, if necessary, to maintain a uniform temperature range of 55 to 70 degrees F.

1-06: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names, types, patterns, etc., are used. Unless otherwise noted, all product numbers/names in this section refer to United States Gypsum products. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, and performance data for comparative evaluation 10 days prior to receipt of Bids. Manufacturers approved for use include:

United States Gypsum Co.
National Gypsum Co.
Georgia Pacific
CertainTeed

PART 2: PRODUCTS

2-01: Cold Rolled Channels and Hanger Wire: Carrying channels shall be painted cold-rolled steel 1-1/2"x9/16"x0.0653" (16 gauge) thickness tied back-to-back with 18 SWG galvanized steel wire 48" o.c. and suspended with 12 SWG galvanized steel wire to joist lower chords or around beams at 48" o.c. max. at each end. Furring channels for lath attachment shall be 3/4"x1/2"x0.0635 (16 gauge) thickness spaced 16" o.c. and tied to carrying channels with 18 SWG wire at 48" o.c. max. and at each end. Extend carrying channels to within 6" of wall surface and furring channels to approximately 1" from wall surface. Splice furring channels with minimum 24"1. Channel back-to-back with 18 SWG wire wrapped at ends and each side of splice. Where light fixtures or other openings occur, box out opening with carrying channels and suspend corners and midpoints of opening with 12 SWG wire to structure at distance not to exceed 48" o.c.

2-02: Metal Trim Molding: Minimum 0.0336" thick (22 gauge) galvanized steel molding equal to USG no. 402 (5/8" & 1 1/8" legs) around openings and secured to carrying channels with 1" Type S drywall fasteners. Spacing of fasteners approximately 8" o.c. along dimension and 10" o.c. along short dimension of opening.

2-03: Wall Angle: Minimum 0.0217" thick (26 gauge) galvanized steel angle with 1-1/4" legs, secured to walls along perimeter of ceiling to support steel framing member ends and for attachment of lath or drywall.

2-04: Gypsum Wallboard: All wallboard shall comply with requirements of ASTM C36 and bear UL Classification Marking and shall be 48" wide and of greatest practicable lengths for reduced number of joints; thickness shall be 5/8" throughout, unless otherwise listed on drawings

a) Wallboard for interior partitions, ceilings soffits and furred walls shall be equal to U.S. Gypsum Co., SHEETROCK® Brand Mold Tough® ULTRACODE® Gypsum Panels, or equal to Gold Bond® BRAND XP® Gypsum Board with Sporgard™* and meeting UL Classification, where indicated

b) Wallboard for interior use at areas of high humidity noted shall be U.S. Gypsum's Firecode "C" Exterior Gypsum Ceiling Board, moisture and mold-resistant drywall, as indicated on drawings.

c) Wallboard for use in Toilets, Janitor Space, Mechanical Rooms or other high humidity areas shall be equal to USG 5/8 " Th. "Humitek" gypsum panels with UL Classification.

d) USG Vinyl-faced Gypsum panels 5/8" thick, Firecode core shall be used as indicated on drawings.

2-05: Cement Board: Ceramic tile backup on all wall surfaces shall be equal to USG Durock Interior Tile Backer Board, 1/2" thick x 36" w. x longest practicable lengths. Board is composed of aggregated Portland cement with woven glass-fiber mesh embedded in back and front surfaces.

2-06: Trim Accessories:

a) Corner reinforcement: USG "Dur-A-Bead" heavy gauge No. 103.
b) Metal Trim: Interior - USG No. 200-A; Exterior - USG No. 402 metal.
c) Control Joints: USG No. 093, interior and exterior, where applicable.

2-07: Fasteners:

a) Wallboard to Steel Framing - 1", and 1 5/8" Type S Buglehead
b) Wood Trim over Wallboard to Steel Framing - 1-5/8" Type S or S-12 Trim Head.
c) Cement Board to Steel Framing - 1-5/8" Durock steel screws.
d) Wallboard to Wood Framing - 1 1/4" Type W Buglehead
e) Gypsum sheathing to steel studs - 1" and 1 5/8" Type S-12

2-08: Joint Treatment – Interior:

a) Wallboard: USG Perf-A-Tape. & as req. by manufacturer for areas requiring Humitek or equal moisture and mold resistant gypsum panels

b) Cement Board: Durock Type P Tape.

c) Joint Compounds: First Coat (embedding tape, over beads, spotting fasteners) - USG Compound Taping. At cement board, use basecoat for thin-set application - see Section 093000, Ceramic Tile.
Second Coat (filling over tape, beads, and fasteners) - USG Ready-Mixed Compound
Topping for use with fire rated and mold resistant wallboard.
Third Coat (finishing over tape, beads, and fasteners) - USG Ready-Mixed Compound
Topping for use with fire rated and mold resistant wall board.

PART 3: EXECUTION

3-01: General: Work specified in this section shall be performed by personnel experienced and skilled in erection and finishing of drywall components.

3-02: Installation of Drywall Ceiling: Install wallboard with long dimension perpendicular to metal framing with side joints centered along runner. Fasten wallboard to framing channels with 1" long drywall fasteners at

12” o.c. along end joints, 8” o.c. along side joints, and 12” o.c. at intermediate framing. End joints of adjacent wallboard sheets shall be staggered not less than 48” o.c. with adjacent panels. Secure wallboard sheets to leg of wall angle with fasteners spaced 8” o.c.

3-03: Installation of Interior Gypsum Board: Panels shall be installed face out with long dimension perpendicular to furring channels or, if vertical, with edges over furring channels or studs. Edges and ends shall be fitted closely, but not forced together. Maximum practical lengths of wallboard shall be used; units shall not be “placed” at door frames. Joints shall be staggered on opposite sides of partitions. Cutouts shall be neatly made at outlets, switch boxes, etc. Screws shall be 1” long, spaced a maximum of 8” o.c. along abutting edges and 12” o.c. at ends, and 12” O.C. at intermediate framing. Distances of screws from edges or ends of panels shall be not less than 3/8”. Dimples shall be not over 1/32” deep; face paper shall not be broken. Screws shall be installed with electric screw gun.

3-04: Cement Board Installation: Follow similar methods as wallboard except that fastening of boards to metal framing shall be with screws spaced 6” o.c.

3-05: Taping and Finishing: Apply a thin uniform layer of compound to joints and angles to be reinforced. Immediately apply tape, center over joints and seat into compound. Provide sufficient compound under tape approximately 1/64” to 1/32” for proper bond. Apply skim coat immediately following tape embedment. Fold tape and embed in angles to provide true angle. Allow to harden prior to application of fill coat. Apply compound over taping skim coat. Fill board, taper flush with surface. On non-tapered joints, apply compound over tape and feather out at least 4” on either side of joint. Do not apply filling coat to interior angles. Apply compound evenly over and extending slightly beyond fill coat on all joints. Feather to a smooth, uniform finish. Over tapered edges, finished joint shall not protrude beyond plane of surface. Apply compound at taped angles to provide a true angle. Fastener depressions shall have a minimum of three coats of compound; each coat shall be allowed to dry or harden before succeeding coat is applied. Each coat shall be feathered out from ground to plane of adjacent surface, each slightly beyond preceding coat. Sanding of compound, to provide flat, smooth surface acceptable for application of finish specified.

END OF SECTION

SECTION 096800: CARPETING

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services required to furnish and install carpeting, with related accessories and specialties as scheduled in Drawings.

1-03: Substitutions: No substitutions, carpet must match existing.

1-04: Submittals: Submit one (1) electronic (pdf) copy of seaming diagrams to Architect for review before installing carpet. Use following criteria for diagram preparation:

1) Carpet widths to provide minimum number of seams.
2) Consistency of direction of pile.
3) Ease of future replacement.
4) Avoidance of seams at or perpendicular to openings.

Submit three copies of following data:

1) Specific listing of manufacturer and mill, exact color, name, number and fiber (for use in reordering).
2) Manufacturer's recommendations for type of adhesive to be used with specified carpet, recommended tests for excessive moisture or alkalinity in concrete and proper installation procedures.

1-05: Certification: General Contractor to furnish certificate provided by carpet manufacturer stating that carpet identified by register number called for in Para. 1-07 was manufactured in accordance with these specifications.

1-06: Applicable Specifications and Standards: Methods of tests to be used shall be those applicable and reported in ASTM "Standards on Textile Materials" prepared by ASTM Committee D-13 and published by the American Society for Testing and Materials. Major method shall be ASTM D418, "Methods for Testing Woven and Tufted Pile Floor Coverings". Testing for such characteristics as flame spread, seam strength, shrinkage, and moth repellence shall be in accordance with testing procedures and end limits (for shrinkage) described in ASTM E-84 and DDD-C-95. Manufacturer's Certification for carpet materials shall comply with "Use of Materials Bulletin UM-44C" published by US Department of Housing and Urban Development and are currently listed in HUD "Certified Products Directory" and so identified by imprint on back of carpet. In addition to the methods of sampling described in the foregoing test procedures, samples can be taken from unused material on the job site, distributor's or retailer's as well as manufacturer's stock of certified materials.

1-07: Delivery and Storage: Carpet shall be delivered to the site in original mill wrappings with each roll having register number tags attached, or register number stenciled on wrapping and intact. Storage areas shall be dry, well ventilated, and heated if required to prevent shrinking or stretching. Carpet shall be protected against damage, dirt, stains, and moisture.

1-08: Inspection of Surfaces: Floor construction and surfaces to receive carpeting shall be inspected and tested for moisture content by carpet installer who shall promptly notify General Contractor and Architect in writing of substrate defects having adverse effect on quality of installation. Proceeding with work shall constitute acceptance of subfloor surface condition and responsibility by carpet installer for finished product. Floor areas to receive carpet shall be smooth, vacuum clean and dry prior to installation of carpeting. Floor temperature must be minimum of 65 degrees F. for 72 hours prior to installation and tested for excessive moisture or alkalinity by carpet installer. Should tests reveal excessive moisture or alkalinity, surfaces of concrete shall be sealed using material and application methods recommended by carpet manufacturer.

1-09: Replacement Materials: For replacement and repairs, Contractor shall furnish Owner with one box of each type and color of carpet installed, from same dye lot as installed carpet. Replacement carpet remnants,

usable scrap (2'x 2' min.) and maintenance instructions shall be packaged in appropriate wrapping, labeled and left with Owner.

1-10: Guarantee/Warranty: Upon completion of installation, the carpet manufacturer must submit a certificate guaranteeing carpet against material and workmanship defects for a period of 1 year from date Certificate of Compliance is received by General Contractor. Manufacturer shall furnish to Owner a standard warranty for 10 years.

PART 2: PRODUCTS

2-01: Carpet:

Collection: Unearthed Style 5T015
Brand: Shaw
Product Type: Tile

2-02: Physical Requirements:

Minimum Sq.Yd. – No minimum
Const. Type - Tufted
Surface Texture – Textured Patterned Loop
Gauge – 1/12 (47.00 rows per 10 cm)
Density – 7457
Weight Density – 134,226
Sustainable Content – Contains a minimum 35% pre-consumer recycled content by total weight
Stitches per inch – 11.0 (43.31 per 10 cm)
Finished Pile Thickness - .080" (2.03 mm)
Dye Method – Solution Dyed
Backing Material – EcoFlex NXT
Fiber Type – Duracolor® Premium Nylon
Fiber Technology – Duracolor® by LEES Stain Resistant System. Passes GSA requirements for permanent stain resistant carpet.
Face Weight – 18 oz. per sq.yd. (610 g/m2)
Pattern Repeat – Not Applicable
Size / Width – 18" x 36" (.6096 m x .6096 m)
Soil Release Technology – Sentry Plus
Installation Method – Monolithic, Quarter Turn, Brick Ashlar, Vertical Ashlar, Multi-Directional
Indoor Air Quality – Green Label Plus 1098
Foot Traffic Recommendation TARR – Severe
NSF 140 – Gold

2-03: Performance:

Static – AATCC-134 Under 3.5 KV
Flammability – ASTM E 648 Class1 (Glue Down)
Smoke Density – ASTM E 662 Less than 450

Service:

Warranties - Lifetime Limited tile Warranty
- Lifetime Duracolor Stain Warranty
- Lifetime Static

Colors to be selected by Architect and Owner from manufacturer's standards.

2-04: Ancillary Materials:

a) Concrete floor sealer, adhesive, cleaning solutions shall be chemically compatible with subfloor and carpet materials, and shall conform to manufacturer's recommendations. Flammability rating of adhesive

material shall not exceed the flame spread specified above for carpet. Adhesives shall be environmentally safe and low odor type.

b) Solid vinyl edge strips, trim, molding, and transition strips shall be submitted to Architect for approval.

PART 3: EXECUTION

3-01: General: The work shall be done by personnel fully experienced in carpet installation. Carpet shall not be installed until the building is enclosed, permanent heating and cooling systems are in operation and residual moisture from plaster, concrete, or terrazzo work has dissipated. Carpet installer shall conduct moisture test of surfaces to receive carpet and be satisfied that surface meets moisture criteria, prior to installation. Carpet shall be installed by the direct glue-down method in accordance with manufacturer's recommendations for seaming technique and for proper amount of stretch in width and length. Each color to be installed shall be from same dye lot.

Carpet shall be cut in the longest lengths possible to eliminate unnecessary cross seams. Cut sections for each area shall be fitted into place before any adhesive is applied.

3-02: Installation: Adhesive shall be thoroughly stirred and evenly applied. Coverage shall be not more than 20 square yards per gallon; there shall be a minimum of 90% bond of carpet to slab. Seams shall be made by the compression method; stripping or plugging will not be accepted. Seams shall be trimmed and fitted neatly and shall be bonded with Roberts Seam Adhesive No. 41-4015 or approved equal material; adhesive shall be applied to cut edges of carpet at the level of carpet backing. Adhesive shall be submitted to Architect for approval. Saddles or "T"- Seams shall not be used in doorways. Carpet surface shall be rolled down to expel any air bubbles. Installer will be required to re-lay any carpet that does not provide wrinkle-free appearance and shall correct any condition due to faulty installation, which may appear for a period of one year from the date of the completed installation. Edge strips, of approved materials and design, shall be installed where floor covering materials change or where exposed edges occur. Installed carpet shall be clean, free of spots, dirt or soil, and shall be without tears, frayed or pulled tufts.

3-03: Protection After Installation: Carpeting shall be protected after installation with 6 mil polyethylene sheeting lapped at edges and joints taped securely. Sheeting shall remain until construction activity is completed.

END OF SECTION

SECTION 098000: ACOUSTICAL TREATMENT

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install suspended acoustical ceilings as called for by Drawings and Finish Schedule, and as specified herein.

1-03: Substitutions: In order to establish type and quality of materials required for work under this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable provided that requests for substitutions are accompanied by supporting technical literature, samples, details and performance data for comparative evaluation 10 days prior to receipt of Bids. Manufacturers approved for this project include:

a) Acoustical ceilings	Armstrong
	CertainTeed
	USG Interiors

1-04: Coordination: Work included in this section shall be coordinated with work of mechanical and electrical trades for ceiling / wall fixtures, switches, receptacles, etc., and installation of contiguous drywall ceilings.

1-05: Samples: Submit samples as follows:

a) Acoustical material - 1-12"x12" piece of each type.
b) Runners and cross tees: 1 each, approximately 12" long.
c) Wall molding: 1 piece approximately 12" long.
d) Acoustical wall material: 1-12"x12" piece and color samples of fabric coverings.

1-06: Standards: Acoustical treatment shall be installed under conditions outlined in the Acoustical and Insulating Materials Association's Bulletin under "Job Conditions".

1-07: Quality Standards: Acoustical Subcontractor shall examine building before beginning work specified herein to determine if space is complete enough to receive installation. Report improper conditions to General Contractor and Architect; do not proceed with work until proper conditions are achieved. Installing material shall constitute acceptance of substrate conditions.

PART 2: PRODUCTS

2-01: Suspended Acoustical Ceiling:

a) Suspension system shall be exposed grid hung from structure (bar joists and steel beams) by means of galvanized wire not lighter than 12 gauge. Framing shall be of electro-galvanized steel with baked on polyester paint finish. Color to be selected from manufacturer's standards. Matching wall moldings shall be provided. Framing shall comply with ASTM C635 requirements for Intermediate Duty systems. System to be equal to Armstrong Prelude Plus XL, aluminum 15/16" exposed tee.

b) Acoustical material shall be "1941 Ultima High NRC" by Armstrong / CertainTeed "Symphony M1222 BB 80-1.

24" x 24" x 7/8" panels tegular for exposed grid system at all areas.

Light reflectance	-	L.R. 0.87 as per ASTM E1264
Weight	-	1.08 lbs. per sq. ft.
NRC Rating	-	0.80 ASTM E 1264
Surface Burn Characteristics	-	Class A, Flame spread 25 or less

2-02: Construction: The acoustical wall panel product shall be supplied in widths up to 4 feet wide and lengths up to 10 feet long. All edges will be fully wrapped with mounting as indicated.

2-03: Mounting:

A. Back-Mounting Accessories: Manufactures standard accessories for securely mounting panels, of type and size indicated and complying with the following requirements:
   1. Impaling Clips: Clip is mounted to the wall, adhesive applied on wall around clip, then panel pressed into place until flush with wall.
   2. Z Clips: Two-part metal clips designed to support weight of panels. One part mechanically attached to wall substrate according to manufactures standard pattern and other part fastened to back of panel.
   3. Rotofast Snap-On Anchors
   4. Other: as specified

2-04: Acoustical Performance:

Sound Absorption: Per ASTM C – 423

Sound Absorption Coefficient per Octave Band Center Frequency (Hz)

Thickness	125	250	500	1000	2000	4000	NRC
1”	0.14	0.27	0.80	1.11	1.14	1.14	0.85
2”	0.22	0.81	1.24	1.30	1.21	1.16	1.15

2-05: Flammability Rating: All components shall have a Class A Flammability rating per ASTM E- 84: Surface Burning Characteristics of Building Materials, with a Flame Spread of 25 or less and Smoke Developed of 450 or less

PART 3: EXECUTION

3-01: General: Acoustical materials and suspension systems shall be installed by experienced subcontractor for types of work involved. Installation of acoustical ceilings panels and baffles shall not begin until building is enclosed and heat is provided so that residual moisture from other trades is dissipated.

3-02: Acoustical Ceiling: Ceilings shall be installed in accordance with patterns indicated on Reflected Ceiling Plan. Suspension system shall be installed in accordance with the requirements of ASTM C636, “Recommended Practice for Installation of Metal Ceiling Suspension System for Acoustical Tile and Lay-in Panels” and manufacturer’s recommendations. Acoustical panels shall be installed in accordance with the recommendations of the Acoustical and Insulating Materials Association, contained in the current AIMA Bulletin. Units shall be of the greatest possible size. Members shall be aligned and leveled to provide true surfaces and straight lines. Provide tile in unopened boxes for replacing 100 sq.ft. minimum of each pattern type and leave with Owner.

3-03: Installation: Install Acoustical Wall panels in locations indicated, top edges level and in alignment with other panels. Comply with manufactures written instructions for installation of panels using type of mounting accessories indicated or, if not indicated, as recommended by manufacture.

3-04: Cleaning and Replacement:

a. Before installation is accepted by Owner, ceiling units or panels which have been improperly installed, or which have been damaged, shall be removed and replaced. Discolored or soiled surfaces shall be cleaned in accordance with manufacturer’s recommendations. Contractor shall furnish (6) complete boxes of ceiling tile from same product run for Owner’s use as attic stock.
b. After completion of installation of panels, remove dust and other foreign material according to manufactures written instructions.
c. Remove surplus material, rubbish, and debris resulting from panel installation, on completion of the work, and leave areas of installation in a neat and clean condition.

END OF SECTION

SECTION 099000: PAINTING

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions of the Contract and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to provide and apply paints, sealers, and related materials called for by drawings and finish schedule and specified herein. In general, all exposed surfaces of factory and/or shop primed work that is delivered to job site without final finish, shall be painted under this section by the General Contractor. Exposed electrical, plumbing, and HVAC equipment in public spaces, excluding mechanical spaces to be painted by the respective trade, shall be painted by the General Contractor. Work covered by this section shall be coordinated with work of other trades; surfaces which are left unfinished by requirements of other sections of specifications shall be painted or otherwise finished as required in this section. Altered existing work or damaged surfaces that have been repaired shall be painted under this section. Finishes shall match existing adjacent surfaces.

1-03: Samples and Colors: Maximum number of different colors which will be used for interior painting will be eleven; not more than three different paint colors will be used in any one space. General Contractor shall obtain color selections from Architect for all types of work and shall prepare samples of each type and color for approval. Samples shall be applied to surfaces which represent surface to be painted; they shall have required number of coats and be treated and finished in same manner as completed work. In lieu of preparing sample panels to show finish and color, Contractor shall have option to prepare a room (complete or in part) to establish standard for workmanship and appearance of finish. See 1-05 below for additional information.

1-04: Storage and Protection: Materials to be used on project shall be stored in an area approved by Paint Suppliers and Architect. Storage spaces shall be protected against damage from spilled or carelessly handled materials and shall be safeguarded against fires. Used rags shall be kept in closed metal containers; paints and other liquids shall be kept covered. All stored materials shall be stored outside building in storage facility equipped to maintain temperatures above manufacturer's low temperature storage requirements or off site.

1-05: Environmental Conditions: Materials specified are assumed to be low or no VOC type coatings. Should manufacturer's specifications change, Architect shall be notified and appropriate coatings submitted for review and approval prior to acceptance for use at this facility. Surfaces to be painted shall be thoroughly dry and clean of any oils or material which will prohibit proper bonding of paint. Painting shall be done at temperatures recommended by manufacturer for air, humidity and surface to receive paint. Failure to comply with these recommendations shall be cause for rejection of work or repainting.
For interior work, temperature of spaces in which painting is being done, or where paint and finish are drying, shall be maintained above 60 degrees F.

1-06: Inspection of Surfaces: Surfaces to be finished under this section shall be examined before work is begun by Painting Subcontractor to determine if they are in condition to receive finish specified. Report improper conditions to General Contractor and to Architect in writing; work shall not proceed until proper substrate conditions have been obtained. Coatings scheduled to be applied to existing "painted surfaces" shall be tested for primer and finish coat compatibility and bond strength prior to application. No work shall be done to surfaces that fail the coating/bonding test prior to remedy of surface bonding as required by the coating manufacturer. Application of paint or other coating to any surface shall constitute acceptance of substrate conditions for that surface and responsibility for finished product. Note General Contractor will be responsible for getting existing walls ready for repainting.

1-07: Approval of Coating Applications: General Contractor shall report to Architect application of each coat on each surface painted or otherwise finished. After coat has been applied, it shall be inspected and approved by Architect before application of succeeding coat; failure to comply with this provision may result in Contractor's

being required to recoat any areas not so reported and approved; no additional compensation will be allowed for such recoating work.

PART 2: PRODUCTS

2-01: General: In order to establish type and quality of materials required for work covered by this section, manufacturer's names and brands are listed in Subsection 2-03, Approved Materials. Products of other manufacturers equal in quality and in suitability for the usage intended, will be acceptable provided that requests for substitutions shall be accompanied by supporting technical literature, samples, and performance data for comparative evaluation 10 days prior to receipt of Bids. Materials for which no brand names are listed, such as thinners, shellac, linseed oil, wood filler, and turpentine, shall be of highest quality and shall have identifying labels on containers. Materials shall be delivered to site in their original containers, seals intact, with labels to include manufacturer's name, product name and number, color code and batch number, undamaged. All finish coats shall constitute a system; i.e., primer shall be compatible with top coat as recommended by paint manufacturer. Wet mil and dry mil thickness range is only a guide for film thickness required; actual film thickness shall be as stated by approved manufacturer for type of paint used.

2-02: All paint products to be low V.O.C. Approved Manufacturers include:

Sherwin Williams
PPG
Coronado

2-03: Approved Materials (Note: (3) coats of paint will be required on all existing walls)

TYPE	NO. OF COATS	WET MIL RANGE	DRY MIL RANGE
Finish No. 1: Ferrous Metal - Interior			
Prime Coat:	1	4.0 - 5.0 W.M.	1.5 - 2.0 D.M.
Sherwin Williams Kem Kromik Universal Metal Primer B50 Series			
PPG Pitt-Tech Plus – 4020-PF / Devflex-4020-PF			
Coronado Rust Scat White Metal Primer 35-111			
Top Coats:	2	4.0 W.M. ea.	2.0-4.0 D.M. ea.
Sherwin Williams ProMar 200 Semi-gloss Enamel			
PPG Pitt-Tech Plus EP –90-1610 DTM Semi-gloss			
Coronado DTM Acrylic Semi-gloss 180 Series			
Finish No. 2: Galvanized Metal - Interior			
Prime Coat:	1	3.0 - 4.0 W.M.	1.4 - 2.0 D.M.
Sherwin Williams Galvite High Solids B50W230			
PPG Pitt-Tech Plus – 4020-PF			
Coronado Perma-Bond Primer 100-10			
Top Coats:	2	4.0 W.M. ea.	2.0-4.0 D.M. ea.
Sherwin Williams ProMar 200 Latex Semi-gloss Enamel			
PPG Pitt-Tech Plus – 90-1610 DTM Semi-gloss			
Coronado Acrylic Latex Semi-gloss Enamel 12 Series			
Finish No. 3: Concrete Block - Interior			
Prime Coat:	1	6.0 - 20.0 W.M.	4.0 - 10.0 D.M.
Sherwin Williams Prep-Rite Interior/Exterior Block Filler B25W25			
PPG Speedhide Interior / Exterior Masonry Latex Block Filler 6-15XI			
Coronado Superkote Latex Masonry Filler 946-11			
Top Coats:	2	4.0 W.M. ea.	1.5 D.M. ea.

Sherwin Williams ProMar 200 Latex Semi-gloss Enamel
PPG Speedhide Zero Interior Latex 6-5510 Semi-Gloss Enamel
Coronado Acrylic Latex Semi-gloss Enamel 90 Series

Finish No. 4: Interior Concrete Block - Glazed Coating

Prime Coat:	1	6.0 - 20.0 W.M.	4.0 - 10.0 D.M.

Sherwin Williams Prep-Rite Interior/Exterior Block Filler B25W25
PPG Speedhide Interior / Exterior Masonry Latex Block Filler 6-15XI
Coronado Superkote Latex Masonry Filler 946-11

Top Coats:	2	3.6 - 9.0 W.M. ea.	2.0 - 6.0 D.M. ea.

Sherwin Williams Water Based Catalyzed Epoxy
PPG Aquapon WB EP Epoxy 98E Series 2.0-3.0 D.M ea. PPG
Coronado Acrylic Epoxy 138 Line Series ,Semi-Gloss

Finish No. 5: Gypsum Board/Plaster - Glazed Coating

Prime Coat:	1	4.0 W.M.	1.5 D.M.

Sherwin Williams Prep-Rite 200 Latex Primer B23W200
PPG Speedhide Zero Interior Latex Sealer 6-4900XI
Coronado Superkote Latex Masonry Filler 946-11

Top Coats:	2	3.6 - 9.0 W.M. ea.	2.0 - 6.0 D.M. ea.

Sherwin Williams Water Based Catalyzed Epoxy
PPG Aquapon WB EP Epoxy 98E Series 2.0-3.0 D.M ea. PPG
Coronado Acrylic Epoxy 138 Series

Finish No. 6: Gypsum Board/Plaster - Wall partitions

Prime Coat:	1	4.3 W.M.	1.1 D.M.

Sherwin Williams Prep-Rite 200 Latex Primer B23W200
PPG Speedhide Zero Interior Latex Sealer 6-4900XI
Coronado Super Coat Latex Primer-sealer 40-11

Top Coats:	2	4.0 W.M. ea.	1.5 D.M. ea.

Sherwin Williams ProMAr 200 Latex Semi-gloss Enamel
PPG Speedhide Zero Interior Latex Semi-Gloss Paint 6-5510
Coronado Latex Semi-gloss Enamel 90 Series

Finish No. 7: Gypsum Board/Plaster - Interior Ceilings, Furred Soffits & Fascia Areas

Prime Coat:	1	4.3 W.M.	1.1 D.M.

Sherwin Williams Prep-Rite 200 Latex Primer B23W200
PPG Speedhide Zero Interior Latex Sealer 6-4900XI
Coronado Super Coat Latex Primer-sealer 40-11

Top Coats:	2	3.0 W.M. ea.	1.2 D.M. ea.

Sherwin Williams ProMar 200 Latex Flat Wall Paint
PPG Speedhide Zero Interior Latex Flat Paint 6-4110
Coronado Flatwalls Flat Latex 24 Series

Finish No. 8: Moisture Resistant Gypsum Board

Prime Coat:	1	3.2 - 4.0 W.M.	1.7 D.M.

Sherwin Williams Prep-Rite 200 Latex Primer B23W200

PPG Speedhide Zero Interior Latex Sealer 6-4900XI
Coronado Super Coat Latex Primer-sealer 40-11

Top Coats: 2 9.5 W.M. ea. 6.0 D.M. ea. Sherwin
Williams Tile-Clad II High Solids Epoxy
PPG Aquapon WB EP Epoxy Semi-Gloss 98E Series 2.0-3.0 D.M ea. PPG
Coronado Acrylic Epoxy Enamel

Finish No. 9: Interior Wood - Painted
Prime Coat: 1 3.1 W.M. 1.5 D.M.
Sherwin Williams Prep-Rite VOC-Complying Wall and Wood Primer B49WZ2
PPG Seal Grip Interior / Exterior Universal Primer Sealer 17-921XI
Coronado Alkyd Enamel Undercoat 37-11

Top Coats: 2 4.0 W.M. ea. 1.5 D.M. ea.
Sherwin Williams ProMar 200 Latex Semi-gloss Enamel
PPG Speedhide Zero Interior Latex Semi-Gloss Paint 6-5510
Coronado Acrylic Semi-gloss Enamel 90 Series

Finish No. 10: Interior Wood - Natural Finish
Prime Coat: Tint , as selected, with oil stain; fill voids with wood filler paste
Sherwin Williams Natural Wood Filler D7051
PPG Deft Interior Water-Based Sanding Sealer
Coronado Sanding Sealer 67-11

Top Coats: 2 3.3 W.M. ea.
Sherwin Williams Waterborne Polyurethane Varnish A68 Series
PPG Deft Interior Water-Based Polyurethane Acrylic / Satin Finish
Coronado Polyurethane 67-100

Finish No. 11: Interior Concrete Floors
Prime Coat: (Thin 20%) 1 W.M. 1.5 D.M.
Sherwin Williams Armour Tread-Flex WB Acrylic Floor Coating Primer B90W100
PPG Aquapon WB EP Epoxy 98E Series 2.0-3.0 D.M ea. PPG
Coronado Polyurethane Floor Finish 1231 Series

Top Coats: 1 or 2 (as required) 10.0 W.M. 1.5 D.M.
Sherwin Williams Armour Tread-Flex WB Acrylic Floor Coating B90W100
PPG Aquapon WB EP Epoxy 98E Series 2.0-3.0 D.M ea. PPG

Finish No. 11b: Interior Concrete Floors, Mechanical / Storage other Utility Areas-Transparent Sealer
Prime Coat: (Thin 20%) 1 W.M. 1.5 D.M.
1. PPG Aquapon WB EP Epoxy 98 E Series
2. Coronado Polyurethane Floor Finish 63 series
3. Sherwin Williams Concrete and Terrazzo Sealer

Top Coats: 2 W.M. 1.5 D.M. ea.
1. PPG Aquapon WB EP Epoxy 98E Series 2.0-3.0 D.M ea. PPG
2. Coronado Polyurethane Floor Finish 63 series
3. Sherwin Williams Industrial Enamel

Finish No. 12: Ferrous Metal - Exterior

Prime Coat	1	4.0-5.0 W.M.	1.5-2.0 D.M

1. Sherwin Williams Kem Kromik Metal Primer
2. Coronado Rust Scat White Metal Primer 35-111
3. PPG Multi-Prime 4160 / Devguard 4160

Top Coats:	2	4.5 - 5.5 W.M. ea.	2.0 - 2.5 D.M. ea.

1. Sherwin Williams Industrial Enamel Gloss B54
2. Coronado Urethane Alkyd Enamel Series M 31
3. PPG HPC Industrial Alkyd 4308 / Devguard 4308

Finish No. 13: Galvanized Metal - Exterior

Prime Coat:	1	3.0 - 4.0 W.M.	1.5 - 2.0 D.M.

1. Sherwin Williams Galvite Primer
2. Coronado Perma-Bond Primer 100-10
3. PPG Multi-Prime 4160 / Devguard 4160

Top Coats:	2	4.5 - 5.5 W.M. ea.	2.0 - 2.5 D.M. ea.

1. Coronado Urethane Alkyd Enamel Series M31
2. Sherwin Williams Industrial Enamel Gloss B54
3. PPG HPC Industrial Alkyd 4308 / Devguard 4308

Finish No. 14: Painted Wood - Exterior

Prime Coat:	1	3.6 - 4.6 W.M.	2.2 D.M.

1. Sherwin Williams a-100 Exterior Oil Wood Primer
2. Coronado Oil House Paint Primer 9-11
3. PPG Seal Grip Interior / Exterior Universal Alkyd Primer Sealer 17-941NF

TYPE	NO. OF COATS	WET MIL RANGE	DRY MIL RANGE
Top Coats:	2	4.5 W.M. ea.	2.5 D.M. ea.

1. Sherwin Williams Pro Mar Alkyd Flat Exterior B38W
2. Coronado Flat OIl House Paint 7 series
3. PPG Speedhide Interior / Exterior WB Alkyd

Finish No. 15: Existing Exterior Masonry and Concrete Panel System

Preparation: Scrape, sand and power wash (min 2100 psi) and allow to dry, Repair racks, voids and other penetrations with coating product manufacturer's patching material and / or sealants. Remove existing mildew with approved method prior to application of primer.

Prime Coat:	1	8.0 W.M.,	3.2 D.M.

1. PPG Perma-Crete Concrete and Stucco Primer 4-503
2. Coronado Masonry Sealer 48-11
3. Sherwin Williams Loxon Masonry Coatings

Masonry Filler as Required:	1 Coat	5.0 W.M.	8.2-16.4 D.M

1. Sherwin Williams Prep-Rite Interior/Exterior Block Filler B25W25
2. PPG Speedhide Interior /' Exterior Masonry Latex Block Filler 4-100XI
3. Coronado Superkote Latex Masonry Filler 946-11

Top Coats:	1 or 2	10.0 W.M.	1.6 D.M. ea

1. PPG Speedhide Exterior Latex Semi-Gloss 56-410XI
2. Coronado 138 series Epoxy Enamel
3. Sherwin Williams A-100 Exterior Paint Coating

2-03: Mechanical and Electrical Equipment: Items in Division 23 and 26 that require painting are to be executed under those contracts. Prime and finish coats applied to those items are specified in Paragraph 2-02. Painting including but not limited to following items are covered by this Section and shall be the responsibility of respective trades of those Divisions to provide required paint finish:

Exposed steel piping
Copper piping
Cast iron piping
Insulated piping
Electrical conduit
Fittings
Ducts
Hangers
Supports

These items shall be primed as specified for their material and shall be painted to color of particular surfaces against which they occur unless directed otherwise by Architect or specified in Color Schedule.

PART 3: EXECUTION

3-01: Preparation of Surfaces:

1) Surfaces to be finished shall be free of imperfections or contamination which would interfere with uniform appearance, adhesion and quality of coating. Contractor shall clean all existing walls of tape, stickers or other items that have been adhered to existing walls before beginning painting operations.

2) Ferrous metal surfaces, excluding stainless steel surfaces, that will be exposed in complete work shall be prepared in accordance with SSCP-SP3, Power Tool Cleaning, for normal requirements, or SSCP-SP6, Commercial Blast Cleaning, for when prolonged job site exposure occurs, prior to placement of primer coat.

3) Galvanized steel surfaces shall be prepared in accordance with SSCP-SP1, Solvent Cleaning, prior to placement of primer coat.

4) Wood surfaces shall be sanded smooth and dust removed before application of any coating. Knots or sap spots shall be sealed with 2-pound cut shellac prior to application of prime coat. Nail holes shall be puttied or filled with plastic wood after priming or undercoating is applied, then sanded smooth; wood filler shall match color of finish where clear coats of finish are specified.

5) Abraded areas of shop coats shall be primed.

6) Concrete Floors

a) Unpainted floors - Acid etch or detergent removal of contaminants as per manufacture's recommendations

b) Previously painted floors - Sand blast or Detergent/power wash removal of existing pain/contaminants as recommended by the manufacturer

3-02: Application:

1) Methods

Materials may be applied to surfaces of large area by brush, roller or spray, provided that final coating has solid hiding and uniform appearance. Brush applied coatings shall be brushed out uniformly, to eliminate laps, skips, and excess brush marks. Cutting in with brush on surfaces adjoining roller or spray coated areas shall be done carefully so that finish will be of the same texture, color, and hiding as adjacent areas. Roller coated areas shall show no signs of lapping or excess paint lines from edges of roller. Spray painting shall be done prior to installation of fixtures, hardware, flooring, and other finish items, unless all such items are thoroughly protected. Spraying equipment shall be suitable in type and of adequate capacity for experienced painters, to assure a uniform finish of acceptable quality. Methods of application, including adherence to spreading rate listed by the approved paint manufacturer to obtain recommended dry mil thickness, time lapse between successive coats, etc., shall be in accordance with manufacturer’s recommendations.

2) Mixing and Tinting

Job site tinting of finish coats shall be done only with the approval of the Architect. Primer, undercoating, and intermediate coats shall each be visibly different in color from preceding coats. Tinted colors are to be of the type recommended by the manufacturer of the coatings approved for use on the project.
Thinning shall be done only when specifically permitted by the manufacturer; if permitted, it shall be done with the materials and to the extent recommended by the manufacturer; wit mil thickness shall be increased to provide manufacturer's recommended dry mil thickness.

3) Final Coatings

Finished work shall show no runs, sags, curtains, excessive brush marks, holidays, or other evidence of poor applications. Spot painting to correct soiled or damaged paint surfaces shall be blended into surrounding finish so that it will not be visible to normal viewing; if it is not, entire sections shall be re-coated between corners or other approved stopping points. Edges of paint adjoining other materials or colors shall be sharp and clean, without overlapping. Sanding between coats, with fine sandpaper, shall be done as required to achieve even, smooth finish on wood and metal surfaces. Should the number of coats specified to be applied to surfaces herein listed not cover, additional coats shall be applied until a satisfactory finish is produced.

3-03: Protection and Cleaning:

Adjacent work and materials shall be protected with suitable covers during painting and finishing operations. Splatters or spills of paint or other coatings on floors, adjacent coatings, glass, and other finished surfaces shall be carefully removed.

END OF SECTION

DIVISION 10

SPECIALTIES

SECTION 101423: INTERIOR SIGNAGE

PART 1: GENERAL
1-01: Reference to Other Documents: The General Conditions of the Contract, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services required to furnish and install interior identifying devices where scheduled and as specified herein. See Architectural Drawings for additional directory and way-finding signage.

1-03: Submittals: Submit one (1) electronic (pdf) copy minimum of shop drawings showing signage layout, method of attachment, typeface, finishes and location schedule. Provide one (1) electronic (pdf) copy minimum of printed instructions for cleaning and maintenance.

1-04: Substitutions: Signs shall match.

PART 2: PRODUCTS
2-01: Signs shall match existing room signage.

2-02: Standards: Signage shall meet the requirements of ADA and ANSI A117.1. Exterior room signs shall have Braille plaque mounted at height required by ADA standards. Unit fire-rating shall be "Self-Extinguishing".

PART 3: EXECUTION
3-01: General: Signage shall be installed by personnel approved and provided by Supplier. Supplier shall coordinate exact locations with General Contractor and Architect.

3-02: Installation of Laminated Plastic: Install interior devices, as required by ADA standards, 60" above finished floor to the centerline of the sign on the wall adjacent to the latch side of the door with chrome-plated fasteners or other fastener of equal quality.

END OF SECTION

DIVISION 12

FURNISHINGS

SECTION 122000: WINDOW TREATMENT - BLINDS & SHADING DEVICES

PART 1: GENERAL

1-01: **Reference to Other Documents:** The General Conditions of the Contract, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: **Work Included:** This section includes labor, materials, equipment and related services necessary to furnish and install operable window blinds at exterior windows in all rooms. Blinds shall be provided at all clear glazed openings and in all new or remodeled spaces in the building.

1-03: **Substitutions:** For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings, and performance data for comparative evaluation 10 days prior to receipt of Bids. Products approved for use include:

Levolor
Hunter Douglas
Bali

1-04: Shop Drawings: Submit one (1) electronic (pdf) copy of shop drawings minimum for review before fabrication is begun. Drawings shall indicate sizes, and hardware installation details.

PART 2: PRODUCTS

2-01: General:

a. **Horizontal Blinds** shall be nominal 1" wide horizontal slats in assembly similar to Levolor Lorentzen, Inc., Riviera DustGuard Series. Slats shall be supported by braided ladders. Products of Bali Classic Mini-blinds are also approved for use.
b. **Black-out Shades** at Conference Room G06, G11 and G39 exterior windows shall be Draper Shearweave Style SW2500 1% open.

<u>For bidding purposes assume blinds at all exterior windows.</u>

2-02: Horizontal Blind Construction and Finish:

a. Slats shall be 0.007" thick before painting, 0.008" after painting. Slats shall have a finish similar to "tomized" catalytic undercoat bonded to aluminum and finished with baked enamel coat. Color of blinds (and other related accessories) shall be selected from standard color samples. Slats shall have an elliptical crown of proper contour formed after coating and curing. Radius of corners shall be 5/32". Note: "Tomized" treatment refers to corrosive resistive treatment on the metals. Other treatments of corrosive resisting finish shall be verified with the Architect.

b. Head channel shall be .025" "Tomized" steel with baked enamel finish coating. It shall be U-shaped, 1" high x 1-9/16" wide with flanged edges at top.

c. Tilter shall be .042" "Tomized" steel and shall have a wand of grooved plastic, which by turning shall adjust slats to desired angle.

d. Cord lock shall be .042" thick "Tomized" steel securely attached to head, crashproof type to snub cords without tearing and to lock slats at one height when cores are released.

e. All blinds shall have a cradle and drum for each ladder. Cradle shall be .042" "Tomized" steel and shall have holes with rolled edges to guide the ladder and cord through bottom of head. The drum shall be .031" thick "Tomized" steel and shall have 2 holes with rolled edges to anchor the barbs of each of the two ladders ends.

f. Tilt rod shall be of solid "Tomized" steel with sectional dimension of 1/4".

g. End braces of .042" thick "Tomized" steel shall be fastened at each end of head. Each brace shall have an adjustable tab.

h. Installation brackets of .042" thick shall be provided to support ends of head channel. Intermediate brackets shall be installed as required by manufacturer's recommendations according to unit size of blind.

i. Slab supports shall be braided of polyester yarn, the vertical component which shall be not less than .045 inch diameter, nor greater than .068 inch diameter for maximum strength. Braiding shall be accurate to hold slats at uniform parallel position for proper tilt control. There shall be 28 rungs per 2'-0" or ladder equally spaced at .788" intervals. Distance between ladders shall not exceed 21".

j. Bottom rail shall be of .031" "Tomized" steel and shall be provided with pierced holds for the ladders and cord. Plastic caps shall lock onto rail to cover cord and ladder holds. End caps with bottom flange shall be provided.

k. Lift cord shall be of rayon core and braided with synthetic fibers and shall have a minimum breaking strength of 200 pounds. Cord ends shall be securely anchored to bottom rail at maximum spacing of 45" between cords.

PART 3: EXECUTION

Frames of blinds and shades shall be installed in required location, set accurately with respect to adjacent building elements, level and square. Anchors shall be as recommended by manufacturer and shall be securely anchored. Width of units shall be verified with Architect. Motorized shading devices shall be installed by manufacturer or manufacturers authorized installer using approved licensed electrician or contractor's electrician. An electrical permit shall be issued by the governing body for this work. Materials shall be protected against physical damage, stain, or other injury, which might be cause for rejection, until the project is accepted by the Owner.

END OF SECTION

SECTION 123216: PLASTIC LAMINATE FACED CABINETWORK

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions of the Contract, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment and related services necessary to furnish and install manufactured base and wall cabinetwork with countertop and backsplash as shown on the drawings and specified herein.

1-03: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, the products of the following manufacturers are listed as approved for use on this project:

1) TMI Systems Design Corp., Dickinson ND.
2) LSI Corporation, Minneapolis, MN
3) Stevens Cabinet Co., Teutopolis IL
4) Cleora Sterling Millwork
5) Northside Cabinet Company / Northside Millwork
6) Wilson Kitchens, Inc.

Other manufactures shall be pre-approved by Owner and Architect and approval acknowledged by addenda during the bidding period.

1-04: Shop Drawings: Submit one (1) electronic (pdf) copy of shop drawings of cabinetwork to show location, arrangement, dimensions, materials, construction, hardware, finishes, laboratory fixtures and other pertinent information. No items shall be delivered to site until these drawings have been approved. The General Contractor is responsible for coordinating field dimensions.

1-05: Delivery and Storage: No items shall be delivered to the building until temperature and humidity conditions are approximately those which will exist when the building is in use by the Owner. The General Contractor shall designate a place for storage upon delivery until installation is complete. Protect items from physical damage or stain.

1-06: Related work specified in other areas:

Rubber Base	see Section 096500
Plumbing Fixtures	see Division 22
Electrical Devices	see Division 26

1-07: Warranty: All materials and workmanship covered by this section will carry a lifetime warranty from date of acceptance by Architect and Owner.

PART 2: PRODUCTS

2-01: General

a) The Casework Subcontractor shall furnish and install all cutouts, fillers, scribes, finished ends, finished backs and tops as required for a complete finished product.
b) Finished rubber base shall be furnished and installed by the General Contractor.
c) MCP II or Thermofused Melamine will NOT be permitted on door and drawer fronts or other exposed faces.
d) All door and drawers shall have a full 3mm PVC edge. (T-mold is not acceptable).
e) All countertops to have 1”x4” separate solid surface Corian backsplashs. Countertops to be 1” solid surface, Corian tops with ¼” rounded edges. Price Group 4.

f) All cabinet components shall be 3/4" thick BEFORE lamination, unless otherwise listed on drawings or specified herein.
g) All base and wall cabinets over 36" wide shall have a full height vertical divider.
h) Interiors shall be selected from manufacturer's full range. PVC Color shall be selected from standards.
i) All sink base bottoms and sides shall be laminated with CL-20 cabinet liner.
j) For bidding purposes provide locks on 50% of cabinets.
k) All shelves shall be banded on front edge with 3mm PVC edging.

2-02: Definitions

a) Unit Body Open Interiors - any storage unit surface without solid door or drawer fronts and units with glass sliding or glass frame doors.
b) Unit Body Closed Interiors - any storage unit surface behind solid door or drawer fronts.
c) Unit Body Exposed Side - any storage unit exterior side surface that is visible.
d) Concealed Surfaces - any surface not normally visible after installation.

2-03: Core Materials

a) Particleboard - minimum density 45 lb. western particleboard of fir or pine meeting or exceeding ANSI A208 1-1979, 1-M-3 requirements. Thickness used shall be 1/4", 1/2", 3/4" and 1".
b) Hardboard - prefinished hardboard in 1/4" thickness meeting or exceeding commercial standards CS-251.
c) Plywood - 9 ply veneer core hardwood.

2-04: Decorative Laminates

a) GP50 - high pressure (0.050), NEMA Test LD-3-1985.
b) GP38 - high pressure (0.038), NEMA Test LD-3-1985.
c) GP28 - high pressure (0.028), NEMA Test LD-3-1985; laminate shall be counter balanced.
d) PF42 - high pressure (0.042), NEMA Test LD-3-1985.
e) CL20 - high pressure (0.020, NEMA Test LD-3-1985; cabinet liner shall be counter balanced.
f) Melamine Laminate - NEMA Test LD-3-1985; laminate shall be counter balanced.
g) BK20 - high pressure (0.020); laminate shall be counter balanced.
h) Colors:
    1) Colors for countertop grades GP50, GP38, PF42 and PF30 shall be selected from Wilsonart's standards, 5 colors maximum per project.
    2) Colors for cabinet surfaces grade GP28 shall be selected from Wilsonart's standards, 1 color per unit face and 5 colors maximum per project.

2-05: Plastic Edging: 3mm PVC - hot melt glue applied.

2-06: Metal Parts: Countertop support brackets, legs and miscellaneous metal parts shall be furniture steel, welded, degreased, cleaned, treated and powder painted. Color to be selected from standards, 1 color per project.

2-07: Cabinet Hardware

a) Pulls - shall be 96mm surface mounted die-cast zinc alloy, powder coated epoxy finish. One color to be selected from standards. Pulls shall be accurately positioned and mechanically fastened from the inside face of door or drawer. Pulls to be compatible with requirements of Americans with Disabilities Act.

b) Hinges - shall be 5-knuckle 2-3/4" overlay type, hospital tip, 0.095" thick steel. Hinges shall have 8 minimum edge and leaf fastenings. Doors 48" and over in height shall have 3 hinges per door. Magnetic door catches are required with this hinge and shall have minimum 10 lb. pull, attached with screws and slotted for adjustment.

c) Extension Drawer Slides:

1) Bottom mount - shall be Blum No. BS 230E with epoxy finish. Slides shall have 100 lb. load rating at full extension, with built-in positive stop both directions. Glides shall have lifetime warranty as offered by manufacturer.

2) Paper storage drawers - shall be Blum No. BS 230E with epoxy finish and lifetime warranty.

3) Knee space drawers - shall be Grant No. 522 with minimum load capacity of 50 lbs. each.

d) Adjustable Shelf Supports

Units shall be capable of supporting 200 lbs., self-locking nylon, to fit 32mm pre-drilled holes in cabinet ends and vertical partitions. Shelf supports shall have 2 pins 5mm in diameter to prevent shelf support from rotating and tipping. Available for 3/4" or 1" thick shelves.

e) Locks:

1) Doors and Drawers - locks shall be National Lock #M4-7054C, removable core, disc tumbler, cam style lock with strike. Each lock shall be furnished with 2 keys, all locks to be keyed alike per classroom. Each classroom shall be keyed separately.

2) Sliding Doors, 3/4" - locks shall be disc type plunger lock, sliding door type with strike. Locks for sliding glass door shall be ratchet type sliding showcase lock.

3) Chain Bolts - units shall be 3" long, with 18" pull and an angle strike to secure inactive door on cabinets over 72" in height. Elbow catches shall be used on inactive doors up and including 72" in height.

f) Sliding Door Track

Wood and glass sliding doors shall be mounted in anodized aluminum double channel.

g) Coat Rods

Units shall be 1-1/4" o.d., 14-gauge chrome-plated steel.

h) Mirrors

Units shall be 1/4" thick polished mirror plate.

i) Undercounter shelf supports:

Welded steel countertop support frames shall be provided at all knee spaces as indicated on drawings. Frames to be fabricated from minimum 1 1/4" square steel tube frame with flange for attachment to wall with 1/2" expansion anchors 12" O.C. Frames to be factory finished, color to be selected from manufacturer' s standards.

2-08: Fabrication

a) General

Fabricate laminate clad casework to dimensions, profiles and details shown on drawings.

b) Joinery

Tops and bottoms shall be joined to ends using 6 dowels min. at each joint for 24" deep cabinets and 4 dowels min. at each joint for 12" deep cabinets. All dowels shall be industrial grade hardwood laterally fluted with chamfered ends and minimum diameters of 10mm. Internal components such as fixed horizontals, rails and verticals shall be doweled in place. Dowels shall be securely glued and cabinets clamped under pressure during assembly to assure secure joints and cabinet squareness.

c) Unit Door and Drawer Fronts

Units shall be 3/4" thick particleboard laminated with GP28 on exposed surface and CL20 on interior surface. Edges shall be finished with 3mm PVC. Double doors shall be used on all cabinets in excess of 24" in width.

d) Unit body Open Interiors

Exposed cabinet shall be 3/4" thick particleboard laminated with GP28 on exterior and balanced with CL20. Unexposed cabinet sides shall be laminated both sides with melamine. All cabinet sides shall be front edge banded with 3mm PVC with color matching door and drawer fronts. All base units except sink bases to be furnished with full sub-top of 3/4" thick particleboard laminated with both sides with melamine and front-edged with 1mm PVC to match door and drawer front edge color. All sub-tops shall be full depth. Bottom of base and wardrobe units shall be 3/4" thick particleboard laminated both sides CL20 and front edged with 1mm PVC. Fixed intermediates shall be 3/4" thick particleboard laminated both sides with melamine and front edged with 1mm PVC; an intermediate shall be provided on all units over 36" wide. Standard unit back shall be 1/2" thick prefinished particleboard, color to match interior. Exposed back on fixed or movable cabinet to be 3/4" thick particleboard laminated with CL20 on interior and GP28 on exterior. Adjustable shelves shall be 3/4"

particleboard up to 30" wide and 1" thick over 30" wide, laminated both sides with melamine and front edged with 3mm PVC to match shelf color.

e) Unit Body Closed Interiors

Requirements listed above (Item d.) shall be included herein with the following exception:

1) Sink cabinet bottoms shall be laminated both sides with CL20.

f) Wall Unit Bottoms

Requirements listed above (Item d.) shall be included herein.

g) Drawers

Sides, back and sub-front shall be particleboard, 1/2" thick, laminated with melamine. the back and sub-front shall be doweled and glued into sides. Top edge is banded with 3mm PVC edging. Bottom shall be 1/2" thick prefinished particleboard screwed directly to bottom edge of drawer box. Paper storage drawers shall be 3/4" particleboard laminated both sides with melamine and constructed with retaining hood at rear of each drawer.

h) Continuous or Unit Tops

All cabinets over 42" and up to 72" in height shall be supplied where shown with a finished 1" continuous top laminated with GP28 and balanced with CL20.

8) Bases

All base and tall units shall have an integral base. Rubber base shall be furnished and installed by General Contractor around all edges exposed to view. Separate plywood base is acceptable.

PART 3: EXECUTION

3-01: General: Cabinet Installer must examine surfaces and areas to receive casework and report to General Contractor and Architect of unsatisfactory conditions. Do not proceed with work unit defective conditions have been corrected; installing products shall be understood by all parties of the acceptance and responsibility by the Installer of conditions being acceptable.

3-02: Cabinets shall be set accurately in place, level, plumb in proper relation to adjacent construction. Connecting and attaching devices, closures, and trim members shall be supplied and installed as required. Moving parts shall be adjusted to operate freely. Debris shall be removed from site as it accumulates. Exterior and interior surfaces shall be cleaned and left from stain, dust, or foreign materials of any kind. Cabinets shall be protected from damage or stain until accepted by the Owner.

3-03: Cleaning and Protection: Repair or remove and replace defective work as directed upon completion of installation. Clean plastic surfaces, repair minor damage as directed by plastic laminate manufacturer; replace other damaged parts or units. Advise contractor of procedures and precautions for protection of casework and tops from damage by other trades until acceptance of work by Owner.

END OF SECTION

DIVISION 26

ELECTRICAL

SECTION 260500 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Supporting devices for electrical components.
   2. Electrical identification.
   3. Cutting and patching for electrical construction.
   4. Sleeves for raceways and cables.
   5. Sleeve Seals.
   6. Grout.
   7. Common electrical installation requirements.
   8. Product Substitutions.

1.3 ASBESTOS

A. There is asbestos in the building.

1.4 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. FMC: Flexible metal conduit.

C. LFMC: Liquidtight flexible metal conduit.

D. RNC: Rigid nonmetallic conduit.

E. RMC Rigid metal conduit

F. AHJ: Authority Having Jurisdiction

G. EPDM: Ethylene-propylene-diene terpolymer rubber.

H. NBR: Acrylonitrile-butadiene rubber.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a third party testing agency accredited by the NCBCC (North Carolina Building Code Council) to Label Electrical & Mechanical Equipment and marked for the intended use.

B. Comply with NFPA 70.

1.6 AUTHORITY HAVING JURISDICTION (AHJ)

A. The Durham City-County Inspections Department is the AHJ.

1.7 INSPECTIONS

A. It is the responsibility of the contractor to notify the AHJ to schedule all required inspections including rough-in, above ceiling and final inspections.

1.8 SUBMITTALS

A. Product Data: For dielectric fittings, flexible connectors, mechanical sleeve seals, and identification materials and devices.

B. Shop Drawings: Detail fabrication and installation for metal and wood supports and anchorage for mechanical materials and equipment.

C. Samples: Of color, lettering style, and other graphic representation required for each identification material and device.

1.9 Product Substitutions

A. Product Substitutions: Only products and product manufacturers detailed in the electrical specifications and plans shall be provided. Bidder proposed substitutions shall be submitted in writing at least 10 days prior to bid date for designer evaluation and inclusion in the last addenda that may be issued no later than 7 days prior to bid date.

B. All pertinent information shall be provided with each product substitution requests to allow a thorough evaluation to be performed. Substitution requests without full supporting documentation will not be considered.

1.10 Coordination:

A. Comply with requirements of authorities having jurisdiction.

B. Check, verify and coordinate work with other trades. Include modifications, relocations or adjustments necessary to complete work or to avoid interference with the building structure or other trades.

C. Drawings and specifications are necessarily schematic in nature and cannot describe completely all situations that might be encountered in the field. It is the responsibility of the contractor to familiarize himself with the scope of work required and include all work indicated or reasonably implied by the contract documents.

D. Layout the work to prevent conflict with, and to co-ordinate with work of other trades. Systems shall generally be run in a rectilinear fashion.

E. Coordinate arrangement, mounting, and support of electrical equipment:
   1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
   2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
   3. To allow right of way for piping and conduit installed at required slope.
   4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
   5. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."
   6. Coordinate sleeve selection and application with selection and application of firestopping details shown on drawings.

F. Each trade is responsible for the coordination of their work with all other work at the site prior to beginning work in each area.

1.11 DIVISION OF WORK (Division 23/26)

A. This section delineates the division of work between Division 23 and Division 26.

B. Specific work to be done under Division 26 is hereinafter listed or described. All other work necessary for the operation of Division 23 equipment shall be performed under Division 23.

C. All individual motor starters for mechanical equipment (fans, pumps, etc.) shall be furnished and installed under Division 23 unless indicated as a part of a motor control center. Motor starters for mechanical equipment provided in motor control centers shall be furnished under Division 26.

D. Under Division 26, power wiring shall be provided up to a termination point consisting of a junction box, trough, starter, VFD or disconnect switch. Under Division 26 line side terminations shall be provided. Wiring from the termination point to the mechanical equipment, including final connections, shall be provided under Division 23.

E. All relays, actuators, pressure, flow, pneumatic-electric, and electric-pneumatic switches, aquastats, line and low voltage thermostats, remote selector switches, interlocking, disconnect

switches beyond termination point, and other appurtenances associated with equipment under Division 23 shall be furnished, installed and wired under Division 23.

F. All wiring required for controls and instrumentation not indicated on the drawings shall be furnished and installed by Division 23.

G. Exhaust fans with built-in disconnects provided under Division 23 shall be wired under Division 26 to the line side of the disconnect switch. A disconnect switch shall be provided under Division 26 if the fan is not provided with a built-in disconnect switch. In this case wiring from the switch to the fan shall be under Division 23.

H. The sequence of control for all equipment shall be as indicated on the Division 23 Drawings and specified in Section, HVAC Control System.

I. Duct smoke detectors, shall be furnished and wired by Division 28, installed by Division 23. Fire alarm AHU shut down circuits shall be wired from the fire alarm control panel to a termination point, adjacent to the AHU control, under Division 28. AHU control wiring from the termination point to the equipment shall be under Division 23.

J. Where electrical wiring is required by trades other than covered by Division 26, specifications for that section shall refer to same wiring materials and methods as specified under Division 26. No Exceptions. Electrical inspections as detailed above shall be requested by the contractor performing the work.

PART 2 - PRODUCTS

2.1 SUPPORTING DEVICES

A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction.

B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.

C. Slotted-Steel Channel Supports: Flange edges turned toward web, and 9/16-inch- diameter slotted holes at a maximum of 2 inches o.c., in webs.

D. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.

E. Expansion Anchors: Carbon-steel wedge or sleeve type.

F. Toggle Bolts: All-steel springhead type.

2.2 ELECTRICAL IDENTIFICATION

A. Identification Devices: A single type of identification product for each application category. Use colors prescribed by ANSI A13.1, NFPA 70, and these Specifications.

B. Raceway and Cable Labels: Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and minimum length of color field for each raceway and cable size.

1. Type: Pretensioned, wraparound plastic sleeves. Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the item it identifies.
2. Color: Black letters on orange background.
3. Legend: Indicates voltage.

C. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape, not less than 1 inch wide by 3 mils thick.

D. Tape Markers for Wire: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

E. Color-Coding Cable Ties: Type 6/6 nylon, self-locking type. Colors to suit coding scheme.

F. NAMEPLATES AND SIGNS

1. Engraved Plastic Nameplates and Signs: Furnish and install engraved laminated phenolic nameplates for all safety switches, panelboards, transformers, switchboards, motor control centers and other electrical equipment supplied for the project for identification. Letters shall be approximately 1/2" high minimum. Embossed self-adhesive plastic tape is not acceptable for marking equipment. The nameplate material colors shall be as follows:
   a. Blue surface with white core for 120/208 volt equipment.
   b. Black surface with white core for 277/480 volt equipment.
   c. Bright red surface with white core for all equipment related to fire alarm system.
   d. Dark red (burgundy) surface with white core for all equipment related to security.
   e. Green surface with white core for all equipment related to "emergency" systems.
   f. Orange surface with white core for all equipment related to telephone systems.
   g. Brown surface with white core for all equipment related to data systems.
   h. White surface with black core for all equipment related to paging systems.
   i. Purple surface with white core for all equipment related to TV systems.
2. Nameplates shall be securely attached to equipment with self-tapping stainless steel screws; if the screw sharp end is protected; otherwise rivets shall be used.

G. All empty conduit runs and conduit with conductors for future use shall be identified for use and shall indicate where they terminate. Identification shall be by tags with string or wire attached to conduit or outlet.

H. All outlets boxes, junction boxes and pull boxes shall have their covers and exterior visible surfaces painted with colors to match the surface color scheme outlined above. This includes covers on boxes above lift-out and other type accessible ceilings.

2.3 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.4 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

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

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM or NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.5 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FIRESTOPPING

A. All penetrations of fire-rated floor and wall assemblies for electrical installations shall be sealed to restore original fire-resistance rating of assembly. See drawings for fire stop details.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

A. Comply with NECA 1.

B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

D. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

E. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

F. Right of Way: Give to piping systems installed at a required slope.

3.2 ELECTRICAL SUPPORTING DEVICE APPLICATION

A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, U-channel system components.

B. Support Clamps for PVC Raceways: Click-type clamp system.

C. Selection of Supports: Comply with manufacturer's written instructions.

3.3 SUPPORT INSTALLATION

A. Install support devices to securely and permanently fasten and support electrical components.

B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.

C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.
   1. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated.

D. Conduit shall be supported in a method and at a spacing approved by the NEC, except as described herein.

E. Conduit shall be supported by approved pipe straps or clamps.
   1. Conduits installed on the interior of exterior building walls shall be spaced off the wall surface a minimum of 1/4 inch using "clamp-backs" or strut.

F. Pipe straps or clamps shall be secured by means of:
   1. Toggle bolts on hollow masonry.

2. Metal expansion shields and machine screws, or standard pre-set inserts, on concrete or solid masonry.
3. Machine screws or bolts on metal surfaces.
4. Wood screws on wood construction.

3.4 IDENTIFICATION MATERIALS AND DEVICES

A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.

C. Identify raceways and cables with color banding to match the existing systems.

D. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.

E. Secondary Service, Feeder, and Branch-Circuit Conductors: Color-code throughout the secondary electrical system.

1. Color-code 208/120-V system as follows:

   a. Phase A: Black.
   b. Phase B: Red.
   c. Phase C: Blue.
   d. Neutral: White.
   e. Ground: Green.

2. Color-code 480/277-V system as follows:

   a. Phase A: Brown
   b. Phase B: Orange.
   c. Phase C: Yellow.
   d. Neutral: Natural gray.
   e. Ground: Green.

3. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG, except for ground and neutral conductors which must be factory colored #6 AWG and smaller:

   a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 1-inch-wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.

b. Colored cable ties applied in groups of three ties of specified color to each wire at each terminal or splice point starting 3 inches from the terminal and spaced 3 inches apart. Apply with a special tool or pliers, tighten to a snug fit, and cut off excess length.

F. Install warning, caution, and instruction signs where required to comply with 29 CFR, Chapter XVII, Part 1910.145, and where needed to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.

G. Install engraved-laminated emergency-operating signs with white letters on red background with minimum 3/8-inch- high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

3.5 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.6 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Cut sleeves to length for mounting flush with both surfaces of walls.

E. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

F. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise.

G. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

H. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants".

I. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

3.7 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.8 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are detailed on the construction drawings.

3.9 CLEANING AND PROTECTION

A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.

B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION 260500

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.
3. Sleeves and sleeve seals for cables.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field quality-control test reports.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a third party testing agency accredited by the NCBCC (North Carolina Building Code Council) to Label Electrical & Mechanical Equipment and marked for the intended use.

B. Comply with NFPA 70 (2017).

PART 2 - PRODUCTS

2.1 BUILDING WIRES AND CABLES

A. UL-listed building wires and cables shall be 600 V, unless otherwise noted, color code conductors for low voltage (secondary feeders and branch circuits) as required by code.

B. Insulation for all interior conductors shall be dual rated THHN/THWN, or XHHW single conductor.

C. Conductor Material: Copper.

D. Stranding: Solid conductor for No. 10 AWG and smaller; Class B stranded conductor for No. 8 AWG and larger.

E. Power and lighting circuits minimum conductor size allowed is No. 12 AWG.

F. Largest conductor size allowed is 500 kcmil.

2.2 CONNECTORS AND SPLICES

A. UL-listed, factory-fabricated wiring connectors of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine raceways and building finishes to receive wires and cables for compliance with requirements for installation tolerances and other conditions affecting performance of wires and cables. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install wires and cables as indicated, according to manufacturer's written instructions and NECA's "Standard of Installation."

B. All power wiring and cable shall be installed in raceway.

C. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

D. Pull Conductors: Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

E. No more than one of each phase conductor A, B and C with the associated neutral(s) and ground conductor(s) shall be pulled in any common raceway. A dedicated neutral shall be installed with each branch circuit.

F. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

G. Install exposed cables, parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

H. Seal around cables penetrating fire-rated elements.

I. Identify wires and cables according to Division 26 Section "Basic Electrical Materials and Methods."

J. Secondary Service, Feeder, and Branch-Circuit Conductors: Color-code throughout the secondary electrical system.

3.3 VOLTAGE DROP

A. Where the conductor length from the panel to the first outlet on a 277 volt system exceeds 125 feet, the minimum branch circuit conductor size shall not be smaller than No. 10 AWG.

B. Where the conductor length from the panel to the first outlet on a 120 volt system exceeds 50 feet, the minimum branch circuit conductor size shall not be smaller than No. 10 AWG

C. Pull Conductors: Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

3.4 CONNECTIONS

A. Conductor Splices: Keep to minimum. All conductors shall be continuous from outlet to outlet. No splices shall be made except within junction boxes, troughs and gutters.

B. Install splices and tapes that possess equivalent or better mechanical strength and insulation ratings than conductors being spliced.

C. Use splice and tap connectors compatible with conductor material.

D. Joints in solid conductors shall be spliced using ”Ideal” wirenuts or 3M Company “Scotchlock” or T&B connectors in junction boxes, outlet boxes or lighting fixtures.

E. Joints in stranded conductors shall be spliced by approved mechanical connectors and gum rubber tape or friction tape. Solderless mechanical connectors for splices and taps, provided with UL approved insulating covers may be used instead of mechanical connectors plus tape.

F. Sta-kon or other permanent type crimped connectors shall not be used for branch circuit connections.

3.5 FIELD QUALITY CONTROL

A. Testing: On installation of wires and cables and before electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

B. Feeder Resistance Testing

1. All current carrying phase conductors and neutrals shall be tested as installed, and before connections are made, for insulation resistance and accidental grounds. This shall be done with a 500-volt megger. The procedures listed below shall be followed:

    a. Minimum readings shall be one million (1,000,000) or more ohms for #6 AWG wire and smaller, 250,000 ohms or more for #4 AWG wire or larger, between conductors and between conductor and the grounding conductor.

b. After all fixtures, devices, and equipment are installed and all connections completed to each panel, the contractor shall disconnect the neutral feeder conductor from the neutral bar and take a megger reading between the neutral bar and the grounded enclosure. If this reading is less than 250,000 ohms, the contractor shall disconnect the branch circuit neutral wires from this neutral bar. He shall then test each one separately to the panel until source of the low reading is found. The contractor shall correct troubles, reconnect, and retest until at least 250,000 ohms from the neutral bar to the grounded panel can be achieved with only the neutral feeder disconnected.

c. Contractor shall furnish a report of megger test results demonstrating that the panels comply with the above requirements.

C. GROUND SYSTEM TESTING

1. Upon completion of installation of the electrical grounding and bonding systems, the ground resistance shall be tested with a ground resistance tester. Where tests show resistance-to-ground is over 25 ohms, appropriate action should be taken to reduce the resistance to 25 ohms, or less, by driving additional ground rods. (The compliance should be demonstrated by retesting.)

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes methods and materials for grounding systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections

B. This project replaces and reworks the existing electrical service. The new service ground shall be bonded to the existing grounding electrode system which includes existing building steel, cold water and fire sprinkler entrance pipe(s), and new driven ground rods.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:

1. Test wells.
2. Ground rods.
3. Grounding arrangements and connections for separately derived systems.
4. Grounding for sensitive electronic equipment.

C. Qualification Data: For testing agency and testing agency's field supervisor.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:

1. Instructions for periodic testing and inspection of grounding features at test wells and grounding connections for separately derived systems based on NETA MTS and NFPA 70B.

a. Tests shall be to determine if ground resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if they do not.
b. Include recommended testing intervals.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70 (2017), Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 GROUNDING CONDUCTORS

A. For insulated conductors, comply with Division 26 Section "Conductors and Cables."

B. Equipment Grounding Conductors: Insulated with green-colored insulation.

C. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.

D. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches (6 by 50 mm) in cross section, unless otherwise indicated; with insulators.

E. Bare Copper Conductors: Comply with the following:

1. Solid Conductors: ASTM B 3.
2. Assembly of Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.

2.2 CONNECTOR PRODUCTS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel 3/4 inch by10 feet (19 mm by 3 m) in diameter. Minimum of three driven ground rods.

B. Building Steel

C. All metallic cold water pipes entering the building including those for domestic cold water and fire sprinkler service.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum.

1. Bury at least 24 inches (600 mm) below grade.
2. Duct-Bank Grounding Conductor: Bury 12 inches (300 mm) above duct bank when indicated as part of duct-bank installation.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated. Bond to grounding electrode system at cold water pipe entrance or electrical service entrance.

1. Install bus on insulated spacers 1 inch (25 mm), minimum, from wall 6 inches (150 mm) above finished floor, unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.

E. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches (150 mm) from the foundation.

3.3 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits. No circuit shall be without an equipment grounding conductor. The conduit shall not serve as the equipment grounding conductor.

B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

D. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch (6-by-50-by-300-mm) grounding bus unless otherwise noted on drawings.
2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.4 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

C. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches (300 mm) deep, with cover.

1. Test Wells: Install at least one test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

E. Grounding and Bonding for Piping:

1. All Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building including but not limited to domestic cold water and fire sprinkler service pipe. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

F. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

G. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:

B. Perform the following tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.

2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal at individual ground rods. Make tests at ground rods before any conductors are connected.

    a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    b. Perform tests by fall-of-potential method according to IEEE 81.

3. Prepare dimensioned drawings locating each test well, ground rod and ground rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

C. Report measured ground resistances that exceed the following values:
    1. 25 ohms.

D. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.3 SUBMITTALS

A. Product Data: For steel slotted support systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.
3. Equipment supports.

C. Welding certificates.

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70 (2017).

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. ERICO International Corporation.
d. GS Metals Corp.
e. Thomas & Betts Corporation.
f. Unistrut; Tyco International, Ltd.
g. Wesanco, Inc.

3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
6. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Powder actuated fasteners are not allowed and shall not be used.

D. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Cooper B-Line, Inc.; a division of Cooper Industries.
2) Empire Tool and Manufacturing Co., Inc.
3) Hilti Inc.
4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
5) MKT Fastening, LLC.

2. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
3. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
5. Toggle Bolts: All-steel springhead type.
6. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts or Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete.

C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Touchup: Comply with requirements in Division 09 painting Sections, Section "High-Performance Coatings" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1. Raceways include the following:

a. EMT: Electrical metallic tubing.
b. FMC: Flexible metal conduit.
c. LFMC: Liquidtight flexible metal conduit.
d. RMC: Galvanized rigid steel conduit.
e. RNC: Rigid nonmetallic conduit.
f. Surface Mounted Metal Raceways

2. Boxes, enclosures, and cabinets include the following:

a. Device boxes.
b. Outlet boxes.
c. Pull and junction boxes.
d. Cabinets and hinged-cover enclosures.

1.3 SUBMITTALS

A. Product Data: For wireways and fittings, outlet boxes, hinged-cover enclosures, and cabinets.

1.4 QUALITY ASSURANCE

A. Listing and Labeling: Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a third party testing agency accredited by the NCBCC (North Carolina Building Code Council) to Label Electrical & Mechanical Equipment and marked for the intended use.

B. Comply with NECA's "Standard of Installation."

C. ASTM International (AST M): ASTM E 814 - Standard Test Method for Fire Tests of Penetration Firestop

D. Comply with National Fire Protection Association (NFPA): NFPA 70 (2017) – National Electrical Code.

E. Underwriters Laboratories Inc. (UL):
   1. UL 5 - Surface Metal Raceways and Fittings.
   2. UL 514A - Metallic Outlet Boxes.

1.5 COORDINATION

A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Galvanized Rigid Steel Conduit: ANSI C80.1.

B. EMT and Fittings: ANSI C80.3. with plated steel hexagonal compression type fittings with insulated throats. Fittings installed in concrete or masonry shall be “concrete tight”. Fittings installed in damp locations shall be “rain tight”.

C. FMC: Zinc-coated steel.

D. LFMC: Liquidtight Flexible steel conduit with PVC jacket.

E. Fittings: NEMA FB 1; compatible with conduit/tubing materials.

2.2 NONMETALLIC CONDUIT AND TUBING

A. RNC: NEMA TC 2, Schedule 40 or 80 PVC.

B. RNC Fittings: NEMA TC 3; match to conduit or conduit/tubing type and material.

2.3 METAL WIREWAYS

A. Material: Sheet metal sized and shaped as indicated.

B. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

C. Wireway Covers: Hinged type.

D. Finish: Manufacturer's standard enamel finish.

2.4 OUTLET AND DEVICE BOXES

A. Sheet Metal Boxes: NEMA OS 1.

B. Cast-Metal Boxes: NEMA FB 1, Type FD, cast box with gasketed cover.

C. Stamped steel boxes with knockouts shall not be used for surface mounting in general use areas.

2.5 SURFACE MOUNTED RACEWAYS

A. Underwriters Laboratories Inc. (UL):
   1. UL 5 - Surface Metal Raceways and Fittings.
   2. UL 514A - Metallic Outlet Boxes.

B. Provide surface metal raceway for branch circuit or low voltage wiring as noted on plans.
   1. Components: Raceway bases, covers, fittings, device boxes and device mounting plates.

C. Raceways: One-piece, single channel system of galvanized steel with base and cover preassembled with scratch resistant finish. 3/4” wide by 17/32” deep.

D. Device Boxes: Metal device box fully compatible with and Listed for use with metal raceways. Provide for receptacles, switches, or communications devices as indicated on drawings.

E. Fittings:
   1. Flat, internal and external elbows.
   2. Couplings for joining sections.
   3. Wire clips.
   4. Device mounting brackets and plates.
   5. Bushings ends of raceways where entering fittings to protect wire from abrasion.
   6. Device Box and conduit connectors.
   7. Mounting straps.
   8. Provide all accessories required for a complete installation

2.6 PULL AND JUNCTION BOXES

A. Small Sheet Metal Boxes: NEMA OS 1.

B. Cast-Metal Boxes: NEMA FB 1, with gasketed cover.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 WIRING METHODS

A. Outdoors: Use the following wiring methods:

1. Galvanized Rigid Steel.
2. Underground, RNC.
3. Connection to Vibrating Equipment LFMC.
4. Boxes and Enclosures: NEMA 250, Type 3R or Type 4.

B. Indoors: Use the following wiring methods:

1. Exposed (only in unfinished spaces): Below 8 feet above the floor: Galvanized Rigid Steel.
2. Exposed (only in unfinished spaces): Above 8 feet above the floor: EMT with compression fittings.
3. Concealed: EMT with compression fittings.
4. Surface mounted metal raceway: Shall only be used where indicated on plans.
5. Connection to Vibrating Equipment: FMC; except in wet or damp locations, use LFMC.
6. Damp or Wet Locations: Galvanized Rigid Steel conduit.
7. Lighting fixture whips: FMC
8. Boxes and Enclosures: NEMA 250, Type 1.

3.3 INSTALLATION

A. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions.

B. Minimum Raceway Size: 3/4-inch trade size, except 1” minimum for telecom/data outlets.

C. In finished areas of the Building, conceal conduit unless otherwise indicated, within finished walls, ceilings, and floors. This includes all areas except for mechanical and electrical rooms.

D. In unfinished areas of the building, conduit shall be neatly routed tight to roof structure, walls and other structural elements.

E. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

F. Install raceways level and square and at proper elevations. Provide adequate headroom.

G. Install raceways parallel to or at right angles to nearby surfaces or structural members, and follow the surface contours as much as practical.

H. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of the pull wire.

I. Telephone and Signal System Raceways, 2-Inch Trade Size and Smaller: In addition to the above requirements, install raceways in maximum lengths of 100 feet and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.

J. Flexible Connections: Use maximum of 6 feet of flexible conduit for recessed and semi recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquidtight flexible conduit in wet or damp locations. Install separate ground conductor across flexible connections.

K. Raceways passing through areas subjected to different temperatures where condensation could be a problem, such as in cold storage areas, or where passing from the interior to the exterior of a building, the raceway shall be sealed to prevent the circulation of warm air to a colder section of the raceway.

L. Install raceways to be mechanically and electrically continuous.

M. Where underground raceways turn up into cabinets, equipment, etc. and on to poles, the elbow required and the stub-up out of the slab or earth shall be of rigid galvanized steel.

3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure coatings, finishes, and cabinets are without damage or deterioration at the time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.5 CLEANING

A. On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

3.6 IDENTIFICATION

A. All outlet boxes, junction boxes and pull boxes shall have their covers and exterior visible surfaces painted with colors to match the surface color scheme outlined in Specification Section 260553 “Identification for Electrical Systems”. This includes covers on boxes above lift-out and other type accessible ceilings. This does not apply to exposed box covers installed in spaces visible to the general public.

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are indicated on plans.

END OF SECTION 260533

SECTION 260534 - VOICE AND DATA COMMUNICATIONS SYSTEM

PART 1. GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

B. SUMMARY

1. This Section includes a turn-key cable and outlet installation. The contractor shall provide all raceway, cable management, outlet boxes, equipment mounting racks / boxes, cabling, jacks, cover plates, terminations, and testing as required for a fully functional installation as noted on plans and within these specifications.

2. The contractor shall route horizontal cables from each workstation outlet to the designated telecom closet on each floor or to a recessed 2x2 grid mounted ceiling equipment / cabling enclosure installed in each zone.

3. Cable ends in racks / ceiling boxes shall be terminated and tested and ready for connection to owner provided electronic equipment.

4. Contractor shall install fiber from each floor telecom closet to the zone boxes as required for an active fiber to the zone infrastructure.

5. All work shall be coordinated with the owner’s IT representative prior to rough-in.

6. Exact locations of zone ceiling boxes shall be coordinated with new and existing structure and utilities. The installation locations shall be easily accessible from below.

C. SUBMITTALS

1. Submit the following:

a) Product data for voice/data transmission media, cable management systems, and all equipment.

b) Product certificates, acknowledged by the communication system manufacturers, certifying that the cables are suitable for the connected equipment as described in 'Quality Assurance' Article below.

c) Field test reports indicating and interpreting test results.

d) Maintenance data for cables to include in the "Operating and Maintenance Manual".

D. QUALITY ASSURANCE

1. Connected Equipment Manufacturer Certification: Where cables specified in this Section are used to provide signal paths for systems furnished under other contracts, obtain review of the cable characteristic and certification for use with the connected system equipment by the connected equipment manufacturers.

2. Testing Firm Qualifications: Testing firm shall meet OSHA criteria for accreditation of testing laboratories, Title 29, Part 1907, or shall be a full member company of the International Electrical Testing Association (NETA).

a) Testing Firm's Field Supervisor Qualifications: A person currently certified by the International Electrical Testing Association or National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

3. Comply with NFPA 70 "National Electrical Code" for components and installation.

4. Listing and Labeling: Provide products specified in this Section that are listed and labeled.

5. Single-Source Responsibility: All cable of each kind shall be the product of a single manufacturer.

PART 2. PRODUCTS

A. MANUFACTURERS

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

a) Electronic Cable:
(1) Cable and Wire Division, AT&T Technology, Inc.
(2) Belden Division, Cooper Industries.
(3) Seicor

b) Equipment Racks

(1) Panduit PanZone
(2) Chatsworth
(3) Hubbell
(4) Legrand

B. COMMUNICATIONS CABLE

1. Cable Specification: All communications cables shall be plenum rated. Manufacturers and model numbers of equipment have been specified only to establish a standard of quality.

a) Plenum rated category 6A. Number of cables per outlet is shown on plans. If not indicated, provide 3 cables minimum per outlet.

(1) EIA/TIA 568 Standard

(2) Category 6a UTP (unshielded twisted pair), Listed.

(3) 4 twisted pair 23 Gauge Solid Copper

(4) 100 Ohm Impedance

b) Plenum rated multimode fiber optic cable with the number of fibers as indicated on drawings (6-strand minimum). Fiber cable shall be installed in orange, plenum rated duct between IT rooms and zone boxes.

C. EQUIPMENT RACKS

1. Two-post, freestanding, floor mounted, modular-steel units designed for telecommunications terminal support and coordinated with dimensions of units to be supported. All racks shall be grounded to the telecommunications ground bar.

a) Approximate Module Dimensions: 84 inches high with 24 inch rack mounting space.

b) Finish: Baked-polyester powder coat.

c) Power Strip: Install an EIA 19 inch rack mounted strip of the base of the rack. Power strip shall be rated for 20 amps.

d) UPS: Minimum 1500 VA minimum, 30 minute back-up minimum.

e) Cable management:

(1) Front of the rack: Provide horizontal cable management in the very top position of the rack and then position another device between each patch panel. Provide vertical management device on rack as shown on drawings. Provide double vertical management between racks.

(2) Rear of the rack: Provide horizontal cable management device between every two patch panels. Provide vertical cable

management device on both sides of the rack as shown on drawings.

(3) Enclosed cable management shall be non-metallic.

f) Patch Panels: All patch panels shall be Power-Over-Ethernet (POE) type to power wireless access points, VoIP phones and other IP equipment. Patch panels shall include no more than 192 ports. Additional ports shall be installed in the next rack. Provide racks as required based on the number of ports shown on the telecommunications drawings.

D. ZONE BOXES

1. UL Listed, TIA/EIA compliant, Plenum Rated, 2x2 Ceiling Grid Mount.
2. Active enclosure for patch panels, cable management, and PoE network switches.
3. Integral thermal management for active equipment.
4. Two RU of active equipment space and 19" equipment mounting brackets.
5. Additional RU space and patch panels to support maximum cable quantity of box (96 port minimum)
6. Grounding and bonding provisions.
7. Cable management and strain relief.
8. Lockable, Hinged cover with gas assist air cylinders

E. VOICE/DATA OUTLETS

1. Two-gang box with single gang flush faceplate with 4 single port modules equipped with blanks as required – see plans for number of outlets at each location. Suitable for use with snap-in jacks accommodating any combination of UTP, optical fiber, and coaxial work area cords. High-impact plastic of color to be coordinated with Division 26 Section "Wiring Devices".

2. Workstation Outlets: See plans for number of port-connector assemblies to be mounted in faceplate. Jacks shall be flush mounted, capable of T568A or B universal wiring, CAT 6A component compliant, and PoE compatible. Provide with secure strain relief, positive snap latching and dust cover.

3. Outlet Identification: All outlets shall be permanently labeled using the cable identification method detailed below. All outlet labeling shall be performed using a labeling machine

4. Provide concealed 1" conduit from each communications outlet box location to above corridor ceiling.

E. HORIZONTAL CABLE MANAGEMENT

1. Provide conduit sleeves per riser on drawings.

2. Provide J-hooks to support CAT6, plenum rated cables above ceilings.

a. Wide base with smooth, rounded edges to provide proper bend radius and sized for cable quantities shown on plans.

b. Compliant with EN 50174-2, TIA 568-C, TIA 569-C, ISO/IEC 14763-2. Tested per DIN 4102-12.

F. TELECOMMUNICATIONS ROOM

1. Provide bushings on ends of all conduit. Provide pull strings in all spare conduits.

2. Provide 3/4" fire resistant plywood in each IT room where any new equipment is shown on plans.

3. Bonding shall be with No. 6AWG copper conductor in 3/4" conduit with grounding bushings. Bond all equipment back to telecom closet ground bus.

4. Provide ladder and wall mount management rings as required to properly support and dress cables.

E. PATCH CABLES

1. CAT 6A, Provide one (1) per wired jack of sufficient length based on location (IT closet or zone box).

PART 3. EXECUTION

A. GENERAL

1. Installation shall include the specified termination, testing, and documentation of all cable. The contractor shall neatly bundle all cables in the closet and label each cable to indicate floor and outlet number per owner's naming scheme for building – field coordinate with owner. All cable shall be labeled both at the termination point in the closet / zone box and at the wall plate at the wall outlet.

2. Cable ends shall be terminated with RJ45 jacks and connected to patch panels.

3. The contractor shall conduct tests outlined below for all cable. The contractor shall perform testing of all twisted pair copper cable as documented in the EIA/TIA 568-C Series standards and TSB-140 Bulletins.

4. All cabling failing to meet the stated minimum specifications shall be replaced by the contractor at no cost to the Owner.

B. EXAMINATION

1. Examine raceways and other elements to receive cable for compliance with cable installation requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.

C. INSTALLATION

1. Install cable as indicated, according to manufacturer's written instructions.

   a) Install transmission media without damaging conductors, shield, or jacket.

   b) Do not bend cable, in handling or installation, to smaller radii than minimum recommended by manufacturer

   c) Make no splices in telecommunications cables.

2. Pull cables without exceeding cable manufacturer's recommended pulling tensions.

   a) Pull cables simultaneously where more than one is being installed in same raceway.

   b) Use pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation.

   c) Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage media or raceway

3. Bond shields and drain conductors to ground at only one point in each circuit.

   a) Connect components to wiring system and to ground as indicated and instructed by manufacturer. Tighten connectors and terminals, including screws and bolts, according to equipment manufacturer's published torque-tightening values for equipment connectors. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals according to torque specified in UL Standard 486A.

4. Cable Identification: All cable shall be labeled both on the outlet and the telecommunications closet with an alpha/numeric identification code to match the existing building format. Coordinate identification scheme with owner.

5. Distribution System

   a) Communications Outlet Box: Recessed outlet boxes shall be used for voice and data services. Outlet boxes shall be 4”X4”X2-1/8” deep and have a single gang plaster ring to and single gang cover plate.

   b) Provide 1” minimum conduit from box to nearest accessible ceiling or into

telecom closet if closer.

c) Install conduit concealed in walls or above ceilings, parallel and perpendicular to surfaces and structural members. Coordinate with other new and existing systems to provide access as required and so that access to junction boxes and above ceiling equipment is not impeded.

d) Free wired plenum rated cabling above ceilings in corridors shall be supported by dedicated j-hooks spaced on 5' intervals. Cables shall be routed neatly and bundled together. Routing shall be field coordinated with other new and existing systems to provide access as required and so that access to junction boxes and above ceiling equipment is not impeded.

e) Provide conduit sleeves as shown on drawings and above hard or inaccessible ceilings and through all wall penetrations. Fire seal all sleeve penetrations through rated walls.

f) If more than two 90 degree bends or a linear distance exceeding 100 feet are required, a pull box must be installed and the locations of pull boxes shall be shown as installed in the contractor red-line drawings.

g) The uses of LB, LL and LR fittings is not allowed. Outlets shall not be looped in the same run of conduit.

h) Grounding: All vertical and horizontal metallic distribution systems must be grounded (#6AWG minimum) in accordance with National Electric Code Article 250-32.

i) Demolition: At end of project all old, unused cable shall be demolished complete.

6. Communications Closets:

a) Provide 3/4" Fire-retardant plywood fully lining all walls of MDF room and one wall of IDF rooms to a height of 9' feet and beginning at 1' above floor level. Provide cut-outs as required for receptacles in existing closets. Coordinate locations with owner.

b) Provide copper telecommunications ground bus on wall near ceiling of each IT closet. Bond each IDF room ground bus to MDF room ground bus. Bond MDF ground bus to electrical service main grounding electrode. Bonding shall be with No. 6AWG copper conductor in 3/4" conduit with grounding bushings on each end of conduit.

7. Communications Zone Boxes:

a) Mount in centrally located, vacant 2x2 ceiling tile in each zone. Field coordinate the exact location with engineer / owner and all new and existing equipment and structures above, in and below ceiling so that equipment is easily accessed from above or below ceiling. Locations should be in area

where access would minimize disruptions to occupants.

b) Provide support to structure as required for weigh of box, cables and equipment. The ceiling grid support shall not be used to support equipment. Support cable outside of box to reduce weight load on box.

D. QUALITY CONTROL

1. Testing Firm: Provide the services of a qualified independent testing firm to perform specified field quality-control testing.

2. Testing: Upon installation of cable and before energizing, demonstrate product capability and compliance with requirements.

a) Copper Cable Procedures: Inspect for physical damage and test cable for continuity and shorts. Use time domain reflectometer with strip chart recording capability and anomaly resolution to within 12 inches (300 mm) in runs up to 100 feet (300 m) in length. Test cable segments for faulty connectors, splices, terminations, and the integrity of the cable and its component parts

b) Testing shall be end-to-end and shall encompass cable, patch panel termination, and face plate termination.

c) Test UTP cable in accordance with TIA-568-C standards including.

(1) TIA-568-C.0, -C.1, - C.2, -C.3, and -C.4 and TSB-140. Document results and deliver to owner for review and acceptance

d) Copper cabling shall be fully tested for compliance with the TIA guidelines, including the following parameters

(1) DC resistance
(2) Open pairs
(3) Shorted pairs
(4) Split pairs
(5) Reversed conductors
(6) NEXT (test from both ends)
(7) ELFEXT
(8) Return loss
(9) Delay skew

3. Fiber Cable Procedures: Inspect for physical damage and test each fiber in each cable section. Tests shall include OTDR and optical signal level measurements. Fiber shall be tested in both directions. Test cable segments for faulty connectors, splices, terminations, and the integrity of the cable and its component parts. Provide OTDR signature traces and optical signal measurement reports to the owner and engineer.

4. Correct malfunctioning items and retest to demonstrate compliance; otherwise,

remove and replace with new items and retest.

E. CLEANING

1. Upon completion of system installation, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasion. Remove debris from outlet boxes prior to installing devices.

F. DEMONSTRATION / TRAINING

1. Operate systems to demonstrate proper functioning. Replace malfunctioning items.

2. Train Owner’s IT personnel on procedures and schedules for start-up and shutdown, troubleshooting, servicing, and preventive maintenance as applicable for equipment installed.

3. Review data in operating and maintenance manuals.

4. Schedule training with Owner, through the Architect, with at least 7 days' advanced notice.

5. Review identification scheme with owner prior to system labeling.

6. Review installation and test results with owner at completion of installation.

END OF SECTION 260534

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Warning labels and signs.
6. Instruction signs.
7. Equipment identification labels.
8. Miscellaneous identification products.

1.2 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

1.3 QUALITY ASSURANCE

A. Comply with ANSI C2.

B. Comply with NFPA 70 (2017).

C. Comply with ANSI A13.1 and NFPA 70 for color-coding.

PART 2 - PRODUCTS

2.1 RACEWAY AND CABLE LABELS

A. Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

1. Color: Black letters on orange field.
2. Legend: Indicates voltage and service.

B. Pretensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the line it identifies and arranged to stay in place by pretensioned gripping action when placed in position.

C. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape.

1. Not less than 6 inches wide by 4 mils thick.
2. Compounded for permanent direct-burial service.
3. Embedded continuous metallic strip or core.
4. Printed legend indicating type of underground line.

D. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

E. Aluminum, Wraparound Marker Bands: Bands cut from 0.014-inch- thick aluminum sheet, with stamped or embossed legend, and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.

F. Plasticized Card-Stock Tags: Vinyl cloth with preprinted and field-printed legends. Orange background, unless otherwise indicated, with eyelet for fastener.

G. Aluminum-Faced, Card-Stock Tags: Weather-resistant, 18-point minimum card stock faced on both sides with embossable aluminum sheet, 0.002 inch thick, laminated with moisture-resistant acrylic adhesive, punched for fasteners, and preprinted with legends to suit each application.

H. Brass or Aluminum Tags: 2 by 2 by 0.05-inch metal tags with stamped legend, punched for fastener.

2.2 NAMEPLATES AND SIGNS

A. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.

B. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes. Letters shall be 1/2” high minimum and the nameplate material colors shall be as follows:

1. Blue surface with white core for 120/208 volt equipment.
2. Black surface with white core for 277/480 volt equipment.
3. Bright Red surface with white core for all equipment related to fire alarm system.
4. Dark red (burgundy) surface with white core for all equipment related to security.
5. Green surface with white core for all equipment related to “emergency” systems.
6. Orange surface with white core for all equipment related to telephone systems.
7. Brown surface with white core for all equipment related to data systems.
8. White surface with black core for all equipment related to paging systems.
9. Purple surface with white core for all equipment related to TV systems.

C. All outlet boxes, junction boxes and pull boxes shall have their covers and exterior visible surfaces painted with colors to match the color scheme outlined above. This includes covers on boxes above lift-out and other type accessible ceilings. This does not apply to exposed box covers installed in spaces visible to the general public.

D. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for the application. 1/4-inch grommets in corners for mounting.

E. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for the application. 1/4-inch grommets in corners for mounting.

F. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

2.3 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16 inch.
2. Tensile Strength: 50 lb minimum.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: According to color-coding.

B. Paint: Formulated for the type of surface and intended use.

1. Primer for Galvanized Metal: Single-component acrylic vehicle formulated for galvanized surfaces.
2. Primer for Concrete Masonry Units: Heavy-duty-resin block filler.
3. Primer for Concrete: Clear, alkali-resistant, binder-type sealer.
4. Enamel: Silicone-alkyd or alkyd urethane as recommended by primer manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.

1. Circuits with More Than 600 V: Identify raceway and cable with "DANGER--HIGH VOLTAGE" in black letters 2 inches high, stenciled with paint at 10-foot intervals over a continuous, painted orange background.

C. Install painted identification according to manufacturer's written instructions and as follows:

1. Clean surfaces of dust, loose material, and oily films before painting.
2. Prime surfaces using type of primer specified for surface.
3. Apply one intermediate and one finish coat of enamel.

D. Color Banding Raceways and Exposed Cables: Band exposed and accessible raceways of the systems listed below:

1. Bands: Pretensioned, wraparound plastic sleeves; colored adhesive tape; or a combination of both. Make each color band 2 inches wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side.
2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
3. Apply the following colors to the systems listed below:

    a. Fire Alarm System: Red.
    b. Fire-Suppression Supervisory and Control System: Red and yellow.
    c. Combined Fire Alarm and Security System: Red and blue.
    d. Security System: Blue and yellow.
    e. Mechanical and Electrical Supervisory System: Green and blue.
    f. Telecommunication System: Green and yellow.

E. Caution Labels for Indoor Boxes and Enclosures for Power and Lighting: Install pressure-sensitive, self-adhesive labels identifying system voltage with black letters on orange background. Install on exterior of door or cover.

F. Circuit Identification Labels on Boxes: Install labels externally.

1. Exposed Boxes: Pressure-sensitive, self-adhesive plastic label on cover and in box.
2. Concealed Boxes: Plasticized card-stock tags.
3. Labeling Legend: Permanent, waterproof listing of panel and circuit number or equivalent.

G. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above line at 6 to 8 inches below finished grade. Where width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches overall, use a single line marker.

H. Secondary Service, Feeder, and Branch-Circuit Conductors: Color-code throughout the secondary electrical system.

1. Color-code 208/120-V system as follows:

    a. Phase A: Black.
    b. Phase B: Red.
    c. Phase C: Blue.
    d. Neutral: White.
    e. Ground: Green.

2. Color-code 480/277-V system as follows:

    a. Phase A: Brown
    b. Phase B: Orange.
    c. Phase C: Yellow.
    d. Neutral: Natural gray.
    e. Ground: Green.

3. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG, except for ground and neutral conductors which must be factory colored #6 AWG and smaller:

    a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 1-inch-wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.
    b. Colored cable ties applied in groups of three ties of specified color to each wire at each terminal or splice point starting 3 inches from the terminal and spaced 3 inches apart. Apply with a special tool or pliers, tighten to a snug fit, and cut off excess length.

I. Power-Circuit Identification: Metal tags or aluminum, wraparound marker bands for cables, feeders, and power circuits in vaults, pull and junction boxes, manholes, and switchboard rooms.

1. Legend: 1/4-inch- steel letter and number stamping or embossing with legend corresponding to indicated circuit designations.
2. Tag Fasteners: Nylon cable ties.
3. Band Fasteners: Integral ears.

J. Apply warning, caution, and instruction signs as follows:

1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
2. Emergency Operation: Install engraved laminated signs with white legend on red background with minimum 3/8-inch- high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

K. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with 1/2-inch- high lettering on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high. Use nameplate colors specified in paragraph 2.2B. Apply labels for each unit of the following categories of equipment using mechanical fasteners:

1. Panelboards, electrical cabinets, and enclosures.
2. Access doors and panels for concealed electrical items.
3. Electrical switchgear and switchboards.
4. Emergency system boxes and enclosures.
5. Disconnect switches.
6. Enclosed circuit breakers.
7. Motor starters.
8. Push-button stations.
9. Power transfer equipment.

10. Contactors.
11. Control devices.
12. Transformers.
13. Power-generating units.
14. Telephone switching equipment.
15. Fire alarm master station or control panel.

END OF SECTION 260553

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following lighting control devices:

1. Indoor occupancy sensors.
2. Dimmers

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field quality-control test reports.

C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a third party testing agency accredited by the NCBCC (North Carolina Building Code Council) to Label Electrical & Mechanical Equipment and marked for the intended use.

B. Comply with NFPA 70 (2017).

PART 2 - PRODUCTS

2.1 INDOOR OCCUPANCY SENSORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hubbell Lighting.
2. Sensor Switch, Inc.
3. Watt Stopper (The).
4. Leviton

B. General Description: Wall- or ceiling-mounting, solid-state units with a separate relay unit.

1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 20 minutes.

2. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.
3. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
4. Mounting:

    a. Sensor: Suitable for mounting in any position on a standard outlet box.
    b. Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
    c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.

5. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
6. Bypass Switch: Override the on function in case of sensor failure.

C. PIR Type: Ceiling mounting; detect occupancy by sensing a combination of heat and movement in area of coverage.

1. Detector Sensitivity: Detect occurrences of 6-inch- minimum movement of any portion of a human body that presents a target of not less than 36 sq. in.
2. Detection Coverage (Room): Detect occupancy anywhere in a circular area of 1000 sq. ft. when mounted on a 96-inch- high ceiling.
3. Detection Coverage (Corridor): Detect occupancy within 90 feet when mounted on a 10-foot- high ceiling.

2.2 DIMMERS

A. Manufacturers: Any manufacturer providing a compatible dimmer compatible with the dimming ballast provided or specified with the lighting fixture. See fixture schedule and plans for details.

1. General Description: Flush wall mounted in standard switch box.
2. Voltage Compensation: Maintains stable light levels despite line voltage variations.
3. Mechanical Air-Gap: Provided with mechanical air-gap to disconnect load power.
4. Ratings: Rated for the Voltage, total circuit Watts, and fixture type (see plans for details).

PART 3 - EXECUTION

3.1 SENSOR INSTALLATION

A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

B. Set time to maximum setting in toilets and offices and to 10 minutes in other spaces. Confirm settings with owner prior to programming.

3.2 WIRING INSTALLATION

A. Wiring Method: Comply with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size shall be 1/2 inch.

B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.3 IDENTIFICATION

A. Identify components and power and control wiring according to Division 26 Section "Identification for Electrical Systems."

1. Identify controlled circuits in lighting contactors.
2. Identify circuits or luminaries controlled by occupancy sensors at each sensor.

B. Label contactors with a unique designation.

3.4 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. After installing sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
2. Operational Test: Verify operation of each lighting control device, and adjust time delays.

B. Lighting control devices that fail tests and inspections are defective work.

END OF SECTION 260923

SECTION 262200 - DRY-TYPE TRANSFORMERS (1000 V AND LESS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes dry-type distribution and specialty transformers rated 1000 V and less.

1.3 SUBMITTALS

A. Product Data: Include data on features, components, ratings, and performance for each type of transformer specified. Include dimensioned plans, sections, and elevation views. Show minimum clearances and installed devices and features.

B. Wiring Diagrams: Detail wiring and identify terminals for tap changing and connecting field-installed wiring.

C. Product Certificates: Signed by manufacturers of transformers certifying that the products furnished comply with requirements.

D. Maintenance Data: For transformers to include in the maintenance manuals.

1.4 QUALITY ASSURANCE

A. Listing and Labeling: Provide transformers specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.
2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.

B. Comply with IEEE C2.

C. Comply with NFPA 70 (2017).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide transformers by one the following:

1. GE Electrical Distribution & Control.
2. Square D; Groupe Schneider.
3. Siemens
4. Cutler Hammer

2.2 TRANSFORMERS, GENERAL

A. Description: Factory-assembled and -tested, air-cooled units of types specified, designed for 60-Hz service.

B. Cores: Grain-oriented, nonaging silicon steel.

C. Coils: Continuous windings without splices, except for taps.

D. Internal Coil Connections: Brazed or pressure type.

E. Enclosure: Class complies with NEMA 250 for the environment in which installed.

2.3 GENERAL-PURPOSE DISTRIBUTION AND POWER TRANSFORMERS

A. Comply with NEMA ST 20 and list and label as complying with UL 1561.

B. Cores: One leg per phase.

C. Windings: One coil per phase in primary and secondary.

D. Enclosure: Indoor, ventilated.

E. Insulation Class: 185 or 220 deg C class for transformers 15 kVA or smaller; 220 deg C class for transformers larger than 15 kVA.

1. Rated Temperature Rise: 80 deg C maximum rise above 40 deg C.

F. Taps: For transformers 3 kVA and larger, full-capacity taps in high-voltage windings are as follows:
1. Taps, 3 through 10 kVA: Two 5-percent taps below rated high voltage.
2. Taps, 15 through 500 kVA: Six 2.5-percent taps, 2 above and 4 below rated high voltage.

3. Taps, 750 kVA and Above: Four 2.5-percent taps, 2 above and 2 below rated high voltage.

G. Wall-Mounting Brackets: Manufacturer's standard brackets for transformers up to 75 kVA.

2.4 FINISHES

A. Indoor Units: Manufacturer's standard paint over corrosion-resistant pretreatment and primer.

B. Outdoor Units: Comply with ANSI C57.12.28.

2.5 SOURCE QUALITY CONTROL

A. Factory Tests: Design and routine tests comply with referenced standards.

B. Factory Sound-Level Tests: Conduct sound-level tests on equipment for this Project if specified sound levels are below standard ratings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with safety requirements of IEEE C2.

B. Arrange equipment to provide adequate spacing for access and for circulation of cooling air.

C. Identify transformers and install warning signs according to Division 16 Section "Electrical Identification."

3.2 GROUNDING

A. Separately Derived Systems: Comply with NFPA 70 requirements for connecting to grounding electrodes and for bonding to metallic piping near the transformer.

B. Comply with Division 16 Section "Grounding" for materials and installation requirements.

3.3 CLEANING

A. On completion of installation, inspect components. Remove paint splatters and other spots, dirt, and debris. Repair scratches and mars on finish to match original finish. Clean components internally using methods and materials recommended by manufacturer.

3.4 ADJUSTING

A. After installing and cleaning, touch up scratches and mars on finish to match original finish.

B. Adjust transformer taps to provide optimum voltage conditions at utilization equipment throughout normal operating cycle of facility. Record primary and secondary voltages and tap settings and submit with test results.

END OF SECTION 262200

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes panelboards, overcurrent protective devices, and associated auxiliary equipment rated 600 V and less for the following types:

1. Lighting and appliance branch-circuit panelboards.
2. Distribution panelboards.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. RFI: Radio-frequency interference.

D. RMS: Root mean square.

E. SPDT: Single pole, double throw.

F. TVSS: Transient voltage surge suppressor.

1.4 SUBMITTALS

A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

C. Maintenance Data: For panelboards and components to include in maintenance manuals specified in Division 1. In addition to requirements specified in Division 1 Section "Contract Closeout," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.

2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a third party testing agency accredited by the NCBCC (North Carolina Building Code Council) to Label Electrical & Mechanical Equipment and marked for the intended use.

B. Comply with NEMA PB 1.

C. Comply with NFPA 70 (2017).

1.6 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Panelboards, Overcurrent Protective Devices, Controllers, Contactors, and Accessories:

a. Square D Co.
b. General Electric Co.
c. Siemens
d. Cutler Hammer

2.2 FABRICATION AND FEATURES

A. Enclosures: Flush- and surface-mounted cabinets. NEMA PB 1, Type 1, to meet environmental conditions at installed location.

B. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.

C. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.

D. Directory Card: With transparent protective cover, mounted inside metal frame, inside panelboard door.

E. Bus: Hard-drawn copper, 98 percent conductivity

F. Main and Neutral Lugs: Mechanical type suitable for use with conductor material.

G. Equipment Ground Bus: Hard drawn copper adequate for feeder and branch-circuit equipment ground conductors; bonded to box.

H. Isolated Equipment Ground Bus: Hard drawn copper adequate for branch-circuit equipment ground conductors; insulated from box.

I. Extra-Capacity Neutral Bus: Hard drawn copper neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads.

J. Split Bus: Vertical buses divided into individual vertical sections.

K. Gutter Barrier: Arrange to isolate individual panel sections.

L. Column-Type Panelboards: Narrow gutter extension, with cover, to overhead junction box equipped with ground and neutral terminal buses.

2.3 PANELBOARD SHORT-CIRCUIT RATING

A. Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

B. Doors: Door-in-door type, front mounted with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.5 DISTRIBUTION PANELBOARDS

A. Doors: Front mounted secured with vault-type latch with tumbler lock; keyed alike.

B. Main Overcurrent Protective Devices: Circuit breaker, bolt on type.

C. Branch overcurrent protective devices shall be one of the following:

1. For Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
2. For Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

2.6 OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker: Bolt on type NEMA AB 1, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic Trip Unit Circuit Breakers: RMS sensing; field-replaceable rating plug; with the following field-adjustable settings:

    a. Instantaneous trip.
    b. Long- and short-time pickup levels.
    c. Long- and short-time time adjustments.
    d. Ground-fault pickup level, time delay, and I^2t response.

4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. GFCI Circuit Breakers: Single- and two-pole configurations with **5** mA trip sensitivity.

B. Molded-Case Circuit-Breaker Features and Accessories. Standard frame sizes, trip ratings, and number of poles.

1. Lugs: Mechanical style, suitable for number, size, trip ratings, and material of conductors.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Mounting Heights: Top of trim 74 inches above finished floor, unless otherwise indicated.

C. Mounting: Plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.

D. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

E. Install filler plates in unused spaces.

F. Provision for Future Circuits at Flush Panelboards: Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.

3.2 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section

B. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.3 CONNECTIONS

A. Install equipment grounding connections for panelboards with ground continuity to main electrical ground bus.

B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.4 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots.

END OF SECTION 262416

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes receptacles, connectors, switches, and finish plates.

1.3 DEFINITIONS

A. GFCI: Ground-fault circuit interrupter.

1.4 SUBMITTALS

A. Product Data: For each product specified.

B. Maintenance Data: For materials and products to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a third party testing agency accredited by the NCBCC (North Carolina Building Code Council) to Label Electrical & Mechanical Equipment and marked for the intended use.

B. Comply with NEMA WD 1.

C. Comply with NFPA 70 (2017).

1.6 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

1. Cord and Plug Sets: Match equipment requirements.

PART 2 - PRODUCTS

2.1 RECEPTACLES

A. Duplex receptacles shall be of the grounding type arranged for back and side wiring, with separate single or double grounding terminals. Receptacles shall be straight blade rated 20 amperes, 125 volt. The face configuration shall comply to the NEMA standard No. WDI.101968 and shall be approved third party listed. Self grounding or automatic type grounding receptacles are not acceptable in lieu of receptacle with separate hex head green grounding screw lugs and a direct green insulated conductor connection to the equipment grounding system.

B. Receptacles shall be heavy duty specification grade mounted vertically. Receptacles mounted over counters, back splashes, etc. shall be mounted horizontally.

C. GFCI Receptacles: Feed-through type, with integral NEMA WD 6, 20 ampere rated, Configuration 5-20R duplex receptacle arranged to protect connected downstream receptacles on same circuit.

D. Industrial Heavy-Duty Receptacle: Comply with IEC 309-1.

E. Hazardous (Classified) Location Receptacles: Comply with NEMA FB 11.

F. Exterior receptacles shall be GFI type rated for wet locations and installed in a weatherproof while in use cover. Box and cover shall be heavy duty aluminum. No plastic covers will be accepted.

2.2 SWITCHES

A. Snap Switches: Heavy-duty, quiet type, single pole, three-way, or four-way as indicated on the drawings. Switches shall be grounding type with hex head grounding screw rated 20 amperes, 120/277 volts A.C. only. All switches shall have quiet operating mechanism without the use of mercury. All switches shall be listed by an approved third party agency approved for the voltage and amperage indicated.

2.3 WALL PLATES

A. Single and combination types match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: Tough non-combustible plastic.
3. Material for Unfinished Spaces: Galvanized steel.

2.4 FINISHES

A. Color: White devices and cover plates.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install devices and assemblies plumb and secure.

B. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

3.2 IDENTIFICATION

A. Comply with Division 26 Section "Electrical Identification."

1. Receptacle and switch cover plates: Identify panelboard and circuit number from which served. Use machine-printed, pressure-sensitive, abrasion-resistant label tape on face of plate and durable wire markers or tags within outlet boxes.

3.3 CONNECTIONS

A. Connect wiring device grounding terminal to branch-circuit equipment grounding conductor. All circuits shall have a green grounding conductor.

B. Isolated-Ground Receptacles: Connect to isolated-ground conductor routed to designated isolated equipment ground terminal of electrical system.

3.4 FIELD QUALITY CONTROL

A. Test wiring devices for proper polarity and ground continuity.

B. Test GFCI operation with both local and remote fault simulations according to manufacturer's written instructions.

C. Replace damaged or defective components.

3.5 CLEANING

A. Internally clean devices, device outlet boxes, and enclosures. Replace stained or improperly painted wall plates or devices.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.

2. Percent Voltage Drop under 15-A Load: A maximum value of 5 percent is acceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new, and retest as specified above.

END OF SECTION 262726

SECTION 262813 - FUSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Cartridge fuses rated 600-V ac and less for use in enclosed switches.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a third party testing agency accredited by the NCBCC (North Carolina Building Code Council) to Label Electrical & Mechanical Equipment and marked for the intended use.

B. Comply with NEMA FU 1 for cartridge fuses.

C. Comply with NFPA 70 (2017).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements provide products by manufacturers offering products that may be incorporated into the Work including, but are not limited to, the following:

1. Cooper Bussmann, Inc.
2. Edison Fuse, Inc.
3. Ferraz Shawmut, Inc.
4. Littelfuse, Inc.

2.2 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

PART 3 - EXECUTION

3.1 FUSE APPLICATIONS

A. Service Entrance: Class L, time delay, current limiting with 200kA interrupting rating.

B. Feeders: Class RK1 or Class J, time delay, current limiting with 200kA interrupting rating.

C. Motor Branch Circuits: Class RK5, time delay, current limiting, 100kA interrupting rating.

D. Other Branch Circuits: Class RK5, time delay, 50kA. Interrupting rating unless otherwise noted on the plans.

E. Control Circuits: Class CC.

3.2 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

3.3 IDENTIFICATION

A. Install labels complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems" and indicating fuse replacement information on inside door of each fused switch and adjacent to each fuse block and holder.

END OF SECTION 262813

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Nonfusible switches.

1.2 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.3 SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated.

B. Field quality-control reports.

C. Operation and maintenance data.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a third party testing agency accredited by the NCBCC (North Carolina Building Code Council) to Label Electrical & Mechanical Equipment and marked for the intended use.

B. Comply with NFPA 70 (2017).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Square D Co.

2. General Electric Co.; Electrical Distribution & Control Division.
3. Cutler Hammer
4. Siemens

2.2 ENCLOSED SWITCHES

A. Enclosed, Nonfusible Switch: NEMA KS 1, Type Heavy Duty (HD) with lockable handle. General duty switches are not acceptable

B. Switches shall have tool defeatable door interlocks that prevent the door from opening when the operating handle is in the “on” position.

C. Switches shall have handles whose positions are easily recognizable in the “on” or “off” position. Padlocks shall be provided for switches located in public areas.

D. Switches shall have nonteasible, positive, quick make-quick break mechanisms.

E. Enclosed, Fusible Switch, 800 A and Smaller: NEMA KS 1, Type HD, with clips to accommodate specified fuses, lockable handle with two padlocks, and interlocked with cover in closed position.

F. Fusible safety switches with short circuit withstand ratings of 100K Amp or 200K Amp require Class R or Class J rejection fuse block feature. (Comply with NEC Article 110-9 and 240-60b)

G. Select/Provide Fuses per the following criteria
   1. Motors, Motor Controller & Transformer Circuits: Class RK5, U/L listed, current limiting time delay with 200K Amp interrupting capacity

H. Spare Fuses: Provide 10% spare fuses of each size and type required with a minimum of one set of each.

2.3 ENCLOSURES

A. NEMA AB 1 and NEMA KS 1 to meet environmental conditions of installed location.

   1. Outdoor Locations: NEMA 250, Type 3R.
   2. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
   3. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.

2.4 FACTORY FINISHES

A. Finish: Manufacturer's standard paint applied to factory-assembled and -tested enclosures before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section.

B. Enclosure Nameplates: Label each enclosure with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.3 CONNECTIONS

A. Install equipment grounding connections for switches and circuit breakers with ground continuity to main electrical ground bus.

B. Install power wiring. Install wiring between switches and circuit breakers, and control and indication devices.

C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 CLEANING

A. On completion of installation, inspect interior and exterior of enclosures. Remove paint splatters and other spots. Repair exposed surfaces to match original finish.

END OF SECTION 262816

SECTION 263213 - ENGINE GENERATORS – DIESEL (ALTERNATE G-3)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Base bid work does not include a new generator but does include modifications to existing generator as required to add a life safety branch to the building.

B. Alternate G-3 provides a new generator and automatic transfer switches. Generator will supply legally required emergency loads and must deliver power within 10 seconds of normal power interruption.

C. This Section includes packaged diesel-engine generator set with features and accessories including but not limited to the following:

1. 275kW/343.75kVA, 480Y/277V, 3-phase, 4-wire.
2. Wired for use with 3-Pole Automatic Transfer Switch.
3. Air-intake silencer.
4. Battery charger.
5. Base fuel tank (24 Hours supply at full load).
6. Engine generator set.
7. Muffler.
8. Outdoor, sound attenuated enclosure.
9. Remote annunciator (Shall comply with NFPA 110).
10. Remote stop switch.
11. Starting battery.
12. Provide a 4-pole alternator, with drip-proof construction, revolving field type, protected and sized for maximum motor starting loads. Insulation shall be Class F per NEMA MG1-1.65. Rotor is dynamically balanced and permanently aligned to engine by flexible disc coupling.
13. Voltage regulation shall be solid state temperature compensated with phase controlled sensing.
14. Provide heavy duty ball bearings, permanently lubricated.
15. The generator engine shall have sub-transient reactance of 12% maximum
16. Two-thirds pitch stator winding and fully linked amortisseur winding shall be provided.
17. Electronic fuel ignition control shall be provided.
18. The governor shall be electronic, adjustable isochronous, with speed sensing.
19. Provide permanent magnet excitation
20. Noise levels 75BA at 7 m (23 ft).

1.3 DEFINITIONS

A. Standby Rating: Power output rating equal to the power the generator set delivers continuously under normally varying load factors for the duration of a power outage.

B. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

C. Steady-State Voltage Modulation: The uniform cyclical variation of voltage within the operational bandwidth, expressed in Hertz or cycles per second.

1.4 SUBMITTALS

A. Product Data: Include data on features, components, ratings, and performance. Include the following:

1. Dimensioned outline plan and elevation drawings of engine generator set and other components specified.
2. Thermal damage curve for generator.
3. Time-current characteristic curves for generator protective device.
4. Manufacturer and model number of all major components.
5. Construction materials.
6. Performance characteristic.
7. Technical product data, specifications, Installation instructions and owners manuals (3 copies).
8. Maintenance data and parts lists / manuals including furnished accessories. Include service and/or operators manuals, wiring diagrams, recommended preventative maintenance, controls manuals, diagnostic manuals and software (3 copies).
9. Provide a current factory approved certification/training schedule for the specific system as detailed above.

B. Shop Drawings: Indicate fabrication details, dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
1. Wiring Diagrams: Detail wiring for power and control connections and differentiate between factory-installed and field-installed wiring.

C. Factory Test Reports: For units to be shipped for this Project, showing evidence of compliance with specified requirements.
1. Maintenance Data: For each packaged engine generator and accessories to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Must be regularly engaged in the manufacture of UL Listed and Labeled generator systems of types, sizes, and electrical characteristics required. Must maintain a service center capable of emergency maintenance and repairs at the Project within four hours' maximum response time. Service Center must be factory authorized, must provide replacement parts supplied by same manufacturer as the generator system and must maintain a stock of these spare parts.

B. Manufacturers shall agree to make the factory training/certification, product programs/software, and/or operating systems, and continued product updates and/or Tech notes available to the owner. Any licensing and/or proprietary agreements between manufacturer and the owner shall be in place prior to product being acceptable.

C. Codes and Standards: The generator system shall meet the following minimum criteria.

1. **NEC Compliance:** Comply with current applicable requirements of NFPA-70, National Electrical Code (NEC) standards pertaining to generator systems.

2. **NFPA Compliance:** Comply with current applicable requirements of NFPA-72, National Fire Alarm Code and NFPA 110 Standard for Emergency and Standby Power Systems.

3. **Testing Laboratory Compliance:** All components shall comply with provisions of applicable UL safety standards. The generator set shall comply with UL-2200 and shall be Listed and Labeled. Listing mark shall be inclusive of the entire assembly – generator, enclosure, accessories, etc.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver engine generator set and system components to their final locations in protective wrappings, containers, and other protection that will exclude dirt and moisture and prevent damage from construction operations. Remove protection only after equipment is safe from such hazards.

1.7 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

1. Warranty Period: Full, five years from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

A. Maintenance: At Substantial Completion, begin 12 months' full maintenance by skilled employees of the manufacturer's designated service organization. Include quarterly exercising to check for proper, starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Maintenance agreements shall include parts and supplies as used in the manufacture and installation of original equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Kohler Co. Generator Division. (Design Basis)
2. Caterpillar, Inc.
3. Onan Corp, Industrial Business Group

2.2 ENGINE GENERATOR SET

A. Furnish a 275kW, 3-Phase, 4-Wire generator set with a coordinated assembly of compatible components.

B. Output Connections: 480Y/208V, Three-phase, four-wire.

C. Safety Standard: Comply with ASME B15.1.

D. Comply with level 1 requirements of NFPA 110.

E. Nameplates: Each major system component is equipped with a conspicuous nameplate of component manufacturer. Nameplate identifies manufacturer of origin and address, and model and serial number of item.

F. Power Output Ratings: Nominal ratings as indicated, with capacity as required to operate as a unit as evidenced by records of prototype testing.

2.3 GENERATOR-SET PERFORMANCE

A. Steady-State Voltage Operational Bandwidth: 4 percent of rated output voltage from no load to full load.

B. Steady-State Voltage Modulation Frequency: Less than 1 Hz.

C. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage recovers to remain within the steady-state operating band within three seconds.

D. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.

E. Steady-State Frequency Stability: When system is operating at any constant load within rated load, there are no random speed variations outside the steady-state operational band and no hunting or surging of speed.

F. Transient Frequency Performance: Less than 5 percent variation for a 50 percent step-load increase or decrease. Frequency recovers to remain within the steady-state operating band within five seconds.

G. Output Waveform: At no load, harmonic content measured line to line or line to neutral does not exceed 5 percent total and 3 percent for single harmonics. The telephone influence factor, determined according to NEMA MG 1, shall not exceed 50.

H. Sustained Short-Circuit Current: For a three-phase, bolted short circuit at system output terminals, the system will supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to any generator system component.

2.4 SERVICE CONDITIONS

A. Environmental Conditions: Engine generator system withstands the following environmental conditions without mechanical or electrical damage or degradation of performance capability:
   1. Ambient Temperature: Minus 15 to plus 40 deg C.
   2. Altitude: Sea level to 1000 feet.

2.5 ENGINE

A. Comply with NFPA 37.

B. Type: Diesel

C. Fuel: Fuel oil, Grade DF-2.

D. Rated Engine Speed: 1800 rpm.

E. Lubrication System: Pressurized by a positive-displacement pump driven from engine crankshaft. The following items are mounted on engine or skid:

   1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
   2. Thermostatic Control Valve: Controls flow in system to maintain optimum oil temperature. Unit is capable of full flow and is designed to be fail-safe.

3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps or siphons or special tools or appliances.

F. Engine Fuel System: Comply with NFPA 37. System includes the following:

1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
2. Relief/Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.

2.6 GOVERNOR

A. Type: Adjustable isochronous, with speed sensing.

2.7 ENGINE COOLING SYSTEM

A. Description: Closed loop, liquid cooled, with radiator factory mounted on engine generator-set skid and integral engine-driven coolant pump.

B. Radiator: Rated for specified coolant.

1. Radiator Core Tubes: Nonferrous-metal construction other than aluminum.
2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
3. Fan: Driven by multiple belts from engine shaft.

C. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.

D. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.

2.8 FUEL SUPPLY SYSTEM

A. Comply with NFPA 30 and NFPA 37.

B. Standard, base-Mounted Fuel Oil Tank: Factory-installed and -piped, listed and labeled fuel oil tank. Features include the following:

1. Tank level indicator.
2. Capacity: 24 hours back-up at full load prime.
3. Vandal-resistant fill cap.
4. Containment Provisions: Comply with requirements of authorities having jurisdiction.
5. The Contractor shall fill fuel oil tanks immediately after installation using Ultra Low Sulfur Diesel (ULSD) with a sulfur content not to exceed 15 parts per million, and refilled immediately with ULSD prior to acceptance of the building.

2.9 ENGINE EXHAUST SYSTEM

A. Muffler: Critical type, sized as recommended by engine manufacturer.

1. Noise levels - 75dB at 7 meters.
2. Minimum sound attenuation of 25 dB at 500 Hz.

2.10 COMBUSTION-AIR-INTAKE SYSTEM

A. Air-Intake Silencer: Filter type provides filtration as recommended by engine manufacturer.
1. Mounting: Factory installed on engine generator set at a location readily accessible for service.

2.11 STARTING SYSTEM

A. Description: 24-V electric, with negative ground and including the following items:

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in "Environmental Conditions" Paragraph in "Service Conditions" Article above.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: 60 seconds.
4. Battery: Adequate capacity within ambient temperature range specified in "Environmental Conditions" Paragraph in "Service Conditions" Article above to provide specified cranking cycle at least three times without recharging.
5. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
6. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit complies with UL 1236 and includes the following features:

    a. Operation: Equalizing-charging rate of 10 A is initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit then automatically switches to a lower float-charging mode and continues operating in that mode until battery is discharged again.
    b. Automatic Temperature Compensation: Adjusts float and equalizes voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
    c. Automatic Voltage Regulation: Maintains output voltage constant regardless of input voltage variations up to plus or minus 10 percent.
    d. Ammeter and Voltmeter: Flush mounted in door. Meters indicate charging rates.
    e. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.12 CONTROL AND MONITORING

A. Functional Description: When the mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic-transfer switches initiate starting and stopping of the generator set. When the mode-selector switch is switched to the on position, the generator set manually starts. The off position of the same

switch initiates generator-set shutdown. When the generator set is running, specified system or equipment failures or derangements automatically shut down the generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down the generator set.

B. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages are grouped on a common control and monitoring panel mounted on the generator set. Mounting method isolates the control panel from generator-set vibration.

C. Indicating and Protective Devices and Controls: Include the following:

1. AC voltmeter.
2. AC ammeter.
3. AC frequency meter.
4. DC voltmeter (alternator battery charging).
5. Engine-coolant temperature gage.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.
10. Fuel tank derangement alarm.
11. Fuel tank high-level shutdown of fuel supply alarm.
12. Generator overload.
13. Safety shutdown and alarm light for:
    a. High water temperature
    b. Low oil pressure
    c. Engine over-speed
    d. Engine over-crank
    e. Auto-Off-Reset switch

D. Provide remote annunciator in 5th floor data center to report alarms.

E. Supporting Items: Include sensors, transducers, terminals, relays, and other devices, and wiring required to support specified items. Locate sensors and other supporting items on engine, generator, or elsewhere as indicated. Where not indicated, locate to suit manufacturer's standard.

2.13 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Circuit Breakers (multiple): Rating (see power riser), Molded-case, thermal-magnetic type; complying with NEMA AB 1 and UL 489.

1. Tripping Characteristic: Designed specifically for generator protection.
2. Trip Rating: Matched to generator rating, life safety branch breaker shall be LSI mission critical type for selective coordination.
3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
4. Mounting: Adjacent to or integrated with control and monitoring panel.

2.14 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Minimum Class F.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Enclosure: Drip proof.

G. Instrument Transformers: Mounted within generator enclosure.

H. Voltage Regulator: Heavy Duty, Solid-state type, separate from exciter, providing performance as specified.

1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.

2. Temperature compensated with phase controlled sensing.

3. Permanently lubricated.

I. Block Heater: Single phase, thermostatically controlled, immersion type engine coolant heater arranged to maintain a minimum coolant temperature of 120 degrees F. Provide contactor in NEMA rated enclosure to disconnect heater when engine is running.

J. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

K. Sub-transient reactance: 12% maximum.

L. Rotor shall be dynamically balanced and permanently aligned to engine by flexible disc coupling.

2.15 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Sound attenuated (75dB max at 7M), Vandal-resistant, weatherproof steel housing, wind resistant up to 100 mph. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.

B. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.

1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.
2. Automatic Dampers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.

C. Interior Lights with Switch: Factory-wired, vaporproof-type fixtures within housing; arranged to illuminate controls and accessible interior. Arrange for external electrical connection.

1. AC lighting system and connection point for operation when remote source is available.
2. DC lighting system for operation when remote source and generator are both unavailable.

D. Convenience Outlets: Factory wired. Arrange for external electrical connection.

2.16 VIBRATION ISOLATION DEVICES

A. Engine-generator system shall be fastened to a welded steel base which allows mounting to a raised concrete pad. Vibration isolation shall be installed between base and generator system components.

B. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, one piece units, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.

1. Material: Standard neoprene.

2.17 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, equipment foundations, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine generator performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CONCRETE BASES

A. Install concrete bases of dimensions indicated for packaged engine generators. See plans for new pad requirements.

3.3 INSTALLATION

A. Comply with packaged engine generator manufacturers' written installation and alignment instructions, and with NFPA 110.

B. Set packaged engine generator set on concrete bases.

C. Install packaged engine generator to provide access for periodic maintenance, including removal of drivers and accessories.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections, and to assist in testing. Report results in writing.

B. Testing: Perform field quality-control testing under the supervision of the manufacturer's factory-authorized service representative.

C. Tests: Include the following:

1. Tests recommended by manufacturer.
2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110.

3.5 CLEANING

A. On completion of installation, inspect system components. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish. Clean components internally using methods and materials recommended by manufacturer.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Provide 4 hours of on-site training for owner’s staff.

B. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

C. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.

1. Overcrank shutdown.
2. Coolant low-temperature alarm.
3. Control switch not in auto position.
4. Battery-charger malfunction alarm.
5. Battery low-voltage alarm.

D. Remote Alarm Annunciator: Comply with NFPA 110. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated. Install in vehicle bay area on back wall in location to be coordinated with owner.

3.7 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.
2. Report factory test results within 10 days of completion of test.

B. GENERATOR / TRANSFER SWITCH SYSTEM TESTING & CERTIFICATION

1. Database and Engine Inspection:
   a. The Contractor/Installer must 100% test all site-specific software functions and/or set parameters for the system and provide a written test report or detailed check list. This documentation must include an engine diagnostics report, a hard copy of the completed program, and wiring diagrams.
   b. The complete final configuration database (site-specific programming) for the system must be permanently stored on a computer disk or CD and archived by the manufacturer or authorized distributor. A disk or CD copy of that database must also be provided to the Owner when the system is commissioned.
   c. 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

2. Contractor/Installer Field Testing:
   a. Upon completion of the installation Contractor and the Manufacturer's authorized representative together shall 100% test and instruct the Owner's designated employees in the proper system operation and in all required periodic maintenance. Performance Testing shall include all permanent building loads with supplemental load bank to generators rating and in accordance with NFPA 110 (current version as adopted by NC), including cycle crank and performance tests. Operation and monitoring of any permanently installed UPS systems shall be provided during test.

b. The owner shall be given advance notification in order to witness testing.
c. Testing shall be performed using all installed generator loads supplemented with additional load to generators nameplate rating. The maintenance instruction shall include three (3) copies (minimum) of a written, bound summary of items covered for future reference.
d. The documentation shall be part of the programming reports. The contractor shall keep history of all deficiencies determined. All deficiencies shall be corrected and retested. Once this has been accomplished, the contractor shall submit to the A/E all documentation of all problems and corrections and request the A/E to inspect and test the system.

END OF SECTION 263213

SECTION 263600 - TRANSFER SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Base bid: Includes the installation of a new automatic transfer switch to provide a dedicated life safety branch to the existing Generac generator.

B. Alternate G-3 provides a new generator and new automatic transfer switches. Generator will supply legally required emergency loads and must deliver power within 10 seconds of normal power interruption.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.

1. Single-Line Diagram: Show connections between transfer switch, bypass/isolation switch, power sources, and load; and show interlocking provisions for each combined transfer switch and bypass/isolation switch.

C. Manufacturer Seismic Qualification Certification: Submit certification that transfer switches accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Qualification Data: For manufacturer.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For each type of product. Include features and operating sequences, both automatic, manual and by-pass isolation. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Maintain a service center capable of providing training, parts, and emergency maintenance repairs within a response period of less than eight hours from time of notification.

B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

C. Source Limitations: Obtain automatic transfer switches and bypass/isolation switches through one source from a single manufacturer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Comply with NEMA ICS 1.

F. Comply with NFPA 70.

G. Comply with NFPA 99.

H. Comply with NFPA 110.

I. Comply with UL 1008 unless requirements of these Specifications are stricter.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Transfer Switches:

a. Emerson; ASCO Power Technologies, LP.
b. Kohler
c. Onan

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

A. Tested Fault-Current Closing and Withstand Ratings: 65kAIC downstream of any UL Listed circuit breaker. Rating shall not be dependent on specific breaker manufacturer or model. Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.

B. Solid-State Controls: Repetitive accuracy of all settings is plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.

C. Resistance to Damage by Voltage Transients: Components meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components meet or exceed voltage-impulse withstand test of NEMA ICS 1.

D. Enclosures: General-purpose NEMA 250, Type 3R, complying with NEMA ICS 6; UL 508, unless otherwise indicated.

E. All transfer switch coils, springs, and control elements shall be easily inspected and conveniently removable from the front of the transfer switch without major disassembly or disconnection of power conductors.

F. All feeder lugs, relays, timers, control wiring, and accessories shall be front accessible.

G. The control module and transfer switch shall be physically separate.

H. Factory Wiring: Train and bundle factory wiring and label consistent with Shop Drawings, either by color code or by numbered or lettered wire and cable tape markers at terminations.

I. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.

J. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
1. Switch Action: Double throw; mechanically held in both directions.
2. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units rated 225 A and greater have separate arcing contacts.

2.3 AUTOMATIC TRANSFER SWITCHES

A. Comply with NFPA 110.

B. Automatic transfer switches shall be 3-Pole, open transition, continuous duty rated.

C. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning, unless otherwise indicated.

D. Manual Switch Operation: Under load, with door closed and with either or both sources energized. Transfer time is the same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.

E. Digital Communications Interface: Matched to capability of remote annunciator or annunciator and control panel.

F. Transfer Switches Based on Molded-Case-Switch Components: Comply with NEMA AB 1, UL 489, and UL 869A.

G. In-Phase Monitor: Factory-wired, internal relay controls transfer so it occurs only when the two sources are synchronized in phase. Relay compares phase relationship and frequency difference between normal and emergency sources and initiates transfer when both sources are within 15 electrical degrees, and only if transfer can be completed within 60 electrical degrees. Transfer is initiated only if both sources are within 2 Hz of nominal frequency and 70 percent or more of nominal voltage. Transfer time shall not exceed 1/6 second.

H. Anti single phasing protection shall detect regenerative voltage as a failed source condition.

2.4 AUTOMATIC TRANSFER-SWITCH FEATURES

A. Undervoltage Sensing for Each Phase of Normal Source: Senses low phase-to-ground voltage on each phase. Pickup voltage is adjustable from 85 to 100 percent of nominal, and dropout voltage is adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.

B. Time delay for override of normal-source voltage sensing delays transfer and engine start signals. Adjustable from zero to six seconds, and factory set for three second.

C. Voltage/Frequency Lockout Relay: Prevents premature transfer to generator set. Pickup voltage is adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency is adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.

D. Time Delay for Retransfer to Normal Source: Adjustable from 0 to 30 minutes; factory set for 10 minutes. Provides automatic defeat of delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.

E. Test Switch: Simulates normal-source failure.

F. Three Position Mode Selector Switch: OFF-LOCAL-REMOTE positions.

G. Switch-Position Pilot Lights: Indicate source to which load is connected.

H. Source-Available Indicating Lights: Supervise sources via transfer-switch, normal- and emergency-source sensing circuits.

1. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
2. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."

I. Additional indicator lights: Provide indicator lights including a test push button to enable their illumination to include Plant Exerciser Active and In-Phase Monitor Active.

J. Control Module microprocessor control settings shall be stored in nonvolatile memory. Control module shall have a three-position, key-operated, programming control switch. Key shall be removable in any position. Positions shall be:
1. Off – Allows all enabled accessories to be monitored only. Settings cannot be changed in this position.
2. Local – Allows all enabled accessory settings to be changed locally at the transfer switch control panel.
3. Remote – Allows all enabled accessories to be altered via the remote communications port.

K. Unassigned Auxiliary Contacts: Two normally open single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.

L. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.

M. Engine Starting Contacts: One isolated, normally closed and one isolated, normally open, rated 10 A at 32-V dc minimum.

N. Engine Shutdown Contacts: Time delay adjustable from zero to five minutes; factory set for five minutes. Initiates shutdown at remote engine-generator controls after retransfer of load to normal source.

O. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine-generator set and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods are adjustable from 10 to 30 minutes. Factory settings are for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:

1. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
2. Push-button programming control with digital display of settings.
3. Integral battery operation of time switch when normal control power is not available.

2.5 FINISHES

A. Enclosures: Manufacturer's standard enamel over corrosion-resistant pretreatment and primer.

2.6 SOURCE QUALITY CONTROL

A. Factory Test Components, Assembled Switches, and Associated Equipment: Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

2.7 SOURCE QUALITY CONTROL

A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform tests and inspections and prepare test reports.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

C. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installation, including connections, and to assist in testing.
2. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.
3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

    a. Check for electrical continuity of circuits and for short circuits.
    b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
    c. Verify that manual transfer warnings are properly placed.
    d. Perform manual transfer operation.

5. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.

    a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
    b. Simulate loss of phase-to-ground voltage for each phase of normal source.
    c. Verify time-delay settings.
    d. Verify pickup and dropout voltages by data readout or inspection of control settings.
    e. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.
    f. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for 1 pole deviating by more than 50 percent from other poles.
    g. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

6. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.

    a. Verify grounding connections and locations and ratings of sensors.

D. Testing Agency's Tests and Inspections:

1. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.
2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
3. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

    a. Check for electrical continuity of circuits and for short circuits.
    b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
    c. Verify that manual transfer warnings are properly placed.
    d. Perform manual transfer operation.

4. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.

    a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
    b. Simulate loss of phase-to-ground voltage for each phase of normal source.
    c. Verify time-delay settings.
    d. Verify pickup and dropout voltages by data readout or inspection of control settings.
    e. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.

f. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for 1 pole deviating by more than 50 percent from other poles.
g. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

5. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.

a. Verify grounding connections and locations and ratings of sensors.

E. Coordinate tests with tests of generator and run them concurrently.

F. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

G. Remove and replace malfunctioning units and retest as specified above.

H. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
3. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.2 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment as specified below. Refer to Division 01 Section "Demonstration and Training."

B. Coordinate this training with that for generator equipment.

END OF SECTION 263600

SECTION 265100 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Interior lighting fixtures, lamps, and ballasts.
2. Lighting fixture supports.

1.2 SUBMITTALS

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes.

B. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, signed by product manufacturer.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a third party testing agency accredited by the NCBCC (North Carolina Building Code Council) to Label Electrical & Mechanical Equipment and marked for the intended use.

B. Comply with NFPA 70 (2017).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FIXTURES AND FIXTURE COMPONENTS, GENERAL

A. Metal Parts: Free from burrs, sharp corners, and edges.

B. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position.

D. Fixtures shall be provided with integral means to disconnect power to ballasts feeding double ended lamps before servicing. The integral disconnecting means shall comply with NEC 410.130 and be a factory installed feature of the Listed fixture.

E. Reflecting Surfaces: Minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.
4. Laminated Silver Metallized Film: 90 percent.

F. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic plastic or annealed crystal glass, unless otherwise indicated.

1. Plastic: High resistance to yellowing and other changes due to aging, exposure to heat, and ultraviolet radiation.
2. Lens Thickness: 0.125 inch minimum, unless greater thickness is indicated.

2.3 LED FIXTURES

A. Construction: Same general construction requirements described above and as noted below.

1. Fixture shall be constructed to allow separate replacement of driver and lamp modules.
2. Manufacturer shall stock LED lamps from original lot to ensure color matching of replacement lamps.

B. Lumen Maintenance Certification: LM 79, LM 80 and TM21. Provide statement of test compliance from accredited NVLAP Lab with submittals.

C. Warranty: Provide a minimum 5 year comprehensive warranty on entire LED fixture including lamps, drivers and all other fixture components.

2.4 FIXTURE SUPPORT COMPONENTS

A. Comply with Division 26 Section "Basic Electrical Materials and Methods," for channel- and angle-iron supports and nonmetallic channel and angle supports.

2.5 FINISHES

A. Fixtures: Manufacturer's standard, unless otherwise indicated.

2.6 EMERGENCY EXIT LUMINAIRE

A. General Requirements: Comply with UL 924 and the following:

1. Emergency exit fixtures shall be completely self-contained and powered by an unswitched circuit from the life safety branch of the emergency power supply system.

2. Luminaire shall be third-party listed as emergency lighting equipment, and meet or exceed the following standards: NEC, NC Building Code, Volume X Energy Code, NFPA-101, and NEMA standards.

3. Fixture shall have a three year warranty which shall start from the date of project acceptance.

B. Internally Lighted Signs: As follows:

1. Lamps for AC Operation: Light-emitting diodes, 70,000 hours minimum rated lamp life. Maximum LED failure rate shall be 25% within a seven (7) year period; otherwise, if exceeded manufacturer shall replace the complete unit at no charge to the owner.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fixtures: Set level, plumb, and square with ceiling and walls, and secure according to manufacturer's written instructions and approved submittal materials. Install lamps in each fixture.

B. Support for Fixtures in or on Grid-Type Suspended Ceilings: Use grid for support.

1. Where a recessed LED, high intensity discharge, or downlight fixture displaces a section or part of ceiling tile fixture shall be supported at two diagonally opposite corners with the same type of wire used to support the lay-in ceiling track. Attach one end of the wire to the corner of the fixture and the other end to the building structure. The lay-in fixture shall then be screwed to the main runners of the lay-in ceiling track at all four corners using sheet metal screws. For fire rated suspended ceiling, luminaire shall be supported to the building structure per the ceiling design criteria, luminaire shall then be screwed to the main runners of the suspended ceiling at all four (4) corners using sheet metal screws.
2. Support Clips: Fasten to fixtures and to ceiling grid members at or near each fixture corner.
3. Fixtures of Sizes Less Than Ceiling Grid: Arrange as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.

3.2 CONNECTIONS

A. Ground equipment.

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Malfunctioning Fixtures and Components: Replace or repair, then retest.

3.4 CLEANING AND ADJUSTING

A. Clean fixtures internally and externally after installation. Use methods and materials recommended by manufacturer.

END OF SECTION 265100

DIVISION 28

ELECTRONIC SAFETY & SECURITY

SECTION 281300 – ELECTRONIC ACCESS CONTROL SYSTEM

PART 1 - GENERAL

A. RELATED DOCUMENTS

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

B. SYSTEM SUMMARY

1. Provide a turn-key web-based access control and event monitoring system that includes, but is not limited to, controllers, power supplies, door position switches, request to exit devices, card readers, interface devices required for integration with the video surveillance system, cable, raceways, terminations, programming, testing, uninterruptible power supply (UPS), dedicated security workstation, desk-top monitor and all ancillary devices required for a complete coordinated and fully functional security system.

2. The system shall be shall incorporate the S2 Security Enterprise system and shall be integrated with the S2 Security NetVR Video Management System and the panic duress system. The system shall allow for web-based remote access by the owner's authorized personnel. The existing dedicated video surveillance security work station shall be upgraded as required to incorporate the access control system and panic alarm system. An additional display shall be installed along with all necessary interface / integration boxes required so that the display of this information is automatic and seamless.

3. Integration of the systems shall allow cameras to be displayed on the CCTV monitor and security events to be displayed on the Access Control monitor. Set-up of the Access Control monitor shall list security events, display access control credentials and display camera views where security events / access occur.

4. Owner will provide badges. Security contractor will coordinate with the owner to set up employee lists and program access privileges. All readers and controllers shall incorporate Open Supervised Device Protocol (OSDP).

5. Readers shall be appropriate for the application (i.e. mullion mount, elevator cab panel, wall mount, etc.

C. QUALITY ASSURANCE

1. Manufacturer's Qualifications: Firms regularly of electronic access control systems and components of types and sizes required, whose products are Listed and Labeled. Manufacturers of Security Systems shall have not less than five (5) years' experience in the design and fabrication of the type of equipment commensurate in size and similar in construction to this project.

2. Installer's Qualifications: The installer have been actively engaged in the design and installation of electronic and access control systems and equipment similar in size, complexity and operation to the scope of work contained herein, and shall have a fully staffed, operational office. Be licensed by the State of NC for security system installation, holding a valid NC alarm systems license. Installer shall provide all security systems per the specifications contained herein and be responsible for the termination of all security

control system cable, field devices and control components specified. Installer shall be responsible for systems start-up, integration of systems, acceptance testing and training for systems.

3. Installer shall be certified to install and service S2 systems, as utilized by Durham County. The installer's facility shall provide 24/7 on-call service and be able to respond on site (with qualified personnel) to provide emergency service within 4 hours of notification. Installer shall provide evidence of having an office staffed with factory trained technicians fully capable of engineering, supervision, installation, system start-up, acceptance testing, and providing the Owner training and services of both hardware and software for systems of similar complexity and function as the system described herein. The office shall be located within 60 miles of the project site in order to provide timely service. The following security installers are pre-qualified: A-3, BFPE, Brady Integrated Security, and Convergint.

4. The installer shall provide a list of a minimum of five (5) systems that are equal or greater in scope and have been installed and have been operational for a minimum of one year.

5. Codes and Standards:

   a) NEMA Compliance: Comply with applicable requirements of NEMA Standards Publications pertaining to security/access control systems.
   b) Testing Laboratory Compliance and Labeling: Comply with applicable requirements of UL safety standards pertaining to security/access control systems. Provide products and components that have been Listed and Labeled.
   c) NFPA Compliance: Comply with applicable requirements of NFPA 731 Standard for the Installation of Electronic Premises Security Systems pertaining to installation and testing for premise security systems.
   d) NEC Compliance: Comply with applicable requirements of the latest edition of the NEC pertaining to construction and installation of Class 2 low voltage systems.

D. SUBMITTALS

1. Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

   a) Shop Drawings submittals for Security equipment and connections shall be submitted as an entire section. The submittal package shall consist of the following:

      (1) Materials list for each system with the names of manufacturers, model numbers, and technical information on all equipment proposed.
      (2) Product technical information sheets for each principal component in the proposed system to include wire/cable specifications for each component.
      (3) Operating sequences: Provide a complete written description of the sequence of operation of the system and its relationship to each other integrated system. Basic block diagrams of all systems shall be included.
      (4) Test procedure: A written document detailing the test procedure of the system shall be supplied. This procedure shall include all tests required by the equipment manufacturers and by this specification. Provide documentation identifying the manufacturer's published recommendations for testing for system components.
      (5) Wiring Diagrams: Provide complete "point to point" wiring diagrams for all systems and subsystems. Show all components and model numbers in the

communications path from the central control through all intervening system components, including terminal boards to the individual end devices. The intent of this requirement is to provide a document that will permit end to end tracing of the system wire and cabling. Where conductors are grouped into a cable for long site runs, a single line properly identified shall be shown. Where these cables fan out for termination, individual wire terminations and markings shall be shown.

(6) Equipment locations: Provide drawings that show the building floor plan indicating the exact locations of all equipment, existing and new, in the system.

(7) Shop detail drawings: These drawings shall indicate the accurate locations of all equipment associated with each system, both existing and new, in respect to architectural and structural conditions. Size drawings of components, equipment layouts and other small size areas to the common scale of 1/8", 1/2" or 1" per foot. Size drawings of larger areas to the common scale of 1/4" or 1/8" per foot. Drawings shall include explicit notes on the termination of all conductors and shields for each location.

(8) Markings: Submit for approval wire marking, panel label, zone label, terminal strip numbering & terminal strip identification styles and typical text as outlined.

(9) Configuration/mounting drawings: Head-End components.

E. Pre-installation Meeting: Convene a pre-installation meeting before start of installation of security system. Requires attendance of parties directly affecting work of this section, including Contractor, Owner, Designer, Installer, and manufacturer's representative. Review installation requirements, field quality control, adjusting and coordination with other work. Review the test procedure for the system and address the specific requirements of the manufacturer’s published recommendations.

F. DELIVERY, STORAGE, AND HANDLING

1. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
2. Storage: Store materials indoors, in a clean, dry area in accordance with manufacturer's instructions.
3. Handling: Protect materials and finishes during handling and installation to prevent damage.

G. Related Sections

1. Section 260533 – Raceways and Boxes for Electrical Systems
2. Section 260526 – Grounding and Bonding for Electrical Systems
3. Section 260553 - Identification for Electrical Systems
4. Section 260500 – Basic Electrical Materials and Methods
5. Applicable Division 26 Specification Sections regarding wiring materials and methods.
6. Section 282301 – CCTV Camera Systems
7. Section 281600 – Panic Alarm System

H. CLOSEOUT SUBMITTALS

1. Project Record Documents: Record actual final locations of all video surveillance system equipment.
2. Operation and Maintenance Data: Submit manufacturer’s standard operating and maintenance instructions.
3. Provide zone maps indicating device locations for display in the maintenance office, headend location and reception area.

I. WARRANTY / SUPPORT

1. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, equipment related to signal transmission, storage and monitoring, and control-station equipment that fail in materials or workmanship within specified warranty period.
2. Verify available warranties and warranty periods for units and components with manufacturers listed in Part 2 articles.
3. Warranty Period: The longer of the standard equipment warranty or two years from date of owner acceptance.
4. Support: All systems and components shall be provided with toll-free, 24-hour technical support from the manufacturer. Technical support shall be provided to the installer or end user at no charge as long as the product is installed.

J. SPARE PARTS

1. Provide spare parts to include 10% of each component (minimum of 1). Components include duress button, strobe light, card reader, control boards, fuses.
2. Spares shall be housed in an environment and condition recommended by the Manufacturer and shall be clearly labeled with “SPARE: DO NOT REMOVE”, manufacturer part number, and date of delivery to the owner.
3. All packaging for spares must be kept in good condition and used as appropriate for any Returns to Manufacturer (RMA).

PART 2 - PRODUCTS

A. MATERIALS

1. The Access Control System’s head-end equipment shall be S2 Enterprise platform to match the existing Durham County system.

2. Site access control head-end shall be sized for project site to support the required quantity of door locations, consisting of locations specified on the Drawings and ten additional future locations.

3 . Controllers, reader interfaces and readers shall support OSDP protocol and accommodate iClass cards used by Owner. Units shall operate at 12-24 volt DC. Controllers shall be Listed UL 294.

4. Card Reader Interface: Reader interface shall accept inputs for request to exit and door contacts (communication with security system). Outputs shall be provided for electrified hardware components and alarm signaling. Units shall operate at 12-24 volt DC. Interface shall be Listed UL 294.

5. Power Supply: Equivalent to Altronix, AL300ULM

    a) Power: 120 VAC, 60 Hz.
    b) Output: 12-24 VDC, request to exit
    c) Provided with enclosure

6. Output Devices – Equivalent to Altronix, AL1024ULACMCB with Maximal 33D

    a) Power: 120 VAC, 60 Hz.
    b) Output: 24 VDC, Class 2 for sets of electrified hardware
    c) Fire alarm interface to unlock all doors in the event of fire alarm system activation
    d) Provided with enclosure.

7. Card Readers:

    a) HID iClass Reader supporting OSDP format. Provide proximity type readers suitable for wall, elevator cab panel, or door frame or mullion, as applicable for location.

8. Request to Exit Sensor: Provide remote sensors suitable for wall or ceiling mounting, as required by the location. Sensor shall be mounted on a single gang back box and sense with passive-infrared (PIR)technology. Units shall operate at 12-24 volt DC and shall be Listed UL 294.

9. Communication cable shall be 2 conductor 24 AWG minimum, shielded twisted pair for RS-485. Cables shall be CMP (plenum rated).

10. Signal cable shall be 18 AWG, shielded twisted cable, conductor pairs as indicated on the drawings. Cables shall be CMP (plenum rated).

11. (Existing) Facility Monitoring Workstation: A single dedicated workstation is provided for integration of all security systems. Workstation computer shall meet the following minimum requirements but shall be sufficient for all system requirements. Separate displays shall be provided for access control / security events and for video surveillance system. The video surveillance system display is existing and access control display shall be added.

    a) Software: Microsoft Windows 10
    b) Processor: Intel Core i7
    c) RAM: 12 GB minimum
    d) Graphics: Intel HD 4000 or Nvidia NVS Series
    e) Network interface: 1000BASE-T Ethernet
    f) HDD Storage: 200 GB SSD minimum
    g) Display: 24” LED (desktop), 1920 x 1080, HDMI input, 250 cd/m2
    h) Mouse: Wired, USB
    i) Keyboard: Wired, USB

PART 3 - EXECUTION

A. EXAMINATION - Examine areas to receive access control equipment and field coordinate exact locations with designer and owner. Notify Designer of any areas found to be unsuitable for specified arrangement. Do not begin installation until unacceptable conditions have been corrected.

B. INSTALLATION - Provide all control and power wiring/conduit needed for a complete operating system.

1. Plenum rated cable may be routed in free air above lay-in ceilings. Cable free wired above accessible ceilings shall be routed neatly and shall be independently supported by J-hooks on 5' intervals. Group cables where possible.
2. Cable shall be in conduit (3/4" minimum) where installed outside, exposed, in walls or above inaccessible ceilings.
3. Provide conduit sleeves from exterior devices to accessible interior ceilings. Seal exterior of conduit sleeves to be waterproof and interior to prevent transmission of unconditioned air into building.
4. Provide conduit sleeves where penetrating floors or walls and provide fire seal where applicable.
5. Provide "main building grounds" (insulated and isolated) for each transient voltage surge suppresser installed. Provide surge protection on all 120V power circuits and all exterior cables entering building.
6. Installer shall be responsible for installing all equipment and providing all required software and licenses required for the complete integrated security system.
7. Perform work in accordance with the applicable state and local codes or standards current at the commencement of installation.
8. Perform cable installation, identification and termination in accordance with the Manufacturer's technical installation guidance, in addition to the applicable codes. In the absence of the Manufacturer's recommendations on conductor applications, the installer shall ensure that the cables selected meets all technical requirements of the equipment to be installed.
9. Label all equipment per owner's naming preference and program accordingly. Provide a zone map showing all equipment locations and their identification number.

C. FIELD QUALITY CONTROL

1. Test completed installation in accordance with submitted/approved Test Procedures to verify each component of the security systems is properly installed and operating. Demonstrate the arrangement of all security events and camera views at the building's security monitoring station. All testing shall be scheduled in advance with Owner and the designer, with at least seven days of advance notice.

D. TRAINING

1. The installer shall supply qualified factory certified personnel to train a group of key Owner employees in the operation and maintenance of the installed security systems. The training program shall be designed to provide a comprehensive understanding and basic level of competence with the entire security system. This training shall be provided after the installation and commissioning of the complete security system.

2. Training under this section shall consist of 4 hours and sufficiently detailed to allow the owner's personnel to operate the system independent of any outside assistance. Coordinate specific Training Schedules at the convenience of the Owner.

3. Provide four (4) copies each of a bound and illustrated operator's manual and service manual. The operator's manual shall be written in layman's language and printed so as to become a permanent reference document for the operators. The service manual shall be written in layman's language and printed so as to become a permanent reference document for maintenance personnel. It shall describe how to run internal self–diagnostic software programs, troubleshoot head–end hardware and field devices with a complete scenario simulation of all possible system malfunctions and the appropriate corrective measures. Both manuals shall be prepared and submitted to the Engineer and Owner prior to the training sessions.

E. PROJECT RECORD DRAWINGS

1. Project Record Drawings include all bid drawings and all submissions.
2. Drawings shall include:

   a) Routing of all security cables, including the designations assigned to each wire/cable and field terminations schedules.
   b) Accurate location of all equipment installed under the specifications.
   c) A complete equipment list for each functional area. Upon completion of this project, the information shown on these drawings shall be transferred to a complete (Record)set of full size, reproducible drawings at no additional cost to the OWNER.

F. PROGRAMMING

1. All programming and integration of the complete security system shall be provided by Contractor, based on preferences established by Owner.

2. Employee lists and authorization levels will be provided to the contractor by the owner.

END OF SECTION 281300

SECTION 281600- PANIC ALARM SYSTEM

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the installation of a new turn-key panic alarm system as described in the drawings and specifications herein. Include all equipment, controls, and devices as shown on the drawings. Include all new panels, devices, ancillary components, software, cards, programming, cabling, terminations, integration, training, etc. as required for a fully functional system. System shall be intelligent or wired to annunciate location of duress button activation.

B. Section includes duress-panic alarm devices, signaling devices, signal wiring and master controller with digital communicator.

C. System shall include strobe lights in locations shown on plans to signal activation of a duress-panic device.

D. System shall be open architecture and shall be integrated into the overall facility security management system so that activation of duress devices will annunciate at the security work station.

1.2 REFERENCES

A. National Fire Protection Association:
   1. NFPA 70, National Electrical Code
   2. Other NFPA Standards as applicable

1.3 RELATED SECTIONS

A. Section 260533 – Raceways and Boxes for Electrical Systems

B. Section 260526 – Grounding and Bonding for Electrical Systems

C. Section 260553 - Identification for Electrical Systems

D. Section 260500 – Basic Electrical Materials and Methods

E. Applicable Division 26 Specification Sections regarding wiring materials and methods.

F. Section 281300 – Electronic Access Control

1.4 SYSTEM OPERATION

A. Activation of any panic button shall:
   1. Illuminate distinctive emergency notification strobe lamps located in corridors at locations shown on plans.

2. Alert security staff at the dedicated security work station through integration into the overall S2 Security building security management system.
3. System shall also have the capability of dialing owner designated telephone numbers should the owner ever want to implement this feature in the future.

1.5 SUBMITTALS

A. Shop Drawings: Indicate system wiring diagram showing each device and wiring connection; indicate duress button and annunciator layout.

B. Product Data: Submit catalog data showing electrical characteristics and connection requirements.

1.6 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of intrusion detection equipment.

B. Operation and Maintenance Data: Submit manufacturer's standard operating and maintenance instructions.

C. Provide zone maps indicating device locations for display at the head-end location and security desk.

1.7 QUALIFICATIONS

A. Manufacturer: Equipment to be installed shall be listed and labeled for the intended use. Equipment shall be installed in accordance with the manufacturer's installation instructions and marked ratings.

B. Installer Qualifications: An experienced installer who is an authorized representative of the equipment manufacturer.

1.8 MAINTENANCE SERVICE

A. Furnish service and maintenance of panic alarm system for one year from Date of Substantial Completion.

1.9 Spare Parts

A. Deliver to the Owner in its original packaging, 10% spare parts (minimum of one for each component of the panic alarm system or as noted in plans including (panic button, strobe light, interface board, fuses, etc.)

B. Spares shall be housed in an environment and condition recommended by the Manufacturer and shall be clearly labeled with "SPARE: DO NOT REMOVE", manufacturer part number, and date of delivery to the owner.

C. All packaging for spares must be kept in good condition and used as appropriate for any Returns to Manufacturer (RMA).

PART 2 PRODUCTS

2.1 SYSTEM COMPONENTS

A. Master controller with digital communicator capable of dialing at least 2 numbers in priority sequence. UL Listed. Preferred brand alternate is Honeywell Vista.

B. Duress – Panic Alarms:
1. Housing shall be rugged metal with duress button recessed from the face/front edge of the housing to prevent accidental activation.
2. Alarm switch/button shall be latching type that locks-in place upon activation until manual reset with key. Operation shall be silent. Device shall have status indicator light.
3. Duress/Panic alarms shall meet the requirements of and be Listed to UL 305 Standard for Panic Alarms. To reduce the possibility of false alarms and ensure installation functionality UL 636 Standard for Holdup Alarms standards shall be met.
4. Preferred brand alternate is Potter Amseco Husk-20

C. Notification lights circuited in designated zones shown on drawings shall illuminate upon activation of a panic button in the given zone. Lamp shall be a distinctive color (blue) and shall flash on and off. Lights shall be low voltage 12 or 24VDC, low current consumption, 200 hour lamp life, 60,000 candle power output, UL Listed.

2.2 WIRE AND CABLE

A. Provide cabling as required and install in conduit (3/4” minimum).

PART 3 EXECUTION

3.1 INSTALLATION

A. Install cables / conductors as required for equipment (16 AWG minimum) for detection and signal circuit conductors.

B. Circuits shall be concealed in finished areas.

C. Cables shall be in conduit in walls, above lay-in ceilings or where exposed. Plenum rated low voltage, power limited cables may be routed in free air above accessible ceilings where allowed by the NEC. Provide conduit sleeves through walls, ceilings, etc. and fire seal where penetrating rated partitions.

D. Wiring Method:
1. Conceal all raceway and cables except in unfinished spaces.
2. Utilize “J” Hooks to support free wired cables on 5’ intervals.
3. Conduit and Boxes: Comply with requirements in Section 260533 "Raceway and Boxes for Electrical Systems. Outlet boxes shall be flush mounted in finished spaces.
4. Install cables without damaging conductors, shield, or jacket.

5. Do not bend cables, while handling or installing, to radii smaller than as recommended by manufacturer.
6. Pull cables without exceeding cable manufacturer's recommended pulling tensions.
7. Pull cables simultaneously if more than one is being installed in same raceway. Use pulling compound or lubricant if necessary. Use compounds that will not damage conductor or insulation.
8. Install exposed raceways and cables parallel and perpendicular to surfaces or exposed structural members, and follow surface contours. Secure and support cables by straps, staples, or similar fittings designed and installed so as not to damage cables. Secure cable at intervals not exceeding 60 inches and not more than 6 inches from cabinets, boxes, or fittings.
9. Separation of Wires: Provide separation as recommended by equipment manufacturer.
10. Splices, Taps, and Terminations: Make splices, taps, and terminations on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.
11. Identification of Conductors and Cables: Comply with requirements in Section 260553 for cable administration, cable schedule, and cable and wire identification.
12. Equipment Identification:
    a. Per Section 260553 "Identification for Electrical Systems" for equipment labels and signs and labeling installation requirements. Label stations, controls, and indicators using approved consistent nomenclature.

E. Duress buttons shall be mounting under desks where easily accessible. Coordinate exact location with user in field. Install 90° from front of work station to minimize risk of accidental activation.

F. Install engraved plastic identification nameplates for fixed equipment.

G. Alarms activation shall result in silent notification at the security desk workstation, flash the visual strobe lights, and be capable of dialing out to a central monitoring station.

3.2 FIELD QUALITY CONTROL

A. Test in accordance with manufacturer’s recommendations.

3.3 MANUFACTURER'S FIELD SERVICES

A. Furnish services of technician to supervise installation, adjustments, final connections, system testing, and Owner training.

3.4 DEMONSTRATION AND TRAINING

A. Furnish four hours of total instruction, to be conducted at project site with manufacturer's representative. Training shall be provided in two 2-hour sessions. A session shall be scheduled for each shift.

END OF SECTION 281600

SECTION 282301 – CCTV CAMERA SYSTEMS

PART 1 - GENERAL

A. RELATED DOCUMENTS

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

B. SYSTEM SUMMARY

1. CCTV CAMERA SYSTEM – A turn-key IP security camera system upgrade as required install new cameras to the existing S2 Video Surveillance System. Installation shall include cameras, raceways, cabling, terminations, programming and all ancillary equipment required for a fully functional system.

2. The existing NVR and Video Management Software is by S2 and shall be integrated with the new S2 access control system and overall security management system.

3. The system shall continue to allow for web-based remote access by the owner's authorized personnel for all new and existing cameras.

4. The new cameras shall be added to the existing security work station display(s). Update programming / video management software as required.

5. Provide an additional display to the dedicated security work station to display access control and other security events in the building. Provide S2 interface box as required for full integration.

6. Exact camera locations shall be field coordinated with owner and engineer.

C. QUALITY ASSURANCE

1. Manufacturer's Qualifications: Firms regularly engaged in manufacture of camera and security systems and system components of types and sizes required, whose products are Listed and Labeled. Manufacturers of Security Systems shall have not less than five (5) years' experience in the design and fabrication of the type of security equipment commensurate in size and similar in construction to this project.

2. Installer's Qualifications: The installer have been actively engaged in the design and installation of camera and security systems and equipment similar in size, complexity and operation to the scope of work contained herein, and shall have a fully staffed, operational office. Be licensed by the State of NC for security system installation, holding a valid NC alarm systems license. Installer shall provide all security systems per the specifications contained herein and be responsible for the termination of all security control system cable, field devices and control components specified. Installer shall be responsible for systems start-up, integration of systems, acceptance testing and training for systems.

3. Installer shall be certified to install and service S2 systems, as utilized by Durham County. The installer's facility shall provide 24/7 on-call service and be able to respond on site (with qualified personnel) to provide emergency service within 4 hours of notification. Installer shall provide evidence of having an office staffed with factory trained technicians fully capable of engineering, supervision, installation, system start-up, acceptance testing, and providing the Owner training and services of both hardware and software for systems of similar complexity and function as the

system described herein. The office shall be located within 60 miles of the project site in order to provide timely service. The following security installers are pre-qualified: A-3, BFPE, Brady Integrated Security, and Convergint.

4. The installer shall provide a list of a minimum of five (5) systems that are equal or greater in scope and have been installed and have been operational for a minimum of one year.

5. Codes and Standards:

   a) NEMA Compliance: Comply with applicable requirements of NEMA Standards Publications pertaining to security/access control systems.
   b) Testing Laboratory Compliance and Labeling: Comply with applicable requirements of UL safety standards pertaining to security/access control systems. Provide products and components that have been Listed and Labeled.
   c) NFPA Compliance: Comply with applicable requirements of NFPA 731 Standard for the Installation of Electronic Premises Security Systems pertaining to installation and testing for premise security systems.
   d) NEC Compliance: Comply with applicable requirements of the latest edition of the NEC pertaining to construction and installation of Class 2 low voltage systems.
   e) Comply with FCC, Class B
   f) Comply with NECA 1.

D. SUBMITTALS

1. Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

   a) Shop Drawings submittals for Security equipment and connections shall be submitted as an entire section. The submittal package shall consist of the following:

      (1) Materials list for each system with the names of manufacturers, model numbers, and technical information on all equipment proposed.
      (2) Product technical information sheets for each principal component in the proposed system to include wire/cable specifications for each component.
      (3) Operating sequences: Provide a complete written description of the sequence of operation of the system and its relationship to each other integrated system. Basic block diagrams of all systems shall be included.
      (4) Test procedure: A written document detailing the test procedure of the system shall be supplied. This procedure shall include all tests required by the equipment manufacturers and by this specification. Provide documentation identifying the manufacturer's published recommendations for testing for system components.
      (5) Wiring Diagrams: Provide complete "point to point" wiring diagrams for all systems and subsystems. Show all components and model numbers in the communications path from the central control through all intervening system components, including terminal boards to the individual end devices. The intent of this requirement is to provide a document that will permit end to end tracing of the system wire and cabling. Where conductors are grouped into a cable for long site runs, a single line properly identified shall be shown. Where these cables fan out for termination, individual wire terminations and markings shall be shown.
      (6) Equipment locations: Provide drawings that show the building floor plan indicating the exact locations of all equipment, existing and new, in the system.
      (7) Storage Array Capacity: Capacity shall be based on 30 days retention, 40% continuous recording time at 15fps per camera, plus 20% additional capacity for future growth.

Provide manufacturer's calculations for required storage system capacity, based on proposed cameras, in drive increments specified. Identify total storage capacity in submittal documentation.

(8) Shop detail drawings: These drawings shall indicate the accurate locations of all equipment associated with each system, both existing and new, in respect to architectural and structural conditions. Size drawings of components, equipment layouts and other small size areas to the common scale of 1/8", 1/2" or 1" per foot. Size drawings of larger areas to the common scale of 1/4" or 1/8" per foot. Drawings shall include explicit notes on the termination of all conductors and shields for each location.

(9) Markings: Submit for approval wire marking, panel label, zone label, terminal strip numbering & terminal strip identification styles and typical text as outlined.

(10) Configuration/mounting drawings: Head-End components.

E. Pre-installation Meeting: Convene a pre-installation meeting before start of installation of CCTV camera system for each phase. Require attendance of parties directly affecting work of this section, including Contractor, Owner, Designer, Installer, and manufacturer's representative. Review installation requirements, field quality control, adjusting and coordination with other work. Review the test procedure for the system and address the specific requirements of the manufacturer's published recommendations.

F. DELIVERY, STORAGE, AND HANDLING

1. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
2. Storage: Store materials indoors, in a clean, dry area in accordance with manufacturer's instructions.
3. Handling: Protect materials and finishes during handling and installation to prevent damage.

G. Related Sections

1. Section 260533 – Raceways and Boxes for Electrical Systems
2. Section 260526 – Grounding and Bonding for Electrical Systems
3. Section 260553 - Identification for Electrical Systems
4. Section 260500 – Basic Electrical Materials and Methods
5. Applicable Division 26 Specification Sections regarding wiring materials and methods.
6. Section 281300 – Electronic Access Control System

H. CLOSEOUT SUBMITTALS

1. Project Record Documents: Record actual final locations of all video surveillance system equipment.
2. Operation and Maintenance Data: Submit manufacturer's standard operating and maintenance instructions.
3. Provide zone maps indicating device locations for display in the maintenance office, headend location and reception area.

I. WARRANTY / SUPPORT

1. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, equipment related to signal transmission, storage and monitoring, and control-station equipment that fail in materials or workmanship within specified warranty period.

2. Verify available warranties and warranty periods for units and components with manufacturers listed in Part 2 articles.
3. Warranty Period: Two years from date of owner acceptance.
4. Support: All systems and components shall be provided with toll-free, 24-hour technical support from the manufacturer. Technical support shall be provided to the installer or end user at no charge as long as the product is installed.

J. SPARE PARTS

1. 1 hot swappable NVR hard drive, 2 surge protectors used for exterior cameras, one interior camera and one exterior camera, and 5 of each fuse size.
2. Spares shall be housed in an environment and condition recommended by the Manufacturer and shall be clearly labeled with "SPARE: DO NOT REMOVE", manufacturer part number, and date of delivery to the owner.
3. All packaging for spares must be kept in good condition and used as appropriate for any Returns to Manufacturer (RMA).

PART 2 - PRODUCTS

A. General:

1. All equipment associated within the IP System shall be UL 3004 compliant and rated for continuous operation.
2. All equipment shall operate on a 120 volts alternating current (VAC); 60 Hz AC power system. All equipment shall have a back-up source of power that will provide a minimum of 1 hour of run time in the event of a loss of primary power to the facility.
3. The system shall be designed, installed, and programmed in a manner that will allow for easy operation, programming, servicing, maintenance, testing, and upgrading of the system.
4. Surge Protection: Protect components from voltage surges entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor's entry connection to components.

    a) Provide surge protection on all 120V power supply circuits feeding electronic equipment.
    b) Provide surge protection for all cables serving exterior cameras.

B. CCTV CAMERA SYSTEM:

1. Manufacturers: Subject to compliance with project requirements. See preferred brand alternates in Section 012300.
2. <u>Existing Network Video Recorders (NVR):</u>
    a) Description: S2 Security, NetVR Series Video Management System to support up to 64 IP cameras and up to 32TB of video storage, real-time video surveillance, on-screen digital controls, forensic search capability, delivers real-time or recorded video to client or mobile app, integrates to S2 access control systems for unified system management or administration, customizable display with single or multi-camera views.
    b) NVR's shall support simultaneous recording of all cameras shown on plans plus 25% spare capacity for future additional cameras.
    c) Provide 30 Days of full video retention at 15 fps at maximum resolution of cameras plus an additional 10 days of partial frame retention. Vendor to provide calculations confirming storage capacity. Calculations shall include initial cameras and 25% future capacity. Provide the quantity of video storage drives as required.
    d) System shall be expandable to allow connection of additional NVR's.

e) Specifications:
   (1) Password protection.
   (2) Alarm and timer controls.
   (3) Continuous recording option.
   (4) Time-lapse operating modes.
   (5) Search video by time, event, or motion.
   (6) Storage: RAID 5. Removable hard drives of sizes required to meet storage requirements of project. Software shall permit hot-swapping drives.
   (7) Open architecture
   (8) Supported Video Formats: H.264.
   (9) 2 Ethernet ports
   (10) Rack mountable
   (11) 400Mbps video throughput

3. Existing Facility Monitoring Workstation: A single dedicated workstation to be used for integration of all security systems. Workstation computer shall meet the following minimum requirements but shall be sufficient for all system requirements. Separate displays shall be provided for access control / security events and for video surveillance system.

   a) Software: Microsoft Windows 10
   b) Processor: Intel Core i7
   c) RAM: 12 GB minimum
   d) Graphics: Intel HD 4000 or Nvidia NVS Series
   e) Network interface: 1000BASE-T Ethernet
   f) HDD Storage: 200 GB SSD minimum
   g) Display: 24" LED (desktop), 1920 x 1080, HDMI input, 250 cd/m2 – Provide one additional display at work station.
   h) Mouse: Wired, USB
   i) Keyboard: Wired, USB

4. CCTV Cameras: CCTV cameras shall be compact network type; UL listed and shall be the standard product of one manufacturer. The preferred brand manufacturer for this project is Axis Communications. Provide a license for each camera specified on Drawings. The cameras shall have the following minimum specifications:

   a) INTERIOR FIXED DOME
      (1) Power Input: PoE IEEE 802.3af RJ45 10BASE-T/100BASE-TX
      (2) Image Sensor: 1/3" CMOS, 2 MP
      (3) Color
      (4) Lens: Varifocal, 3-10.5 mm; F1.4
      (5) Remote focus, zoom
      (6) Manual pan (+/-180°), tilt (-35 to 75°) and rotation (+/-95°)
      (7) Compression: H.264; MJPEG
      (8) Max Resolution: 1920x1080
      (9) Frame Rate: WDR 30 fps HDTV 1080p
      (10) Forensic capture Technology
      (11) Controllable frame rate and bandwidth
      (12) Alarm Input/output
      (13) Dust proof / vandal-proof, Active Tampering Alarm, impact resistant
      (14) Digital PTZ
      (15) Wide Viewing Angle – 92 degree minimum
      (16) Video Motion Detection
      (17) 512MB RAM, 256MB Flash Memory, SD card

(18) HDMI Output
(19) Day and Night Functional, Minimum Illumination 0.16 Lux color, 0.003, IR illumination, Automatic adjustment for Light Variations
(20) 3 Year warranty
(21) Mounting hardware as required for installation (see plans for mounting locations)

b) EXTERIOR FIXED DOME
(1) Power Input: PoE IEEE 802.3af RJ45 10BASE-T/100BASE-TX
(2) Image Sensor: 1/2.5" CMOS, 5 MP
(3) Color
(4) Lens: Varifocal, 3.5-10 mm; F1.7
(5) Remote focus, zoom
(6) Manual pan (+/-180°), tilt (-40 to 75°) and rotation (+/-95°)
(7) Compression: H.264; MJPEG
(8) Max Resolution: 3072x1728
(9) Frame Rate: WDR 30 fps
(10) Forensic capture Technology
(11) Controllable frame rate and bandwidth
(12) Alarm Input/output
(13) IP66, NEMA 4X, vandal-proof, Active Tampering Alarm, impact resistant, dehumidifying membrane
(14) Operating Conditions: -40 °F to 122 °F, 10 – 100% RH 61Digital PTZ
(15) Wide Viewing Angle – 100 degree minimum
(16) Video Motion Detection
(17) 512MB RAM, 256MB Flash Memory, SD card
(18) HDMI Output
(19) Day and Night Functional, Minimum Illumination 0.18 Lux color, 0.04, IR illumination, Automatic adjustment for Light Variations
(20) 3 Year warranty
(21) Mounting arms and hardware as required for exterior installation (see plans for mounting locations)

c) Install each camera complete, including appropriate lens having automatic iris and camera enclosure (fully compatible with the camera provided).

d) All cameras shall have provisions for adjustable image size, quality and bit rate. Camera shall provide time stamp and text caption overlay capability.

e) Cameras shall be configurable for brightness, contrast, saturation, sharpness, white balance and exposure.

f) All cameras shall contain with Micro SD/SDHC/SDXC card slot for on-board storage.

g) Power supplies shall be internally protected for overload conditions and from transient surges.

h) Cameras shall support 10/100 Mbps Ethernet network communications using RJ-45 jack/terminations.

i) Field verify all camera/housing mounting locations and heights and necessary/unique installation detailing due to existing building finish materials and configurations. The Shop Drawing submittal shall depict the exact installation detailing for review and approval. Notify the Engineer of problems or concerns.

j) Camera installations shall be securely attached to the mounting surface, at the height and location as indicated on the drawings and field coordinated with owner and designer. Utilize security fasteners (Torx-head) of the appropriate type. Anchoring devices shall be rated to support not less than five times the total equipment weight.

k) Weather proof compression seals shall be provided for entry of wiring/cabling.

l) CABLE - Provide Category 6, yellow (confirm with owner) plenum rated cables for CCTV system meeting the following requirements:

m) Cable lengths shall not exceed 250 feet in length, for cameras served as part of the CCTV camera system. Cables shall be terminated with straight RJ45 connectors.

5. Uninterruptible Power System (UPS): Provide a complete and operational uninterruptible power system (UPS) to supply power to the NVR and CCTV System equipment for a minimum of 30 minutes at full load of the system. Subject to compliance with requirement below, provide a UPS equivalent to that manufactured by one of the following:
   a) Liebert
   b) Exide
   c) BEST

6. The UPS will protect itself against damage from short circuits and overloads, and upon correction will automatically resume normal operation. Output shall be constantly regulated to ±10%.

PART 3 - EXECUTION

A. EXAMINATION - Examine areas to receive CCTV camera and security devices and equipment. Field coordinate exact locations and mounting heights with designer and owner. Notify Designer of any areas found to be unsuitable for specified arrangement. Do not begin installation until unacceptable conditions have been corrected.

B. INSTALLATION - Provide all control and power wiring/conduit needed for a complete operating system. The CCTV system shall operate on a dedicated network. This contractor shall mount all cameras and extend CAT 6 cable back to the CCTV headend.

1. Plenum rated cable may be routed in free air above lay-in ceilings. Cable free wired above accessible ceilings shall be routed neatly and shall be independently supported by J-hooks on 5' intervals. Group cables where possible.
2. Cable shall be in conduit (3/4" minimum) where installed outside, exposed, in walls or above inaccessible ceilings.
3. Provide conduit sleeves from exterior cameras to accessible interior ceilings. Seal exterior of conduit sleeves to be waterproof and interior to prevent transmission of unconditioned air into building.
4. Provide conduit sleeved where penetrating floors or walls and provide fire seal where applicable.
5. Provide "main building grounds" (insulated and isolated) for each transient voltage surge suppresser installed. Provide surge protection on all 120V power circuits and all exterior cables entering building.
6. Installer shall be responsible for installing all equipment and providing all required software and licenses required to view project cameras at Computer Monitoring Stations (CMS) within the facility and remotely.

7. Create software generated camera view groups for the various areas of the facility at the CMS work stations, based on Owner's preference in groupings. Provide description of view area associated with each camera, for review and approval of the Engineer and Owner. Submit for review and approval prior to testing and training.
8. Install, coordinate and provide final adjustment of cameras, based on coordinated effort with Owner to identify view region preferences. Link each camera into software at server and verify proper view.
9. Perform work in accordance with the applicable state and local codes or standards current at the commencement of installation.
10. Perform cable installation, identification and termination in accordance with the Manufacturer's technical installation guidance, in addition to the applicable codes. In the absence of the Manufacturer's recommendations on conductor applications, the installer shall ensure that the cables selected meets all technical requirements of the equipment to be installed.
11. Label all cameras per owner's naming preference and program camera identification accordingly. Provide a zone map showing camera locations and their identification number.

C. FIELD QUALITY CONTROL

1. Test completed installation in accordance with submitted/approved Test Procedures to verify each component of CCTV Camera and Security Systems is properly installed and operating. Demonstrate the arrangement of all camera views and view designations at the facility monitoring stations. Demonstrate access of real-time camera views and stored content for facility. All testing shall be scheduled in advance with Owner and the designer, with at least seven days of advance notice.

D. TRAINING

1. The installer shall supply qualified factory certified personnel to train a group of key Owner employees in the operation and maintenance of the installed CCTV Camera and Security Systems. The training program shall be designed to provide a comprehensive understanding and basic level of competence with the entire security system. This training shall be provided after the installation and commissioning of the video management software package.

2. Training under this section shall consist of 4 hours and shall cover products specified in this section and shall train owner personnel to operate the system independent of any outside assistance. Coordinate specific Training Schedules at the convenience of the Owner.

3. Provide four (4) copies each of a bound and illustrated operator's manual and service manual. The operator's manual shall be written in layman's language and printed so as to become a permanent reference document for the operators. The service manual shall be written in layman's language and printed so as to become a permanent reference document for maintenance personnel. It shall describe how to run internal self–diagnostic software programs, troubleshoot head–end hardware and field devices with a complete scenario simulation of all possible system malfunctions and the appropriate corrective measures. Both manuals shall be prepared and submitted to the Engineer and Owner prior to the training sessions.

E. PROJECT RECORD DRAWINGS

1. Project Record Drawings include all bid drawings and all submissions.
2. Drawings shall include:

    a) Routing of all security cables, including the designations assigned to each wire/cable and field terminations schedules.
    b) Accurate location of all equipment installed under the specifications.
    c) A complete equipment list for each functional area. Upon completion of this project, the information shown on these drawings shall be transferred to a complete (Record) set of full size, reproducible drawings at no additional cost to the OWNER.

F. PROGRAMMING

1. All programming for the CCTV camera system shall be provided by Contractor, based on preferences established by Owner. This shall include the arrangement of camera views for the various floors in the building at the NVR workstation and the presentation of names and descriptions for the views.

END OF SECTION 282301

SECTION 283111 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes complete replacement of the existing fire alarm system. A new turn-key addressable fire alarm system shall be installed and shall include, but is not limited to, alarm initiating devices, notification appliances, control panels, auxiliary control and monitoring devices, all wiring, programming and testing as specified herein.

B. The new fire alarm system installation will require work throughout the entire building - not just in the major renovation areas. Work outside of the major project areas will require coordination with the owner and building occupants.

C. The contractor shall furnish all parts, materials, and labor customarily required or provided for a complete and operating system, in accordance with all requirements applicable, even if each needed item is not specifically shown or described in the project plans or specifications.

D. The fire alarm system shall comply with NFPA 70 (2017) - National Electrical Code (NEC).

E. The fire alarm system shall comply with applicable NFPA 72 - National Fire Alarm Code.

F. The old fire alarm system shall remain active to protect and notify any occupied spaces outside of the project renovation areas during construction. Once the new system is installed, tested, inspected and accepted, the old system shall be completely demolished including all devices, conduit and wiring.

G. During any lapses in coverage, the contractor will be responsible for providing an approved third party fire watch for all areas of the building without coverage. The contractor’s staff or building occupants shall not be used to provide a fire watch.

H. New conduit, boxes and wiring shall be provided as required to feed all new devices.

1.2 DEFINITIONS

A. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

B. Fire Alarm Control Panel (FACP) - Also called a Fire Alarm Control Unit (FACU) by some entities. See requirements in Part 2

C. Remote Annunciator (RA) – Provides LCD display with a text statement of the panel status and/or LED lamps to indicate the status of the fire alarm system. It is provided to assist fire fighters who respond to a call and to assist technicians who respond to a trouble condition.

D. Authority Having Jurisdiction (AHJ) will be the Durham City-County Inspections Department.

1.3 SYSTEM DESCRIPTION

A. General: The system is to be the addressable type, with a 24vdc nominal operating voltage. All equipment supplied must be specifically listed for its intended use and shall be installed in accordance with any instructions included in its listing.

B. The FACU and all other control equipment locations, including any transponders, sub-panels, and booster power supplies, must be protected by a spot type smoke detector located within 15 feet of the equipment (measured horizontally

C. A supervised "AHU Shutdown Defeat" toggle switch shall be provided in or adjacent to the FACU or as a key-operated function in the Remote Annunciator (if provided). If the RA option is utilized, provide an informative engraved label at the FACU about this function. The switch must cause a system "trouble" indication when it's placed in the off-normal ("Shutdown Defeated") position.

1.4 SUBMITTALS

A. 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.

B. Product Data: Submit Manufacturer's technical product data, including specifications and installation instructions, for each type of fire alarm system equipment. Submit technical product data on the fire alarm service equipment. Submittals shall provide mA draw for each device submitted and the listed minimum voltage required to operate. Panel submittal shall list voltage drop allowed for panel and for individual NAC circuits.

C. Shop Drawings:

1. Submit shop drawings showing equipment, device identification numbers and locations, and connecting wiring of entire fire alarm system. Include wiring and riser diagrams. Wiring diagrams shall be based on the project floor plans, with devices and proposed conduit routing shown. Provide distance and route for each NAC (Notification Appliance Circuit). Riser diagrams shall show consecutive connections for all devices with addresses and ratings. Utilize existing device addresses where applicable.

2. The fire alarm contractor shall submit complete Shop Drawings to the engineer for review, prior to performing any work. These shall clearly demonstrate compliance with the engineer’s plans and specifications, which have a System Response Matrix showing the fire alarm system's actions (outputs) required for each type of alarm, supervisory, and trouble signal. Any non-compliant features must be fully described.

3. Engineer’s approval (with or without corrections) of contractor’s Shop Drawings, samples, cut sheets, etc., is for general conformance with the contract documents and design concept. It shall not relieve the contractor of responsibility for full compliance with the project plans and specifications, EXCEPT for any specific non-compliant features for which the engineer gives written authorization.

D. Wiring Diagrams: Detail all wiring and differentiate between manufacturer-installed and field-installed wiring. Include diagrams for equipment and for system with all terminals and interconnections identified.

E. Wire and Cabling: Submit wire and cable for signal circuits and notification circuits.

F. Installation Instructions: Submit Manufacturer's detailed installation instruction for all duct mounted smoke detectors, supervisory switches, and similar items which require mechanical installation.

G. Battery Calculations:

1. Provide battery calculations used to size secondary power source(s). Calculations must be submitted prior to installation of equipment. System shall be supplied from the life safety branch of the emergency generator and shall be provided with 24 hours of battery backup.

2. Identify NAC current draws and voltage drops for each circuit in the submittal package. In no case shall the calculated voltage at any notification appliance fall below the minimum listed operating voltage for the devices used.

3. Include a copy of system battery sizing calculations with the shop drawing submittal to the engineer. Use manufacturer's battery discharge curve to determine expected battery voltage after 24 hours of providing standby power. Then use calculated Notification Appliance Circuit current draw in the alarm mode to determine expected voltage drop at EOL, based on conductor resistance per manufacturer's data sheet or NEC.

4. The voltage drop at EOL must not exceed 14% of the expected battery voltage, after the required standby time plus alarm time. (Typically, for a 24 volt system, this limits the voltage drop from the battery to the EOL to 3 volts). Determine "worst case" voltage at far end of each NAC, by subtracting its calculated V-drop from the expected battery voltage. The result must be no less than the minimum listed operating voltage for the alarm notification appliances used.

5. All of these calculations must be placed on a dedicated sheet of as-built drawings, for future reference by fire alarm service technicians. NAC voltage drop is to be verified during system tests.

H. Device Address List: Coordinate with final system programming.

I. Maintenance Data: Submit maintenance data and parts lists for each type of fire alarm equipment installed, including furnished specialties and accessories. Include this data, product data, and shop drawings in maintenance manual.

J. Maintenance Contract: Submit a quote for a maintenance contract to provide all maintenance, test, and repair described below and/or in accordance with NFPA-72, "Guide for Testing Protection Signaling Systems". Include also a quote of unscheduled maintenance/repair, including hourly rates for technicians trained on this equipment, and response travel costs. Submittals that do not identify all post contract maintenance costs will not be accepted. Rates and costs shall be valid for the period of five (5) years after expiration of the guaranty. Maintenance and testing shall be on a semiannual basis or as required by the local AHJ which ever is the most restrictive. A preventive maintenance schedule shall be provided by the Contractor that shall describe the protocol for preventive maintenance. The schedule shall include:

1. Semiannual systematic examination, adjustment and cleaning of all detectors, manual fire alarm stations, control panels, power supplies, relays, and all accessories of the fire alarm system.

2. Semiannual testing of each circuit in the fire alarm system.

3. Semiannual testing of each smoke detector in accordance with the requirements of NFPA 72.

K. Certifications:
1. Submit a certification from the major equipment manufacturer indicating that the proposed supervisor of installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses, and telephone numbers in the certification.
a. Installer's training certificate as defined under Quality Assurance

1.5 QUALITY ASSURANCE

A. 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.

B. Acceptable Manufacturers: Products as produced by the following systems are judged by the Owner to be acceptable for use on this project. No alternates will be accepted since this is an existing system.

1. Notifier
2. Edwards
3. Honeywell

C. Installer's Qualifications:

1. Company specializing in performing the work of this section and making the final terminations of this section. Minimum of 5 years documented experience installing fire detection and alarm systems similar in size and scope to this project. Qualifications of installer shall be provided with equipment submittal. Installer shall be certified by the manufacturer to install, program and service the system and shall directly supervise the final connections between the equipment and the wiring system. Only the Installer may make program changes and must be present for the 100% test, Designer's pre-final review and Owner inspections.

2. All connections to the FACP and the system's programming shall be done only by the manufacturer, or by an authorized distributor that stocks a full compliment of spare parts for the system. The technicians who do this are required to be trained and individually certified by the manufacturer, for the FACP model/series being installed. This training and certification must have occurred within the most recent 24 months, except that a NICET Level III certification will extend this to 36 months. Copies of the certifications must be part of the Shop Drawing submittal to the engineer, prior to installation. The submittal cannot be approved without this information.

1.6 Codes and Standards:

A. Comply with NFPA 70 (2017) - National Electrical Code (NEC).

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a Nationally Recognized Testing Agency (NRTL) that is accepted by the North Carolina Building Code Council (NCBCC) to label electrical and mechanical equipment.

C. FM Compliance: Provide fire alarm systems and accessories which are FM approved.

D. Compliance with Local Requirements: The fire alarm system shall comply with applicable provisions of the NC Building.

E. Compliance with Local Requirements: The fire alarm system shall comply with applicable provisions of current NC Fire Prevention Code.

1.7 RELATED DOCUMENTS

A. Drawings, General and Supplementary Conditions apply to work of this section.

B. See Section 260533, Raceways and Boxes.

PART 2 - PRODUCTS

2.1 FIRE ALARM CONTROL PANEL (FACP)

A. FACP - General: The FACP shall meet the following general requirements (unless otherwise required by the owner for certain systems):
   1. The system is to be the addressable type, with a 24vdc nominal operating voltage.
   2. The system is to have multiple access levels so owner's authorized personnel can disable individual alarm inputs or normal system responses (outputs) for alarms, without changing the system's executive programming or affecting operation of the rest of the system. How to do this must be included in the training required to be given to the owner's designated personnel, and must also be part of the written documentation provided by the fire alarm equipment supplier.
   3. Signal Line Circuits: (SLC) also called addressable loop - Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded onto an NFPA Style 6 (Class A) Signaling Line Circuit (SLC) with no “T” taps.
   4. Initiation Device Circuits: Initiation Device Circuits (IDC) shall be wired Class A (NFPA Style D).
   5. Notification Appliance Circuits: Notification appliance circuits shall be wired Class B (NFPA 72 Style Y).
   6. Digitized electronic signals shall employ check digits or multiple polling. In general a single ground or open on any system signaling line circuit, initiating device circuit, or notification appliance circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.
   7. Loss of Power: Alarm signals arriving at the main FACP shall not be lost following a power failure (or outage) until the alarm signal is processed and recorded.

B. System Response to an Alarm Condition: When a fire alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:
   1. The system alarm LED shall flash.
   2. A local piezo-electric signal in the control panel shall sound.
   3. The 80-character LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.

4. On systems equipped with a printer, printing and history storage equipment shall log the information associated each new fire alarm control panel condition, along with time and date of occurrence.
5. All system output programs assigned via control-by-event equations to be activated by the particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated. Exact programming shall be provided by the Contractor to meet the Owner's requirements.
6. Activate all fire alarm Notification Appliances in the building, sounding and flashing in synchronization continuously until manually silenced, or until the initiating device and control unit have been reset to normal condition.
7. Activate digital alarm communicator.
8. Deactivate control relays allowing HVAC units to run.

C. System Response to a Trouble Condition:
1. Systems AC power trouble signal shall not be sent unless maintained for 1 to 8 hours (or more) Provide additional relays as required for this purpose.
2. Provide immediate transmission of all other supervising signals.
3. Provide adjustable time delay for all other trouble signals prior to transmission.

D. FACP - Minimum Requirements: The FACP shall contain a microprocessor based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent detectors, addressable modules, local and remote operator terminals, printers, annunciators, and other system controlled devices. The main FACP shall perform the following functions:
1. Supervise and monitor all intelligent addressable detectors and monitor modules connected to the system for normal, trouble and alarm conditions.
2. Supervise all initiating, signaling, and notification circuits throughout the facility by way of connection to monitor and control modules.
3. Detect the activation of any initiating device and the location of the alarm condition. Operate all notification appliances and auxiliary devices as programmed.
4. Visually and audibly annunciate any trouble, supervisory or alarm condition on operator's terminals, panel display, and annunciators.

E. System Capacity and General Operation: The system shall have the following capacities and general operation modes:
1. The FACP shall provide, or be capable of expansion to 198 intelligent/addressable devices per SLC and 2048 annunciation points, minimum, per system. The number of SLCs provided shall be as indicated on the Drawings. Total points shall be as indicated on the drawings or otherwise specified.
2. The FACP shall include a full featured operator interface control and annunciation panel that shall include a backlit, 80 character liquid crystal display, individual, color coded system status LEDs, and an alphanumeric keypad for the field programming and control of the fire alarm system.
3. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the fire alarm control panel.

F. The FACP shall be able to provide the following features:

Upload/Download to PC Computer
Charger Rate Control
Alarm Verification with Tally

Drift Compensation
Automatic Day/Night Sensitivity Adjust
Device Blink Control
Pre-alarm Control Panel Indication
Trouble Reminder
NFPA 72 Smoke Detector Sensitivity Test
System Status Reports
Periodic Detector Test
Alarm Verification, by device, with tally
Non-Alarm Module Reporting
Block Acknowledge
Smoke Detector Maintenance Alert
Control-By-Time

G. The control panel shall be capable of printing historical data and device parameters and shall include all equipment necessary to produce printouts, including an external printer and shall be U.L. listed as meeting the NFPA sensitivity testing and maintenance requirements without the need for manually removing and testing each smoke detector. The control panel shall provide a display and a printed list of these sensitivity measurements as a permanent record of the required sensitivity testing. The system shall also annunciate a trouble condition when any smoke detector approaches 80% of its alarm threshold due to gradual contamination, with an annunciation of the location of the smoke detector requiring service. If any specialized equipment must be used to program any function of the smoke detector devices, then one must be furnished as part of the system.

H. The system shall perform time based control functions including automatic changes of specified smoke detector sensitivity settings.

I. The Fire Alarm System shall have multiple access levels which permit the Owner's authorized personnel to disable individual alarm inputs or normal system responses (outputs) for alarms without changing the system's executive programming or affecting operation of the rest of the system. This must include the ability to override selected alarm inputs or system responses to alarms without affecting the remaining portions of the system. The owner shall be taught how to make these changes in the training program provided.

J. Central Processing Unit: The Central Processing Unit (CPU) shall communicate with, monitor, and control all other modules within the control panel. Removal, disconnection or failure of any control panel module shall be detected and reported to the system display by the CPU.
   1. The CPU shall contain and execute all control-by-event (including ANDing, ORing, NOTing, CROSSZONEing) programs for specific action to be taken if an alarm condition is detected by the system. Such control-by-event programs shall be held in non-volatile programmable memory, and shall not be lost with system primary and secondary power failure. The CPU shall also provide a real-time clock for time annotation of all system displays. The Time-of-Day and date shall not be lost if system primary and secondary power supplies fail.
   2. The CPU shall be capable of being programmed on site without requiring the use of any external programming equipment. Systems that require the use of external programmers or change of EPROMs are not acceptable.
   3. The CPU and associated equipment are to be protected so that they will not be affected by voltage surges or line transients consistent with UL standard 864.

K. Operators Control: Provide an operators interface which allows the following minimum functions. In addition, the operators interface shall support any other functions required for system control and/or operation:
   1. Acknowledge (ACK/STEP) Switch
   2. Signal Silence Switch
   3. System Reset Switch
   4. System Test Switch
   5. Lamp Test Switch

L. Display: The system display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters. The display assembly shall contain, and display as required, custom alphanumeric labels for all intelligent detectors, addressable modules, and software zones.
   1. The system display shall provide an 80-character back-lit alphanumeric Liquid Crystal Display (LCD).
   2. The Display shall also provide four Light-Emitting-Diodes (LEDs), that will indicate the status of the following system parameters: AC POWER, SYSTEM ALARM, SYSTEM TROUBLE, and SIGNAL SILENCE.
   3. The system display shall provide a touch key-pad with control capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels shall be accessible through the display interface assembly to prevent unauthorized system control or programming.

M. Signaling Line Circuit (SLC) Interface Board: The FACP shall contain SLC interface boards as required to communicate with the SLC. Each SLC board shall monitor and control a minimum of 198 intelligent addressable devices. This includes 99 analog detectors (Ionization, Photoelectric, or Thermal) and 99 monitor or control modules.
   1. Each SLC interface board shall contain its own microprocessor, and shall be capable of operating in a local mode (any SLC input activates all or specific SLC outputs) in the event of a failure in the main CPU of the control panel. The SLC interface board shall not require any jumper cuts or address switch settings to initialize SLC Loop operations. SLC interface boards shall provide power and communicate with all intelligent addressable detectors and modules connected to it's SLC Loop on a single pair of wires. This SLC Loop shall be capable of operation as NFPA Style 6.
   2. Each SLC interface board shall receive analog information from all intelligent detectors and shall process this information to determine whether normal, alarm, or trouble conditions exist for that particular detector. The SLC interface board software shall include software to automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information may also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.

N. Printer: Provide a printer to provide hard-copy printout of all changes in status of the system. The printer shall time-stamp such printouts with the current time-of-day and date. The printer shall be standard carriage with 80-characters per line and shall use standard pin-feed paper. Thermal printers are not acceptable. The printer shall operate from a 120 VAC, 60 Hz power source. Provide table and stand for printer if it is to remain constantly connected to the fire alarm panel.

O. Remote Transmissions: The FACP shall be interfaced to a Digital Alarm Communications Transmitter (DACT).

P. Power Supply: The FACP power supply(ies) shall operate on 120 VAC, 60 Hz and shall have a continuous rating adequate to power all equipment and functions in full alarm continuously. All modules and drivers must be able to withstand prolonged short circuits in the field wiring, either line-to-line or line-to-ground, without damage. Further, the power supply shall be expandable for additional notification appliance power in 3.0 Ampere increments.

Q. The power supply shall provide a battery charger using dual-rate charging techniques for fast battery recharge.

R. Batteries: Shall be completely maintenance free, shall not require liquids, fluid level checks or refilling, and shall not be capable of producing spills and/or leaks. Batteries shall be sealed gel-cell type with expected life of 10 years. Battery voltage shall be as required by the FACP and related equipment. Battery shall have sufficient capacity to power the fire alarm system for not less than 24 hours plus 5 minutes of alarm (maximum load) upon a normal AC power failure. NAC circuits shall not exceed 75% of maximum current load allowed.

S. Enclosures: The FACP shall be housed in a 3rd party listed cabinet suitable for surface or semi-flush mounting. Cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish. The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators. For convenience, the door may be hinged on either the right or left side (field selectable).

2.2 ALARM APPLIANCES

A. Programmable Electronic Sounders: Sounders located outdoors shall be listed for use in wet locations. Electric sounders shall operate with synchronized audible output and have the following specifications:

1. Voltage: Programmable electronic sounders shall operate on 24 VDC nominal.
2. Programming: Electronic Sounders shall provide the ANSI S3.41 three-pulse temporal pattern audible evacuation signal with minimum and maximum output sound levels in accordance with NFPA 72. Electronic Sounders shall be field programmable without the use of special tools.
3. 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 7'-6" Above Finished Floor (AFF) or 6" Below Finished Ceiling (BFC), whichever is lower.

B. 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:

1. Voltage: Strobe lights shall operate on 24 VDC nominal.
2. Maximum pulse duration: 2/10ths of one second.
3. 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 at 7'-6" Above Finished Floor (AFF) or 6" Below Finished Ceiling (BFC), whichever is lower.

4. Strobe intensity and flash rate: Must meet minimum requirements of UL 1971. Provide strobe lights with minimum intensity Candela (Cd) rating of 15/75 Cd, or greater if such is indicated adjacent to the device symbol on the Drawings.

C. Audible/Visual Combination Devices shall be located as shown on the Drawings and shall comply with all applicable requirements for both Programmable Electronic Sounders and Strobe Lights. Unless otherwise indicated on the Drawings, combination A/V devices shall be mounted at 7'-6" Above Finished Floor (AFF) or 6" Below Finished Ceiling (BFC), whichever is lower.

2.3 INITIATING DEVICES

A. Addressable Devices - General: All initiating devices shall be individually addressable. Addressable devices shall comply with the following requirements:

1. All addressable spot type and duct smoke detectors shall be the analog type and the alarm system shall automatically compensate for detector sensitivity changes due to ambient conditions and dust build-up within detectors. This feature must be armed and sensitivities set prior to acceptance of the system.
2. Address Setting: Addressable devices shall provide an address-setting means.
3. Connections: Addressable devices shall be connected to a Signaling Line Circuit (SLC) with two (2) wires.
4. Operational Indications: Addressable initiation devices shall provide dual alarm and power LEDs. Both LEDs shall flash under normal conditions, indicating that the device is operational and in regular communication with the control panel. Both LEDs shall be placed into steady illumination by the FACP to indicate that an alarm condition has been detected. The flashing mode operation of the detector LEDs shall be optional through the system field program. An output connection shall also be provided in the device base to connect an external remote alarm LED.
5. Intelligent Initiation Devices: All smoke detectors shall be the "intelligent" in that smoke detector sensitivity shall be set through the FACP and shall be adjustable in the field through the field programming of the system. Sensitivity shall be capable of being automatically adjusted by the FACP on a time-of-day basis. Using software in the FACP, detectors shall be capable of automatically compensating for dust accumulation and other slow environmental changes that may affect performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72.
6. Spot-type detectors must be the plug-in type, with a separate base (not a mounting ring), to facilitate their replacement and maintenance. The base shall have integral terminal strips for circuit connections, rather than wire pigtails. Each detector or detector base shall incorporate an LED to indicate alarm.
7. Device mounting Base: Unless otherwise specified all detectors shall be ceiling-mount and shall include a separate twist-lock base with tamper proof feature.
8. Test Means: The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel when in the "test" condition.
9. Device Identification: Detectors shall store an internal identifying type code that the control panel shall use to identify the type of device. Device identifications shall be either ION, PHOTO, or THERMAL.

B. Photoelectric Smoke Detectors: Photoelectric smoke detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.

C. Ionization Smoke Detector: Ionization smoke detectors shall use the dual-chamber ionization principal to measure products of combustion and shall, on command from the control panel, send data to the panel representing the analog level of products of combustion.

D. Thermal Detectors: Thermal Detectors shall be intelligent addressable devices rated at 135°F. (58°C.) and shall have a rate-of-rise element rated at 15°F. (9.4°C.) per minute. It shall connect via two wires to the Fire Alarm Control Panel Signaling Line Circuit. Up to 99 intelligent heat detectors may connect to one SLC loop. Thermal detectors shall use an electronic sensor to measure thermal conditions caused by a fire and shall, on command from the control panel, send data to the panel representing the analog level of such thermal measurements.

1. Non-Rate of Rise Detectors: Provide thermal detectors with non-rate of rise thermal elements. Non-rate of rise detectors are indicated by NRR adjacent to the thermal detector symbol.
2. Specialized Element Temperature Ratings: Provide thermal detectors with specialized element temperature ratings. Specialized element temperatures are indicated by a temperature rating adjacent to the thermal detector symbol, e.g. 195°F.

E. Duct Smoke Detector: In-Duct Smoke Detector Housings shall accommodate a velocity rated photoelectric detector. The device, independent of the type used, shall provide continuous analog monitoring and alarm verification from the panel. When sufficient smoke is sensed, an alarm signal shall be initiated at the FACP.

1. Installation: Duct detectors and related items shall be furnished and connected by the Division 16 (Electrical) Contractor but installed by the Division 15 (Mechanical) Contractor.

F. Addressable Pull Stations - General: Addressable pull stations shall, on command from the Control Panel, send data to the panel representing the state of the manual switch. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.

1. All pull stations shall be dual-action, have a positive, visual indication of operation and utilize a key type reset.
2. Construction: Pull stations shall be constructed of Lexan or other material suitable to the installation environment with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches or larger. Stations shall be suitable for surface mounting or semiflush mounting as shown on the plans. Unless otherwise indicated on the Drawings pull stations shall be mounted at 48" Above Finished Floor.

2.4 MISCELLANEOUS SYSTEM ITEMS

A. Addressable Dry Contact Monitor Module: Addressable Monitor Modules shall be provided to connect one supervised IDC zone (either Style D or Style B) of non-addressable Alarm Initiating Devices (any Normally Open [N.O.] dry contact device) to one of the Fire Alarm Control Panel Signaling Line Circuit Loops. Monitor modules shall be installed as required by the system configuration. All required monitor modules may not be shown on the Drawings.

1. Indication of Operation: An LED shall be provided that shall flash under normal conditions, indicating that the Monitor Module is operational and in regular communication with the control panel.
2. Mounting Requirements: Monitor Modules shall mount in a standard 4-inch square, 2-1/8" deep electrical boxes. Modules must be located in conditioned spaces unless they are tested, listed and marked for continuous duty across the range of temperatures and humidities expected at their installed location.

B. Two Wire Detector Monitor Module: Addressable Monitor Modules shall be provided to connect one supervised IDC zone, Class A or B (Style D or B operation) of non-addressable 2-wire smoke detectors or alarm initiating devices (any N.O. dry contact device) to one of the Fire Alarm Control Panel Signaling Line Circuit Loops. Monitor modules shall be installed as required by the system configuration. All required monitor modules may not be shown on the Drawings. Modules must be located in conditioned spaces unless they are tested, listed and marked for continuous duty across the range of temperatures and humidities expected at their installed location.
1. Indication of Operation: Unless otherwise indicated on the Drawings an LED shall be provided that shall flash under normal conditions, indicating that the Monitor Module is operational and in regular communication with the control panel.
2. Mounting Requirements: Monitor Modules shall mount in a standard 4-inch square, 2-1/8" deep electrical boxes.

C. Addressable Control Module: Addressable Control Modules shall be provided to supervise and control the operation of one conventional Notification Appliance Circuit (NAC) of compatible, 24 VDC powered, polarized Audio/Visual (A/V) Notification Appliances. For fan shutdown and other auxiliary control functions, the control module may be set to operate as a dry contract relay. The control module shall provide address-setting means using decimal switches and shall also store an internal identifying code that the control panel shall use to identify the type of device. An LED shall be provided that shall flash under normal conditions, indicating that the control module is operational and is in regular communication with the control panel. Modules must be located in conditioned spaces unless they are tested, listed and marked for continuous duty across the range of temperatures and humidities expected at their installed location.
1. Mounting Requirements: Control Modules shall mount in a standard 4-inch square, 2-1/8" deep electrical boxes.
2. Configuration: The control module NAC circuit may be wired for Style Y (Class B) with up to 1 Amp of inductive A/V signal, or 2 Amps of resistive A/V signal operation, or as a dry contact (Form C) relay. The control module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30 VDC. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.
3. Power Source: Audio/visual power shall be provided by a separate supervised power loop from the main fire alarm control panel or from a supervised, 3rd party listed remote power supply. A/V power sources and connections are not shown on the Drawings
4. Test Switch: A magnetic test switch shall be provided to test the module without opening or shorting its NAC wiring.

D. Isolator Module: Isolator Modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC loop. The Isolator Module shall limit the number of modules or detectors

that may be rendered inoperative by a short circuit fault on the SLC Loop. Modules must be readily accessible (not above ceiling) and clearly labeled.

1. Operation: Isolator Modules shall operate such that if a wire-to-wire short occurs, the Isolator module shall automatically open-circuit (disconnect) the SLC loop. When the short circuit condition is corrected, the Isolator Module shall automatically reconnect the isolated section. The Isolator Module shall not require any address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an Isolator Module after its normal operation.
2. Mounting: The Isolator Module shall mount in standard 4-inch square, 2-1/8" deep electrical boxes. It shall provide a single LED that shall flash to indicate that the Isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.
3. Labeling: Each isolation module must be clearly labeled, readily accessible for convenient inspection (not above a lay-in ceiling), and shown on as-built system drawings.

E. Serially Connected LED Annunciator: Annunciator shall communicate with the fire alarm control panel via an EIA-485 communications loop (four-wire) and shall individually annunciate all zones in the system. System zones shall be as indicated on the Drawings. Up to 10 annunciators may be connected to the EIA-485 communications loop.

1. Annunciator Indicators: The annunciator shall provide a red Alarm LED per zone, and a yellow Trouble LED per zone. The annunciator shall also have an "ON-LINE" LED, local piezo sounder, local acknowledge/lamp test switch, and custom zone/function identification labels. Annunciator switches may be used for System control such as, Global Acknowledge, Global Signal Silence, and Global System Reset. All annunciator switches and indicators shall be software programmable.
2. LCD Alphanumeric Display Annunciator: The Alphanumeric display annunciator shall be a supervised, remotely located back-lit LCD display containing a minimum of eighty (80) characters for alarm annunciation in clear English text. The LCD annunciator shall display all alarm and trouble conditions in the system.
3. System Capacity: The system shall allow a minimum of four LCD annunciators. In addition to annunciation functions, each LCD annunciator shall be capable of the following software programmed system functions: Acknowledge, Signal Silence and Reset.
4. Connections: The annunciator shall connect to a two-wire EIA-485 interface. The two-wire connection shall be capable operation at distances of 6,000 feet. Provide interface to fiber optic cable systems and/or repeater units where such are indicated on the Drawings.

F. Remote Annunciator Indicator Lights (RAIL): RAILs shall be provided with a key type switch for testing of the annunciated device. In addition, RAILs shall have the following features:

1. Voltage: RAILs shall operate on 24 VDC nominal.
2. 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, RAILs shall be mounted as described for electronic sounders above.

G. Door Hold-Open Magnets: Door hold open magnets shall be suitable for mounting in a single gang electrical device box. Door hold open magnets shall be furnished with keepers, door chains, and other accessories as required to properly hold open doors as indicated on the Drawings. Holding force of the magnet shall be appropriate for the door to be held open.

Door hold open magnets shall operate in a fail safe manner, i.e., the door shall release in event of a failure of voltage to the device.

1. Power Source: Door hold open magnets shall be configured to operate from a nominal 24 VDC system as supplied by the FACP or other power supply listed for the purpose. All hold open magnet supply sources, whether a part of the FACP or whether derived from a separate power supply, shall be supervised. Door hold open magnet circuits which use step-down transformers, 120 VAC, or local relays are not permitted.
2. Device box support: Door hold open magnet device boxes shall be securely attached to the building structure by means of wood blocking or other equally effective means. Boxes attached directly to only one metal stud or boxes supported by means of expansion type fasteners are not acceptable.

H. Battery Power Supply (BPS) &/or Supplementary Notification Appliance Circuit (SNAC): These types of panels shall be completely maintenance free, shall not require liquids, fluid level checks or refilling, and shall not be capable of producing spills and/or leaks. Batteries shall be sealed gel-cell type with expected life of 10 years. Battery voltage shall be as required by the FACP and related equipment. Battery shall have sufficient capacity to power the fire alarm system for not less than 24 hours plus 15 minutes of alarm upon a normal AC power failure. Battery cabinet shall be twice the size of the batteries it will contain. NAC circuits shall not exceed 75% of maximum current load allowed.

I. Surge Protection: The following protection against voltage transients and surges must be provided by the fire alarm equipment supplier, and installed by the electrical contractor:

1. On AC Input: A series type, feed through (not shunt-type) branch circuit transient suppressor such as the EFI E100HW120, Leviton 51020-OWM, Emerson/Northern Technologies TCS-HWR, Transtector ACP100BW series, or equivalent UL 1449 - 2nd Edition Listed device submitted to and approved by the electrical design engineer.
2. On DC Circuits Extending Outside Building: Adjacent to the FACP, and also near point of entry to outlying building, provide "pi"-type filter on each leg, consisting of a primary arrestor, series impedance, and a fast acting secondary arrestor that clamps at 30v-40v. Some acceptable models: Innovative Technology D2S33-2ML, Transtector TSP8601, Ditek DTKxLVL series, Citel America B280-24V, Leviton 3824-OWM, Northern Technologies DLP-42. Submit data on others to the engineer for approval. UL 497B listing is normally a prerequisite for their consideration. Devices using only MOV active elements are not acceptable.

2.5 Wiring

A. Addressable loop (signaling line) circuits shall be wired with type FPL/FPLR/FPLP fire alarm cable, AWG 18 minimum, low capacitance, twisted shielded copper pair. Cable shield drain wires are to be connected at each device on the loop to maintain continuity, taped to insulate from ground, and terminated at the FACP. Acceptable cables include Atlas 228-18-1-1STP, BSCC S1802s19 (same as EEC 7806LC), West Penn D975, D991 (AWG 16), D995 (AWG 14), or equal wire having capacitance of 30pf/ft. maximum between conductors. Belden 5320FJ acceptable if only FPL rating needed. The cable jacket color shall be red, with red (+) and black (-) conductor insulation.

1. Unshielded cable, otherwise equal to the above, is permitted to be used if the manufacturer's installation manual requires, or states preference for, unshielded cable
2. In underground conduit, use Type TC or PLTC cable (PE insulated) to avoid problems from moisture.

PART 3 - EXECUTION

3.1 FIRE ALARM SYSTEM:

A. The fire alarm 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.

B. All equipment supplied must be specifically listed for its intended use and shall be installed in accordance with any instructions included in its listing. The most common non-compliance with listings is exceeding environmental limits. 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.

C. 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.

D. When programming the system, activate the automatic drift compensation feature for all spot-type smoke detectors. Systems with alarm verification are not to have this feature activated without written direction from the owner's representative or the AHJ. Alarm verification must not be used with multi-sensor/multi-criteria detectors under any circumstances, as inadequate system response may result.

1. Most applications of analog addressable smoke detectors do not require alarm verification to reduce nuisance alarms, as they are better able to discriminate between fire and common non-fire ambient events. A short operational test with normal occupancy can determine if transient ambient events are a problem

E. Set spot-type smoke detector sensitivities to normal/medium, unless directed otherwise by the design engineer/owner's rep.

1. High sensitivity may be appropriate in relatively benign, clean environments such as art museums and libraries, to improve system response time without causing nuisance alarms.
2. Duct smoke detectors shall be programmed for supervisory annunciation.

F. Print a complete System Status and Programming Report, after the above steps have been done. This must include the program settings for each alarm initiating device and the current sensitivity of each analog addressable smoke detector.

3.2 FIRE ALARM CONTROL EQUIPMENT INSTALLATION

A. The technician who makes final connections and programs the FACP is legally the "installer" even though most field connections to system devices and appliances are normally made by electrical contractor personnel. The responsibility for assuring a proper installation overall rests with this individual fire alarm system technician. In addition to doing the final hookups and activating the system, this individual is expected to check enough field connections to assure a proper job was done there. The absence of system "trouble" signals is not a sufficient measure

of the field wiring, which could have "T" taps, the wrong type of wire, improper terminations, ground (drain wire) issues, etc.

B. No splices shall be made in the fire alarm system other than at device terminal blocks, or on terminal blocks in cabinets. Wire nuts and crimp splices are not permitted.

C. The electrical contractor is not permitted to apply power to the FACP or any system power supplies, or to make any connections to them. However, the electrical contractor is responsible for installing and making field connections to initiating devices, notification appliances, control relays, and other components.

D. The FACP must have an Alarm Silence switch, and be equipped with the Subsequent Alarm (alarm resound) feature. Any remote annunciators or graphic displays located away from the alarm area must also include an audible signal with alarm resound feature.

E. Notification Appliance Circuit booster power supplies must be individually monitored by the FACP and protected by a smoke detector per NFPA 72. They shall not be located above a ceiling, or in non-conditioned space. A 24vdc power circuit serving addressable control relays must also be monitored for integrity.

F. All junction boxes shall be painted red prior to pulling the wire. Those installed in finished areas are permitted to be painted outside to match the finish color.

G. Basic operating instructions shall be framed and permanently mounted at the FACP. (If the owner concurs, they may instead be affixed to the inside of the FACP 's door.) In addition, the NFPA 72 "Record of Completion" must either be kept at/in the FACP, or its location shall be permanently indicated there by engraved label.

H. Provide an engraved label inside the FACP identifying its 120vac power source, as follows: Panelboard location, panelboard identification, and branch circuit number.

I. Alarm notification appliances (audible and visible) are to comply with NFPA 72, the North Carolina Building Code, and North Carolina Accessibility Code criteria for intensity and placement. The standard audible evacuation signal is the ANSI S3.41 three-pulse temporal pattern except it shall not be used if the planned action during fire emergency is to relocate occupants or protect in place, instead of immediate evacuation (e.g., some health care facilities, prisons). All strobe lights installed in a single space must be synchronized. See additional alarm notification appliance requirements for special situations. Contact the AHJ for additional information or to seek approval of any alternative design.

3.3 ADDRESSABLE INTERFACE MODULES (Control and Monitor Modules)

A. Addressable interface modules (used to monitor all contact type initiating devices) must be located in conditioned space, unless they are tested, listed, and marked for continuous duty across the range of temperatures and humidity expected at their installed location.

B. One module may serve as many as 6 heat detectors, in a single space.

3.4 SURGE PROTECTION

A. For each AC power circuit that interfaces with fire alarm equipment install a series type, AC suppressor in a listed enclosure near the electrical panelboard, and trim excess lead lengths. Wind small coil in the branch circuit conductor just downstream of the suppressor connection. Coil to be 5 to 10 turns, about 1" diameter, and securely tie-wrapped. This series impedance will improve the effectiveness of the suppressor in clipping fast rise time voltage transients. Shunt type suppressors are not allowed.

B. On DC Circuits Extending Outside Building: Near the point of entry to or exit from each building install the surge arrestor in a labeled enclosure.

3.5 RISER DESIGN

A. The outgoing and return loops run in 2 separate vertical risers, to promote survivability during fire.

B. A single loop is permitted to serve a maximum of 3 floors. However, if any loop serves more than 1 floor, include an isolation module at each terminal cabinet it uses.

C. Provide isolation modules (or isolator bases) along each SLC (addressable loop).

D. Notification Appliance Circuits (NAC's) are permitted to be Class "B" and serve a maximum of 3 floors.

3.6 AC POWER

A. 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.

B. The branch circuit breaker(s) supplying the system must be physically protected by panelboard lock or handle lock and each must be identified with a 1/4" permanent red dot applied to handle or exposed body area.

C. Provide an engraved label at each fire alarm system control unit, system sub-panel or data gathering panel, supplementary notification appliance (SNAC) panel, digital alarm communicator, etc., identifying its 120vac power source, as follows: Panelboard location, panelboard identification, and branch circuit number.

D. The fire alarm system shall monitor 120vac power to shunt trip breakers used in conjunction with fire suppression systems. Examples include a shunt trip used for cooking appliance power shut-off when the kitchen hood fire suppression system shoots. Use an addressable monitor module to accomplish this supervisory function.

3.7 CONDUIT AND WIRING

A. 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.

B. Provide metal backboxes or plastic skirts as manufactured by the fire alarm manufacturer for devices installed in a surface mounted application. Such boxes shall match device in size and color.

C. Box covers shall be labeled to indicate the circuit(s) or function of the conductors contained therein. Labels shall be neatly applied black lettering on a clear background. Handwritten labels or labels made from embossed tape are not acceptable.

D. All fire alarm system wiring shall be in metal conduit. All fire alarm system raceway, couplers, and connectors must meet the performance and installation requirements of Section "RACEWAYS". Provide 3/4" minimum conduit.

E. All conduit shall be concealed in finished spaces.

F. All outlet, junction and pull boxes shall be concealed in finished spaces.

G. All conduits that penetrate outside walls from air conditioned space must have internal sealing (duct-seal), to prevent condensation from infiltrating humid air.

H. 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:

1.	Initiating Circuits, General	Red (+)/White (-)
2.	Initiating Circuits, Smoke Only	Violet (+)/Gray (-)
3.	Signal Line Circuit cable	Red jacket with Red(+)/Black(-)
4.	Alarm Indicating Appliance Circuits	Blue (+)/Black (-)
5.	AHU Shutdown Circuits	Yellow (+)/Brown (-)
6.	Door Control Circuits	Orange

I. Signaling Line Circuits (SLC's, also called addressable loops) must be NFPA Style 6 (Class A) with no "T" taps. Each must have a minimum of 20% spare addresses, for future use. Individual loops are permitted to cover more than 1 floor of a building.

J. To minimize wiring fault impact, isolation modules shall be provided in all of the locations listed below. If ceiling height ≤10 feet, isolator base type initiating devices are permitted to be used to satisfy any or all of the following

1. In or immediately adjacent to the FACP, at each end of the addressable loop. These two isolators must be in the same room as the FACP and within 15 feet.
2. After each 20 initiating devices and control points on the addressable loop, or a lesser number where recommended by the manufacturer. (Check instructions.)
3. For loops with less than 20 devices and control points, install an isolator at the approximate middle of the loop (in addition to those at the FACP.
4. Near the point any addressable circuit extends outside the building, except for those attached to the building exterior walls and well sheltered by walkways.
5. For loops covering more than one floor, install isolator at terminal cabinet on each floor (with additional isolator[s] on any floor with over 20 addresses).

6. Each isolation module must be clearly labeled, readily accessible for convenient inspection (not above a lay-in ceiling), and shown on as-built drawings

K. Except as required otherwise all circuits in the system shall be wired with AWG 14, minimum, stranded copper, THHN/THWN conductors, installed in conduit. Color code as shown below throughout the system, without color change in any wire run.

1. Alarm notification Appliance Circuits (horns/strobes)..….Blue (+)/Black (-)
2. Separate 24vdc Operating Power (for equipment)……..…Yellow (+)/Brown (-)
3. Door Control Circuits (magnet power, if from system)…...Orange
4. Circuits from Addressable Modules (ZAM's) to Monitored Devices (AWG 14/16)...Violet(+)/Grey (-)

L. Detection or alarm circuits must not be included in raceways containing AC power or AC control wiring. Within the FACP, any 120 VAC control wiring or other circuits with an externally supplied AC/DC voltage above the nominal 24 VDC system power must be properly separated from other circuits and the enclosure must have an appropriate warning label to alert service personnel to the potential hazard.

M. 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.

N. There shall be no splices in the system other than at device terminal blocks, or on terminal blocks in cabinets. "Wire nuts" and crimp splices will not be permitted. Permanent wire markers shall be used to identify all connections at the FACP and other control equipment, at power supplies, and in terminal cabinets All terminal block screws shall have pressure wire connectors of the self-lifting or box lug type.

O. Permanent wire markers shall be used to identify all splices and terminations for each circuit. For splices, use markers or other means to indicate which conductors leads to the FACP. All junction boxes and covers shall be painted red prior to pulling wire. Those boxes in finished areas are permitted to be painted to match the finish color.

P. In multistory buildings, all circuits leaving the riser on each floor shall feed through a labeled terminal block in a hinged enclosure accessible from the floor. If building layout requires the terminal cabinet to be above a drop ceiling, its location must be clearly and permanently identified with a placard readable from floor. Terminal block screws shall have pressure wire connectors of the self-lifting or box lug type.

Q. All wiring shall be checked for grounds, opens, and shorts, prior to termination at panels and installation of detector heads. The minimum resistance to ground or between any two conductors shall be ten (10) megohms, as verified with a megger. Provide advance notice to the A/E of these tests.

R. The system shall be electrically supervised for open or (+/-) ground fault conditions in SLC, alarm circuits, and control circuits. Removal of any detection device, alarm appliance, plug-in relay, system module, or standby battery connection shall also result in a trouble signal. Fire alarm signal shall override trouble signals, but any pre-alarm trouble signal shall reappear when the panel is reset.

3.8 NOTIFICATION DEVICES

A. Both audible and visible alarm signals shall be provided. Visible signals must be the strobe (flash discharge) type, with white or clear lens, and shall comply with current ADA requirements for intensity and placement.

B. The coverage of each fire alarm zone as described in the Drawings shall be indicated on the FACP and any remote annunciator. This may be accomplished by engraved labels, framed directories, and/or graphic displays. Label tape or handwritten labels are not acceptable.

C. Alarm notification appliance (NAC) circuits shall be NFPA 72 Style Y (Class B). The load connected to each circuit must not exceed 80% of rated module output and the coverage of each circuit shall not exceed 3 floors (to limit the effect of faults, and to facilitate trouble-shooting). The NAC voltage drop during alarm must not exceed 14% of the voltage measured across the batteries at that time. To achieve this, the design must consider wire size, length of circuit, device load, inherent voltage loss within the FACP 's power supply, etc. The contractor shall use power outage testing to verify that the NAC circuit was designed and installed properly.

D. End of Line (EOL) resistors: On fire alarm notification circuits, end of line resistors shall be installed in accessible terminal cabinets or dedicated accessible boxes, to facilitate testing and maintenance. EOL resistors shall be located as follows:
   1. In a location that is accessible to fire alarm maintenance personnel.
   2. In an area where maintenance or testing at the EOL resister location will not be disruptive to the normal use of the facility.
   3. In an area that is not easily accessible to the normal building occupants (objective is to avoid accidental or malicious damage by building occupants).
   4. In an area that is no higher than 9 ft. or lower than 7 ft. from the floor level.
   5. Not located in a stairway or bathroom location.

3.9 DETECTORS

A. Automatic fire/smoke detectors used shall be selected in accordance with Table I, “Applications Matrix for Selecting Detection Devices”.

B. Detectors used for elevator: Primary and/or alternate recall points are as indicated on the control Matrix. Elevator capture or control signals shall come from the FACP as relayed by control modules.

C. The FACP and all other control equipment locations, including any transponders, sub-panels, and booster power supplies, must be protected by a spot type smoke detector located within 15 feet of the equipment (measured horizontally).

D. When installed in a room, detectors shall be oriented so their alarm light is visible from the nearest door to the corridor, unless Remote Alarm Indicator Light (RAIL) equipped.

E. Spot-type smoke detectors shall have a built-in locking device to secure the head to the base, for tamper resistance. For detectors mounted within 12 feet of the floor, activate this lock after the system has been inspected and given final acceptance.

F. Unless suitably protected against dust, paint, etc., spot type smoke detectors shall not be installed until the final construction clean-up has been completed. In the event of contamination during construction, the detectors must be replaced.

1. Covers supplied with smoke detector heads do not provide protection against heavy construction dust, spray painting, etc., and must not be used for that purpose. They are suitable only during final, minor cleanup or touchup operations.

G. Identification of individual detectors is required. Assign each a unique number as follows, in sequence starting at the FACP: (Addressable Loop # -- Device #). Show on the as-built plans, and also permanently mount on each detector's base so that it's readable standing on the floor below without having to remove the smoke detector. Exception: For detectors with housings (i.e., air duct, projected beam, air sampling, flame), apply the identification to a suitable location on exterior of their housing. Device labels may not be affixed to the device. Identification labels must be printed labels with black lettering on a clear background. Handwritten labels or labels made from embossed tape are not acceptable.

H. Set spot-type smoke detector sensitivity to normal/ medium, unless directed otherwise by the design engineer or owner's representative. Make additional changes as directed during testing and certification of the system.

I. Unless suitably protected against dust, paint, etc., detectors shall not be installed until the final construction clean-up has been completed. Contaminated detectors must be REPLACED by the Contractor at no additional cost to the Owner.

3.10 DUCT MOUNTED SMOKE DETECTORS

A. All air duct/plenum detectors must have a Remote Alarm Indicator Lamp (RAIL) installed in the nearest corridor or public area and identified by an engraved label affixed to the wall or ceiling. Duct smoke detectors are permitted to be installed only inside an air duct. It is not appropriate to mount them in front of a return air opening. Duct detectors shall also be installed in a manner that provides suitable, convenient access for required periodic cleaning and calibration.

B. Each duct detector installation shall have a hinged or latched duct access panel, 12x12 inches minimum, for sampling tube inspection and cleaning. Indicate airflow direction on the duct, adjacent to the detector, using stencil or permanent decal.

C. Duct detector sampling tubes shall extend the full width of the duct. Those over 36 inches long must be provided with far end support for stability.

1. The preferred method for providing support is to extend the intake tube through the far side of the duct, seal around the tube where it penetrates the duct wall, and plug the end with a rubber stopper. This facilitates visual inspection, intake tube cleaning, and injection of smoke or equivalent aerosol for testing the detector

D. Duct smoke detector mounting position and air sampling tube orientation, are critical for proper operation. The Manufacturer's detailed installation instructions must be followed. The contractor shall mark the direction of air flow on the duct at each duct detector location.

E. All duct smoke detectors shall be programmed for supervisory annunciation per 2012 NC Fire Code 907.4.1.

3.11 PRINTER: Provide a 120vac printer that uses ordinary (non-thermal) paper. Install in location shown on plans.

3.12 AIR HANDLER UNIT (AHU) SHUTDOWN

A. A supervised "AHU Shutdown Defeat" switch must be provided in/adjacent to the FACP or as a key-operated function in the Remote Annunciator (if provided). If the RA option is utilized, provide an informative engraved label at the FACP about this function. The switch must cause a system "trouble" indication when it's placed in the off-normal ("Shutdown Defeated") position.
   1. This is to provide the owner with a convenient means to temporarily resume HVAC operation in the event an unwanted alarm will not clear, prior to arrival of the fire alarm service technician.

B. If the system includes AHU shutdown, silencing the alarm (without resetting) must not reverse the shutdown. A supervised "AHU Shutdown Defeat" switch must be provided in the FACP. The switch must be labeled and its "Normal" position indicated. Provide supervised Hand-Off-Auto switch(es) at the FACP for any building smoke control equipment (pressurization or exhaust fans).

3.13 ANNUNCIATOR - Each addressable fire alarm system must include an LED-type "zone" annunciator at (or in) the FACP. As a minimum, this annunciator is to indicate the specific type of alarm or supervisory signal for groups of addressable devices. The area ("zone") that is represented by each LED shall not exceed 1 floor or 22,500 square feet, and must not cross building fire walls or smoke compartments.

3.14 ALARM VERIFICATION FOR SMOKE DETECTORS

A. The fire alarm system shall be equipped with Alarm Verification.

B. System shall provide as a feature an alternate signal processing algorithm to verify the presence of smoke. The algorithm shall be selectable during system programming. The total effective delay created by the verification algorithm shall not exceed 60 seconds.

3.15 REMOTE ALARM TRANSMISSION REQUIREMENTS

A. Each system with automatic fire detection shall be equipped with a Digital Alarm Communicator Transmitter (DACT) for transmission of fire alarm, supervisory, and trouble signals to a Central Station, Remote Supervising Station, or Proprietary Supervising Station. DACT shall be VoIP with cellular back-up in accordance with NFPA 72.

B. The following signals shall be reported as applicable:
   1. Fire Alarm
   2. Fire Alarm System AC Power Trouble (only if 120vac interrupted for 1 to 8 hours)

C. The precedence of DACT / signals transmitted to the Supervising Station shall be as follows:
   1. Fire Alarm
   2. Supervisory Signal

3. Trouble Signal*

* Loss of AC power to FACP must not be transmitted until it has continued for 1 hour minimum. This avoids nuisance transmissions to the supervising station for brief power outages (switching transients, thunderstorms)

D. "Trouble" signals shall not be sent unless maintained for 60 seconds or more to avoid nuisance transmissions due to alarm verification cycles.

E. DACT shall be compatible with the owner's alarm receiving equipment. Contractor shall program the PROM, connect each DACT to the telephone line(s) provided, and verify proper signal receipt by the Supervising Station.

3.16 AUTOMATIC SMOKE DOOR AND AUTOMATIC LOCK REQUIREMENTS

A. Wall-mounted magnetic door holders and separate heavy-duty closers shall be used, instead of combination door control units. The electromagnets shall be controlled by the building's smoke detection system FACP. Individual smoke detector auxiliary contacts shall not be used to release door holders.

B. Automatic door locks controlled by the system must be either fail safe magnetic locks or fail-safe electro-mechanical with reverse bevel dead bolts.

C. All lock protected doors must immediately unlock upon fire alarm, loss of AC power, disablement of the fire alarm system (defined as loss of 24 VDC power) or upon manual operation of an unlock switch at a constantly attended location.

3.17 FIRE ALARM SYSTEM INSTALLATION AND CONFIGURATION

A. Supervision required: The connection between individual addressable modules and their contact type initiating device(s) must be supervised.

B. Graphic Chart must be mounted behind Plexiglass and secured to surface. Mounting shall be such that charts cannot be removed without a flat head screw driver.

C. Floor Plans with Device Numbers: A copy of the floor plans shall be provided in the control panel. A separate sheet shall be provided for each floor. Plans shall be reduced in size from engineering plans in order to fit on 11 x 14 sheets. All device addresses shall be clearly labeled on plans. Indicate locations of all cabinets, modules and end of line resistors. Plans shall be bound in book form. Sheets shall be laminated. Provide legend for symbols. Provide holder for plan book in panel or in a locked box adjacent to panel keyed to match panel. Provide label for box and book.

D. Loop 1 shall be assigned to the first floor devices and loop number shall increase with floor number. Device numbering starts in the same location on each floor and increase accordingly as circuit location increases.

3.18 FIRE AND LIFE SAFETY CRITERIA FOR DOORS CONTROLLED BY FIRE ALARM SYSTEM:

A. Any exit or exit access doors that are locked to delay egress, in accordance with the NC Building Code, by use of one of the following types of locking hardware:

1. Magnetic Lock (fail-safe) utilizing a 24vdc magnet and contact plate
2. Electro-Mechanical Lock (fail-safe) with reverse bevel type dead bolt

Shall immediately unlock upon any fire alarm signal, loss of building AC power, disablement of the fire alarm system (defined as loss of its 24vdc power).

B. Smoke doors held open by 24vdc wall/floor-mounted magnets powered by the FACP shall be released upon alarm. The resulting current drain shall be included in the standby battery calculations or the system must be programmed to drop the door hold-open magnet load 60 seconds after the loss of 120vac power.

3.19 SYSTEM DOCUMENTATION, TRAINING, AND MAINTENANCE

A. Maintenance: The manufacturer, or authorized distributor, must maintain software version (VER) records on the system installed. The system software shall be upgraded free of any charge if a new VER is released during the warranty period. For new VER to correct operating problems, free upgrade shall apply during the entire life of the system.

B. System Report In addition to the Shop Drawing submittal described elsewhere, the fire alarm system contractor shall provide the engineer two bound copies of the following technical information, for transmittal to the owner:

1. As-Built wiring diagram showing all loop numbers and device addresses, plus terminal numbers where they connect to control equipment.
2. Manufacturer's detailed maintenance requirements.
3. Technical literature on all control equipment, isolation modules, power supplies, alarm/supervisory signal initiating devices, alarm notification appliances, relays, etc.
4. The as-built "calculations" sheet
5. Electronic archive: Complete configuration data (site-specific programming) for the system must be stored on electronic media and archived by the fire alarm system manufacturer or authorized distributor. A CD or USB jump drive copy of this data shall be submitted to the engineer for transmission to the owner on the day the system is commissioned.

C. The contractor shall provide the owner with three copies of the following:

1. As-built wiring and conduit layout diagrams, including wire color code and/or label numbers, and showing all interconnections in the system.
2. Electronic circuit diagrams of all control panels, modules, annunciators, communications panels, etc.
3. Technical literature on all major parts of the system, including control panels, batteries, detectors, manual stations, alarm indicating appliances, power supplies, and remote alarm transmission means.

D. The contractor shall provide the owner with one copy of the following:

1. All software required, both for the installed fire alarm system and for any personal computer (PC) necessary to access the fire alarm system for trouble shooting, programming, modifications, monitoring, de-bugging, or similar functions.
2. Complete documentation for all software for both the installed fire alarm system and for any interface PC software necessary for system functions as described in (i) above.
3. Framed floor plans, mounted at the FACP. Plans shall show all system devices with the unique device identification numbers indicated adjacent to each device. The identification numbers shall match those represented in the as-built drawings and those reported at the FACP and the LCD annunciator.

E. The Contractor shall provide the owner with an interconnection cables, any dongle, hasp or software/hardware keys required, to connect the fire alarm system to a PC.

F. The manufacturer's authorized representative must instruct the owner's designated employees in operation of the system, and in all required periodic maintenance. A minimum of 2 hours on-site time shall be allocated for this purpose. Two copies of a written, bound summary shall be provided, for future reference.
1. Scheduling of training must be arranged to meet the Owner's schedule. Additional training shall be available at a cost to be mutually agreed upon by the Owner and the Contractor.
2. Training shall be in the Owner's provided classroom.
3. The training may not be waived, deleted or reduced in the number of hours required.
4. Training shall cover the following topics at a minimum:
   a. Preventive maintenance service techniques and schedules, including historical data trending of alarm and trouble records.
   b. Overall system concepts, capabilities, and functions. Training shall be in depth, so that the owner shall be able to take any device out of service and return any device to service without need of Manufacture's approval or assistance.
   c. Explanation of all control functions.
   d. Methods and means of troubleshooting and replacement of all field wiring devices.
   e. Methods and procedures for troubleshooting the main fire alarm control panel, including field peripheral devices as to programming, bussing systems, internal panel and unit wiring, circuitry and interconnections.
   f. Manuals, drawings, and technical documentation.

3.20 SPARE PARTS:

A. The following spare parts shall be provided with the system. For multi-building projects, calculate quantities separately for each building that contains a dedicated fire alarm control panel. If FACP also serves auxiliary buildings (e.g., storage, boiler/chiller), calculate as if one building. Increase decimal quantities to the next higher whole number
1. Fuses (If Used).....2 of each size in system
2. Manual Fire Alarm Boxes.....2% of installed quantity
3. Addressable Control Relays.....4% of installed quantity
4. Indoor Horns/Speakers with Strobes Lights.....4% of installed quantity
5. Indoor Strobe-only Notification Appliances.....4% of installed quantity
6. Monitor Modules (Addressable Interface).....4% of installed quantity
7. Isolation Modules / Isolation Bases.....4% of installed quantity
8. Addressable, Electronic Heat Detectors.....4% of installed quantity

9. Spot-Type Smoke Detectors …….....6% of installed quantity
10. No spares are required for projected beam, air sampling, or duct smoke detectors

3.21 SYSTEM TESTING & CERTIFICATION

A. Upon completion of the installation the Division 16 Contractor and the Manufacturer's authorized installer together shall conduct a 100% performance test of each and every alarm initiating device for proper response. The system shall operate for 48 hours prior to start of test. The Division 16 Contractor shall be present for the full 100% test.

B. The engineer and owner shall be given 7 days advance notice of the final tests.

C. All Audio Visual Device Testing shall be scheduled with the owner. Testing to be conducted after hours.

D. 100% Test: The manufacturer or authorized distributor (by definition, "installer") must 100% test all site-specific software functions for the system and then provide a detailed report or check list showing the system's operational matrix. This documentation must be part of the "System Status and Programming Report".

1. Upon completion of the installation and its programming, the installer's technician shall test every alarm initiating device for proper response and indication, and all alarm notification appliances for effectiveness. Also, in coordination with the other building system contractors, all other system functions shall be verified, including (where applicable) elevator capture and the control of HVAC systems, door locks, pressurization fans, fire or smoke doors/dampers/shutters, etc. The engineer must be notified in advance of these 100% tests, to permit witnessing them if desired.
2. If AHU shutdown occurs for any alarm, then the matrix would indicate the specific control relay(s) for that function being commanded to operate for alarm from any initiating device.
3. The digital communicator shall be on-line and tested for proper communication to the receiving station.
4. All supervised circuits shall be tested to verify proper supervision. (Control circuits and remote annunciation lines are among those required to be supervised.)
5. All testing described above shall be repeated in the event that subsequent software or wiring modifications are determined necessary to meet the requirements of the contract documents. Such re-testing shall be included as part of the base bid and provided at no additional cost to the Owner.

E. Test Documentation: The installer shall fill out and submit the following documentation to the owner, through the engineer, prior to the AHJ's system acceptance inspection:

1. Written verification that this 100% system test was done with copy of print out generated during test.
2. The NFPA 72, "Record of Completion" Form. Use this form (no substitutes) to detail the system installation and also to certify that: (a.) It was done per Code, and (b.) The Code-required 100% test was performed. The fire alarm installer (manufacturer or authorized distributor's technician) shall sign this form. If a representative of the AHJ, owner, or engineer witnesses the tests, in whole or in part, they shall also sign the form to signify that fact only (annotating the form as needed to clarify their limited role).

3. The System Status and Programming Report described in NFPA 72. This shall be generated on the day of the system acceptance inspection and shall include the measured sensitivity of each smoke detector.
4. After completion of the 100% system test and submission of documentation as described above the installer is to request the engineer to set up an inspection. The system shall operate for at least two days prior to this inspection.
5. The responding Fire Department shall be notified of this, for pre-fire planning purposes. On local government projects, local fire authorities may also want to participate in system acceptance inspections.

F. PRE -FINAL INSPECTION: After passing the Designer's pre-final inspection, the Contractor and Manufacturer's authorized installer will conduct system test in the presence of the Owner and the Designer.

3.22 FINAL INSPECTION

A. The fire alarm system will be inspected, with portions of it functionally tested. This will normally include the use of appropriate means to simulate smoke for testing detectors, as well as functionally testing the system interface with building controls, fire extinguishing systems and any off-premises supervising station. This statistical (sampling) inspection is intended to assure that the contractor has properly installed the system and performed the 100% operational test as required by NFPA 72. The electrical contractor shall provide two-way radios, ladders, and any other materials needed for testing the system, including a suitable smoke source.
1. The test will be conducted entirely by the Contractor. A copy of the final database software must be presented to the Owner before this test. The software shall be loaded from these disks into the system in the presence of the Owner. The review will then be conducted using this software. Any deficiencies shall be recorded and corrected. After the items have been corrected, the system shall be tested again.
2. Once the contractor has completed the installation and has pre-tested the system, a system test shall be conducted for the engineer to witness. Additional testing with the fire marshal shall then be conducted as required.

B. In the event of malfunctions or excessive nuisance alarms, the Contractor must take prompt corrective action. The Owner may require a repeat of the Contractor's 100% system test, or other inspections.

C. Test Report: Upon successful completion of the Inspection and after the correction of all deficiencies, the manufacturer's authorized representative shall issue a test report to the Engineer and Owner, detailing and certifying the test.

D. System Acceptance: After successful completion of the Final Inspection and recommendation of the Engineer, the system will be accepted by the Owner. At this time the warranty period begins.

3.23 GROUNDING

A. Ground cable shields and equipment according to system manufacturer's written instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

3.24 CLEANING AND ADJUSTING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and marred finish to match original finish. Clean equipment internally using methods and materials recommended by manufacturer.

3.25 ON-SITE ASSISTANCE

A. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels, controls, and sensitivities to suit actual occupied conditions. Provide up to three requested visits to Project site for this purpose.

TABLE I - APPLICATIONS MATRIX FOR SELECTING DETECTION DEVICES

SMOKE/FIRE DETECTOR APPLICATION	ACCEPTABLE DETECTOR TYPES*			
	ION	PHOTO	IR/UV FLAME	HEAT
Atriums/Auditoriums		B**		
Corridors – Any Occupancy		X		
Office Areas	X	X		
Cable Rooms (PVC)		X		
Elevator Equipment Rooms	X			
Furnace/Boiler Rooms				X
Gymnasiums		B**		
Laboratories (Chemical)			X	X
Linen Rooms		X		
Mech/Elect. Equipment Rooms	X	X		X
Motor-Generator Rooms			X	X
Attics (Non-Conditioned Environment)				X
Loading Docks			X	X
Non-Conditioned or Hostile Environment			X	X
Storage (Conditioned Environment Only)	X	X		
Duct Smoke Detectors		X		

****** "B" symbol indicates projected beam (linear beam) type smoke detector with separate transmitter and receiver, or with transceiver and prism reflector.

Spaces which may be exposed to vehicle exhaust, fumes from nearby cooking, fireplaces, etc., high/low temperatures or high humidity (including dishwashing, laundry) are generally unsuitable for the use of smoke detectors. Heat detectors should include the rate-of-rise feature unless installed where temperatures may rise more than 15°F/minute from space heaters, vehicle exhaust stacks, furnaces, or following outside door closure.

END OF SECTION 283111