

PROJECT MANUAL
FOR
RENOVATIONS
to the
HAMPTON STREET
AUDITORIUM

General Contractor
BID #2015-04

WALTERBORO,
SOUTH CAROLINA

PREPARED BY:

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SECTION 2016-1701 - ADVERTISEMENT FOR BID

Owner: Colleton County, 109 Benson Street, Walterboro, South Carolina

Tych & Walker Architects, LLP Project No.: 2015-04

Separate sealed bids (**Bid Number CPST-05**) for Professional Services for the Colleton County Hampton Street Auditorium Renovations in Colleton County, South Carolina will be received at the Capital Projects and Purchasing Department located at 113 Mable T. Willis Boulevard until **11:00 A.M., Tuesday, February 14, 2017** and publicly opened and read aloud. The work to be completed as a part of this project consists of providing all required materials, equipment and labor necessary to complete the Construction Services for the Colleton County renovations to the Hampton Street Auditorium in Colleton County, South Carolina, with the following approximate quantities:

Professional Services for the renovation to the approximately ± 10,000 sf auditorium, lobby and accessory spaces; and the addition of approximately ± 500 sf to the back of the stage, and miscellaneous upgrades throughout the defined work area.

The Instructions to Bidders, Bid Form, Contract, Plans, Specifications, Bid Bond, Performance Bond, Payment Bond, and other contract documents may be examined at the following locations:

Colleton County website: colletoncounty.org/bids-and-proposal-requests

Drawings, specifications, and contract documents may be obtained from the office of Duncan Parnell, 1478 Dividend Loop, Myrtle Beach, SC, 843-626-3641. The deposit will be nonrefundable. When requesting drawings, specifications, or contract documents, provide the following information about your company: Mailing address; street (UPS) address; telephone number, email.

Bidders must deposit security with all bids. Security shall be in the form of a certified check or bid bond made payable to Colleton County, and shall be for an amount equal to not less than five percent (5%) of the amount of the bid. Provisions of the security shall be as described in the Information for Bidders. No bid will be considered unless the bidder is legally qualified under the provisions of the South Carolina Sections 40-11-10 through 40-11-428).

NOTICE TO BIDDERS:

Each bidder shall fully acquaint himself with conditions of this Bid. The failure or omission of a bidder to acquaint him/herself with existing conditions shall in no way relieve him/herself of any obligation with respect to this Bid or to the Contract.

BIDS WILL NOT BE CONSIDERED FROM ANY VENDOR THAT OWES DELINQUENT PROPERTY TAXES TO THE COUNTY OF COLLETON.

NOTICE TO BIDDERS: Each bidder shall fully acquaint him/herself with the conditions relating to the scope and restrictions attending the execution of the work under the conditions of this Bid. All amendments to and interpretations of this solicitation shall be in writing and issued by the Colleton County Capital Projects & Purchasing Department. Colleton County shall not be legally bound by any amendment or interpretation that is not in writing. Award of the project is contingent on funding approval by Colleton County Council.

The Owner reserves the right to waive any informality or to reject any or all bids.

Architect
Tych & Walker Architects, LLP
Post Office Box 509
Pawleys Island, South Carolina 29585

OWNER
Colleton County
109 Benson Street
Walterboro, SC 29488

SECTION 2016-1702 – INFORMATION FOR BIDDERS

ARTICLE 1 - DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. **Issuing Office** - The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.
 - B. **Architect** - The person or firm in charge of the project. This person or firm will be selected by the owner and in some instances, the owner will self-perform, acting as the Architect.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

- 2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Invitation to Bid may be obtained from Duncan Parnell, 1478 Dividend Loop, Myrtle Beach, SC, 843-626-3641. The deposit will be nonrefundable.
- 2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer or Architect assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.03 Owner and Engineer or Architect, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

- 3.01 Bidders must be licensed as a General Contractor in the State of South Carolina and will hold all Trade Contracts and the Building Permit on the project.
- 3.02 To demonstrate Bidder's qualifications to perform the Work, within five (5) days of Owner's request, Bidder shall submit written evidence such as financial data; previous experience, present commitments.

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

- 4.00 **Mandatory Pre-bid Conference and Site Inspection** will begin promptly at Tuesday, January 24 at 10:00 A.M. on the grounds of the project site, located at 494 Hampton Street, Walterboro, SC 29488. A site tour will be available immediately following the pre-bid Conference. *No other scheduled tours will be conducted.* The Construction superintendent or firm cost estimator is required to attend. Failure to attend this mandatory meeting will disqualify a firm from bidding
- 4.01 Subsurface and Physical Conditions
- A. The General Conditions identify:

Reports of explorations and tests of conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents including the Limited Asbestos Survey that has been completed for the project by Shepard & Associates, dated September 22, 2015.

- B. Copies of reports and drawings referenced in Paragraph 4.01.A are included herein. Those reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions has been identified and established. Bidder is responsible for any interpretation or conclusion Bidder draws from any “technical data” or any other data, interpretations, opinions or information contained in such reports or shown or indicated in such drawings.

4.02 Underground Facilities

- A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer or Architect by owners of such Underground Facilities, including Owner, or others.

4.03 Hazardous Environmental Condition

- A. The General Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that Engineer or Architect has used in preparing the Bidding Documents.
- B. Copies of reports and drawings referenced in Paragraph 4.03.A are included herein. Those reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established. Bidder is responsible for any interpretation or conclusion Bidder draws from any “technical data” or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.

4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates. Construction Coordinator and Owner shall be notified prior to any site visits.

4.06 Reference is made to Article 7 of the General Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such other work.

4.07 It is the responsibility of each Bidder before submitting a Bid to:

- a. Examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda.
- b. Visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

- c. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
- d. Carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities), which have been identified in Paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions at the Site which have been identified in Paragraph 4.06 of the General Conditions.
- e. Obtain and carefully study (or accept consequences of not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site, which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.
- f. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.
- g. Become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- h. Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.
- i. Promptly give Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Owner is acceptable to Bidder.
- j. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.
- k. No plea of ignorance of conditions that exist or may hereafter exist on the site of the work, or difficulties that may be encountered in the execution of the work, as a result of failure to make necessary investigations and examinations, will be accepted as an excuse for any failure or omission on the part of the Contractor to fulfill in every detail all the requirements of the contract documents and to complete the work for the consideration set forth therein, or as basis for any claim whatsoever.
- l. Apparent omission of a detailed description concerning any point, shall be regarded as meaning the best commercial practice is to prevail and that only material and workmanship of the finest quality is to be used.
- m. Bidders may refer to Sections 2-67, 2-73, and 2-74 of Ordinance #2008-09, also known as the Colleton County, South Carolina Purchasing Policy to determine their remedies concerning this competitive process. The failure to be awarded a bid shall not be valid grounds for protest.
- n. The Bidder further agrees that the performance time specified is a reasonable time, having carefully considered the nature and scope of the project as aforesaid.

- 4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Owner written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Owner are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 - SITE AND OTHER AREAS

- 5.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional land and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 6 - INTERPRETATIONS AND ADDENDA

- 6.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Owner in writing and submitted by email to; jstieglitz@colletoncounty.org. Interpretations or clarifications considered necessary by Owner in response to such questions will be issued by Addenda. Questions received less than seven (7) days prior to the date for opening of Bids will not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 6.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by the Owner. Addenda will be posted on the Colleton County website. It is the responsibility of the bidder to monitor this web site for addendums. Notice of issued addendum will not be forwarded to bidders.
- 6.03 Division 00 and Division 01 shall have authority over all over documents contained within the project manual. Where duplication of titles, articles, standards, requirements and such are found, division 00 and Division 01 govern.

ARTICLE 7 - BID SECURITY

- 7.01 A Bid must be accompanied by Bid security made payable to Colleton County in an amount of five percent (5%) of Bidder's maximum Bid price and in the form of a certified check, bank money order, or a Bid Bond (on the form attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.
- 7.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within fifteen (15) days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders Whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven (7) days after the Effective Date of the Agreement or sixty (60) days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.
- 7.03 Bid security of other Bidders Whom Owner believes do not have a reasonable chance of receiving the award will be returned within fourteen (14) days after the Bid opening.

ARTICLE 8 - CONTRACT TIMES

- 8.01 Construction Services to Serve the Colleton County Hampton Street Auditorium Renovations in Colleton County, South Carolina is to be completed within three hundred (300) calendar days after the Notice to Proceed has been issued.

ARTICLE 9 - LIQUIDATED DAMAGES

9.01 Document Execution

- A. The successful Bidder, upon failure or refusal to execute and deliver the contract and bonds within ten (10) days after they have received the notice of the acceptance of their bid, shall forfeit to the Owner, as liquidated damages, the security deposited with the bid.

9.02 Project Execution

- A. Bidder must agree to commence work on or before a date to be specified in a written "Notice to Proceed" of the Owner and to fully complete the project within the dates specified in the Bid Form, Article 6; Paragraph 6.01. Bidder must agree also to pay as liquidated damages the sum as indicated in the Bid Form, Article 6; Paragraph 6.02 for each consecutive calendar day thereafter as hereinafter provided in the General Conditions.

ARTICLE 10 - SUBSTITUTE AND "OR-EQUAL" ITEMS

- 10.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to the Construction Coordinator, application for such acceptance will not be considered by the Owner until after the Effective Date of the Agreement.
- a) The use of a "**Brand Name Only**" specification is for the purpose of describing the sole item that will satisfy the county's requirements. Bids offering alternate products will be declared non-responsive.
- (b) The use of a "**Brand Name or Equal**" specification is for the purpose of describing the standard of quality, performance and characteristics desired and is not intended to limit or restrict competition. An item shall be considered to be substantially equivalent, or "equal" to the specified brand in the opinion of the Purchasing Director, the County can reasonably anticipate sufficiently similar quality, capacity, durability, performance, utility and productivity as provided by the specified brand.

ARTICLE 11 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 11.01 The General Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner with the bid packet. The bidder shall submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Construction Coordinator, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, in which case apparent Successful Bidder shall submit an acceptable substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost

occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

- 11.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Construction Coordinator makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Construction Coordinator subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.
- 11.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.
- 11.04 Each bidder shall fully acquaint himself with conditions of this Bid. The failure or omission of a bidder to acquaint himself with existing conditions shall in no way relieve him of any obligation with respect to this Bid or to the Contract.

ARTICLE 12 - PREPARATION OF BID

- 12.01 Should a bidder need any reasonable accommodations for any type of disability in order to participate in this procurement, you are asked to contact the Colleton County Capital Projects & Purchasing Department.
- 12.02 The Bid Form is included with the Bidding Documents. Additional copies may be obtained from Owners Web Site.
- 12.03 All blanks on the Bid Form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each unit price item listed therein, or the words "No Bid," "No Change," or "Not Applicable" entered.
- 12.04 A Bid by a corporation shall be executed in the corporate name by the president, vice-president, or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.
- 12.05 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.
- 12.06 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.
- 12.07 A Bid by an individual shall show the Bidder's name and official address.
- 12.08 A Bid by a joint venture shall be executed by each joint venture in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.
- 12.09 All names shall be typed or printed in ink below the signatures.
- 12.10 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 12.11 The address and telephone number for communications regarding the Bid shall be shown.

- 12.12 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.
- 12.13 Any reports, studies, photographs, negatives or other documents prepared by vendor in the performance of its obligations shall be the exclusive property of the procurer and all such material shall be remitted to the procurer by the vendor upon completion, termination or cancellation of this order. Vendor shall not use, willingly allow or cause to have such material used for any purpose other than performance of its obligations under this order without the prior written consent of the procurer.
- 12.14 The contractor will take affirmative action in complying with all Federal and State requirements concerning fair employment and employment of the handicapped, and concerning the treatment of all employees, without regard or discrimination by reason of age, race, color, religion, sex, national origin or physical handicap. The following are incorporated herein by reference: 41 C.F.R. 60-1.4, 60-250.4 and 60-741.4.
- 12.15 All construction contracts over \$2,000.00 must include a provision for compliance with the Copeland "Anti-Kickback" Act (18 U.S.C. 874) as supplemented in Department of Labor regulations (29 CFR Part 3). This act provides that each Contractor shall be prohibited from inducing, by any means, persons employed in the construction, completion, or repaid of public work to give up any part of their compensation.
- 12.16 The contractor certifies that the vendor(s) will provide a "drug-free workplace" as that term is defined in Section 44-107-30 of the Code of Laws of South Carolina, 1976, as amended, by the complying with the requirements set forth in title 44, Chapter 107
- 12.17 The federally-assisted construction contractor certifies that he will not maintain or provide, for his employees, segregated facilities at any of his establishments and that he will not permit his employees to perform their services at any location under his control where segregated facilities are maintained. The federally assisted construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this Contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms, and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason. The federally assisted construction contractor agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause and that he will retain such certifications in his files.
- 12.18 By signing this bid or proposal, Contractor certifies that it will (a) comply with the applicable requirements of Title 8, Chapter 14, and (b) include in their contracts with the sub-subcontractor's language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14. (An overview is available at www.procurement.sc.gov)
- 12.19 Bidders must clearly mark as "confidential" each part of their bid which they consider to be proprietary information that could be exempt from disclosure under section 30-4-40, Code of Laws of South Carolina 1976, as amended (Freedom of Information Act). If any part is designated as confidential, there must be attached to that part an explanation of how this information fits within one or more categories listed in section 30-4-40. The County reserves the right to determine whether this information should be exempt from disclosure and no legal action may be brought against the County or its agents for its determination in this regard.

- 12.20 Nothing herein is intended to exclude any responsible vendor, his product or service or in any way restrain or restrict competition. On the contrary, all responsible vendors are encouraged to bid and their bids are solicited.
- 12.21 The successful Bidder must be responsible for obtaining all necessary city, county, and state permits/licenses and must comply with all State and local codes and ordinances. Copies of such permits/licenses shall be made available to Colleton County upon request. Work within the Walterboro City Limits may require a City Business License.
- 12.22 This Agreement shall be governed by and construed in accordance with the laws of the State of South Carolina, U.S.A.
- 12.23 All claims, disputes and other matters in question between parties arising out of, or relating to, this Agreement, or the breach thereof, shall be decided in the Circuit Court of the Fourteenth Judicial Circuit in Colleton County, South Carolina. By executing this Agreement, all parties specifically consent to venue and jurisdiction in Colleton County, South Carolina and waive any right to contest jurisdiction and venue in said Court.
- 12.24 The County reserves the right to reject all or any part of any bid, waive informalities and award the contract to the lowest responsive and responsible bidder to best serve the interest of the County.
- 12.25 By submitting a bid, the Bidder certifies to the best of its knowledge and belief, that it and its principals, sub-contractors and assigns are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal, State or local department or agency. A copy of the County's debarment procedure in accordance with Section 2-68 of Ordinance #2008-09, also known as the Colleton County, South Carolina Purchasing Policy is available upon request.
- 12.26 Federal guidelines require grant recipients to obtain sufficient assurance that bidders are not suspended or debarred from participating in federal programs when contracts exceed \$25,000. By signing the bid submittal form you verify that no party to this agreement is excluded from receiving Federal contracts, certain subcontracts, and certain Federal financial and nonfinancial assistance and benefits, pursuant to the provisions of 31 U.S.C. 6101, note, E.O. 12549, E.O. 12689, 48 CFR 9.404, and each agency's codification of the Common Rule for Non-procurement suspension and debarment. [See <https://www.epls.gov/> for additional information.]

ARTICLE 13 - BASIS OF BID; COMPARISON OF BIDS

- 13.01 Unit Price
- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.
 - B. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General Conditions.
 - C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.
- 13.02 The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents as provided in Paragraph 11.02 of the General Conditions.
- 13.03 Bid prices will be compared after adjusting for differences in the time designated by Bidders for Substantial Completion. The adjusting amount will be determined at the rate set forth in the Contract

Documents for liquidated damages for failing to achieve Substantial Completion for each day before or after the desired date appearing in Article 9.

- 13.04 The contents of the successful IFB/RFP are included as if fully reproduced herein. Therefore, the selected contractor must be prepared to be bound by his/her proposal as submitted.

ARTICLE 14 - SUBMITTAL OF BID

- 14.01 With each copy of the Bidding Documents, a Bidder shall furnish one (1) original separate unbound copy of the Bid Documents, to include all forms listed in 2016-1714. Three (3) additional bound copies are to be submitted with the original. The unbound copy of the Bid Form is to be completed and submitted with the Bid security.
- 14.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque sealed envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, Contractor's License Number, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "**BID# CPST-05**". A mailed Bid shall be addressed to:
- Colleton County
Kaye B. Syfrett, Procurement Manager
113 Mable T. Willis Boulevard
Walterboro, SC 29488
- 14.03 In the case of Inclement Weather/Closure of Colleton County offices; If the Colleton County office is closed for business at the time scheduled for bid opening, for whatever reason, sealed bids will be accepted and opened on the next scheduled business day, at the originally scheduled time.
- 14.04 The Bid shall be submitted on the Bid Form provided; no other form is acceptable.
- 14.05 The successful Bidder will be required to provide verified breakdown of costs of all services and work in a manner acceptable to the Owner.
- 14.06 All blanks on the Bid Form shall be filled in, either typed or printed in ink. The person signing the bid shall initial all corrections or erasures.
- 14.07 Where so indicated on the Bid Form, the Bid Sum shall be expressed in both words and figures; in case of a discrepancy between the two, the Sums expressed in words shall govern.
- 14.08 Bid unit price on quantity specified - extend and show total. In case of errors in extension, unit prices shall govern. Unit pricing shall include all applicable overhead, administrative, profit and other associated cost.
- 14.09 Bidder shall quote all Alternates in the Bidding Documents. If Bidder fails to bid on all Alternates, then his/her Bid may be considered irregular, non-responsive and may be disqualified.
- 14.10 Bids containing qualifications will be considered irregular, non-responsive and may be disqualified.
- 14.11 A Bid Form submitted by a partnership shall list the names of all partners and shall be signed in the partnership name by one of the members of the partnership who is authorized to sign for the partnership.
- 14.12 A Bid Form submitted by a corporation shall be executed in the legal name of the corporation, followed by the state of incorporation and signed by the President or Vice President or another

authorized officer. The name of each person signing the Bid Form shall be typed or printed below the signature.

- 14.13 When the person signing for a corporation is other than the President or Vice President and when requested by the Owner, a resolution or other satisfactory evidence of the authority of the officer signing in behalf of the corporation shall be furnished for the Owner's records. The name of each person signing the Bid Form shall be typed or printed below the signature.

ARTICLE 15 - MODIFICATION OF BID

- 15.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

ARTICLE 16 - OPENING OF BIDS

- 16.01 Bids will be opened at the time and place indicated in the Advertisement or Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids in the form of a Bid Tabulation and Bid Comparison. The Bid Opening Minutes will also be provided to all bidders in an email.

ARTICLE 17 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

- 17.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 18 - EVALUATION OF BIDS AND AWARD OF CONTRACT

- 18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, non-responsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also, reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.
- 18.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.
- 18.03 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.
- 18.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the General Conditions.
- 18.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.

- 18.06 If the Contract is to be awarded, Owner will award the Contract to the Bidder whose Bid is in the best interests of the Project.
- 18.07 The Owner reserves the right not to Award the Project.
- 18.08 The Owner shall have the right to accept Alternates in any order or combination, and to determine the low bidder on the basis of the sum of the Base Bid and alternates accepted.

ARTICLE 19 - CONTRACT SECURITY AND INSURANCE

- 19.01 Article 5 of the General Conditions sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds.

ARTICLE 20 - SIGNING OF AGREEMENT

- 20.01 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within seven (7) days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within seven (7) days thereafter, Owner shall deliver one (1) fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

ARTICLE 21 - RETAINAGE

- 21.01 Retainage from progress payments to the Contractor shall be ten percent (10%) of each payment for work completed and stored materials on site.

ARTICLE 22 – INSURANCE

- 22.01 The successful bidder shall procure, maintain, and provide proof of, insurance coverage for injuries to persons and/or property damage as may arise from or in conjunction with, the work performed on behalf of the County by the bidder, his agents, representatives, employees or subcontractors. Proof of coverage as contained herein shall be submitted fifteen (15) days prior to the commencement of work and such coverage shall be maintained by the bidder for the duration of the contract period; for occurrence policies.

a. General Liability

Coverage shall be as broad as: Comprehensive General Liability endorsed to include Broad Form, Commercial General Liability form including Products/Completed Operations.

Minimum Limits

General Liability:

- \$2,000,000 General Aggregate
- \$2,000,000 Products & Completed Operations Aggregate
- \$1,000,000 Personal and Advertising Injury
- \$1,000,000 Each Occurrence (Bodily Injury and Property Damage)
- \$50,000 Fire Damage Limit
- \$5,000 Medical Expense Limit

b. Automobile Liability

Coverage sufficient to cover all vehicles owned, used, or hired by the bidder, his agents, representatives, employees or subcontractors.

Minimum Limits

Automobile Liability:

\$1,000,000 Combined Single Limit

\$1,000,000 Each Occurrence

Limit \$5,000 Medical Expense

c. Workers' Compensation

Limits as required by the Workers' Compensation Act of SC. Employers

Liability, \$1,000,000.

d. Owners' & Contractors' Protective Liability

Policy will be in name of Colleton County.

Minimum limits required are \$1,000,000.

e. Excess or Umbrella Liability

General Aggregate \$2,000,000

Each Occurrence \$2,000,000

f. Contractual Liability

Bodily Injury:

Each Accident

\$2,000,000

Annual Aggregate

\$2,000,000

Property Damage:

Each Accident

\$2,000,000

Annual Aggregate

\$2,000,000

g. Coverage Provisions

1. All deductibles or self-insured retention shall appear on the certificate(s).
2. The County of Colleton, its officers/ officials, employees, agents and volunteers shall be added as "additional insured" as their interest's may appear. This provision does not apply to Professional Liability or Workers' Compensation/ Employers' Liability.
3. The bidder's insurance shall be primary over any applicable insurance or self-insurance maintained by Colleton County.
4. Shall provide 30 days' written notice to Colleton County before any cancellation, suspension, or void of coverage in whole or part, where such provision is reasonable.
5. All coverage for subcontractors of the bidder shall be subject to all of the requirements stated herein.
6. All deductibles or self-insured retention shall appear on the certificate(s) and shall be subject to approval by the County. At the option of Colleton County, either; the insurer shall reduce or eliminate such deductible or self-insured retention; or the bidder shall be required to procure a bond guaranteeing payment of losses and related claims expenses.

7. Failure to comply with any reporting provisions of the policy(s) shall not affect coverage provided Colleton County, its officers/officials, agents, employees and volunteers.
8. The insurer shall agree to waive all rights of subrogation against Colleton County, its' officers/officials, agents, employees or volunteers for any act, omission or condition of premises which the parties may be held liable by reason of negligence.
9. The bidder shall furnish Colleton County certificates of insurance including endorsement affecting coverage. The certificates are to be signed by a person authorized by the insurance company(s) to bind coverage on its' behalf, if executed by a broker, notarized copy of authorization to bind, or certify coverage must be attached.
10. All insurance shall be placed with insurers maintaining an A.M. Best rating of no less than an A: VII. If A.M. Best rating is less than A: VII, approval must be received from Colleton County's Risk Officer.

22.02 Colleton County, SC will require each contractor and service provider to maintain on file with the Procurement Manager, a current Certificate of Insurance showing limits as required by the Workers' Compensation Act of SC:

Employers Liability, \$1,000,000.

The law also recognizes "statutory employees." These are employees who work for a subcontractor who may be working for a business or another contractor. Employers should inquire whether or not a subcontractor working for them has workers' compensation insurance, regardless of the number of employees employed by the subcontractor. If the subcontractor does not, the subcontractor's injured employees would be covered under the employer's workers' compensation insurance. If the subcontractor does not carry workers' compensation insurance, then the owner or the principal contractor would be liable just as if the subcontractor's employee was one of their employees.

For answers to additional questions, visit the SC Worker's Compensation Commission website at: <http://www.wcc.state.sc.us/Frequently%20Asked%20Questions/FAQ.htm>

22.03 Contractor shall provide and maintain, during the progress of the work and until execution of the Certificate of Contract Completion, a Builder's Risk Insurance policy to cover all work in the course of construction including false work, temporary buildings, scaffolding, and materials used in the construction process (including materials designated for the project but stored off site or in transit). The coverage shall equal the total completed value of the work and shall provide recovery at replacement cost.

- a) Such insurance shall be on a special cause of loss form, providing coverage on an open perils basis insuring against the direct physical loss of or damage to covered property, including but not limited to theft, vandalism, malicious mischief, earthquake, tornado, lightning, explosion, breakage of glass, collapse, water damage, and testing/startup.
- b) Coverage shall include coverage for "soft costs" (costs other than replacement of building materials) including, but not limited to, the reasonable extra costs of the architect/engineer and reasonable Contractor extension or acceleration costs. This coverage shall also include the reasonable extra costs of expediting temporary and permanent repairs to, or permanent replacement of, damaged property. This shall include overtime wages and the extra cost of express or other means for rapidly transporting materials and supplies necessary to the repair or replacement.

- c) The policy shall specifically permit and allow for partial occupancy by the owner prior To execution of the final Certification of Contract Completion, and coverage shall remain in effect until all punch list items are completed.
- d) The Builder's Risk deductible may not exceed \$5,000. The Contractor or subcontractor experiencing any loss claimed under the Builder's Risk policy shall be responsible for that loss up to the amount of the deductible.
- e) If Contractor is involved solely in the installation of material and equipment and not in New building construction, the Contractor shall provide an Installation Floater policy in lieu of a Builder's Risk policy. The policy must comply with the provisions of this paragraph.

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SECTION 2016-1703 – BOND FORMS

BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address): _____

SURETY (Name and Address of Principal Place of Business): _____

OWNER (Name and Address): Colleton County
109 Benson Street
Walterboro, SC 29488

Bid Number: CPST-05

Bid Due Date: Tuesday, February 14, 2017 at 11:00am

Project (Brief Description Including Location): **Construction Services for renovations and an addition to the Hampton Street Auditorium for Colleton County, SC**

Bond Number: _____

Date (Not later than Bid due date): _____

Penal sum _____ (Words) _____ (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each because this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

SURETY

(Seal)

(Seal)

Bidder's Name and Corporate Seal

Surety's Name and Corporate Seal

By: _____
Signature and Title

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title

Attest: _____
Signature and Title

Note: Above addresses are to be used for giving required notice.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon

default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
 - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2. All Bids are rejected by Owner, or
 - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR:

SURETY:

OWNER: Colleton County
109 Benson Street
Walterboro, SC 29488

CONTRACT

Date: _____

Amount: _____

Description (Name and Location): **Construction Services for Renovations to the Hampton Street Auditorium for Colleton County, SC**

BOND

Bond Number: _____

Date (Not earlier than Contract Date): _____

Amount: _____

Modifications to this Bond Form: _____

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Company: _____

Signature: _____ (Seal)

Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL

Company: _____

Signature: _____ (Seal)

Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.
2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.
3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
 - 3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
 - 3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and
 - 3.3. Owner has agreed to pay the Balance of the Contract Price to:
 1. Surety in accordance with the terms of the Contract;
 2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.
4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:
 - 4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
 - 4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
 - 4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
 - 4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:
 1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
 2. Deny liability in whole or in part and notify Owner citing reasons therefor.
5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.
6. After Owner, has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:
 - 6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;
 - 6.2. Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and
 - 6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.
7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.
8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.
9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.
11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted here from and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common-law bond.
12. Definitions.
 - 12.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.
 - 12.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
 - 12.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
 - 12.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER: Colleton County
109 Benson Street
Walterboro, SC 29488

CONTRACT

Date: _____

Amount: _____

Description (Name and Location): **Professional Services for the renovations and addition to the Hampton Street Auditorium in Colleton County, South Carolina**

BOND

Bond Number: _____

Date (Not earlier than Contract Date): _____

Amount: _____

Modifications to this Bond Form: _____

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

Company:

Signature: _____ (Seal)

Name and Title:

(Seal)

Surety's Name and Corporate Seal

By:

Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest:

Signature and Title

CONTRACTOR AS PRINCIPAL

SURETY

Company:

Signature: _____ (Seal)

Name and Title:

(Seal)

Surety's Name and Corporate Seal

By:

Signature and Title
(Attach Power of Attorney)

Attest:

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.
2. With respect to Owner, this obligation shall be null and void if Contractor:
 - 2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and
 - 2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.
3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.
4. Surety shall have no obligation to Claimants under this Bond until:
 - 4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
 - 4.2. Claimants who do not have a direct contract with Contractor:
 1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
 2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
 3. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.
 5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.
 6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:
 - 6.1. Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
 - 6.2. Pay or arrange for payment of any undisputed amounts.
 7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.
8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.
9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.
11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.
13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted here from and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common-law bond.
14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.
15. DEFINITIONS
 - 15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
 - 15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
 - 15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

SECTION 2016-1704 – CONTRACT
SECTION 2016-1705 – CONTRA

THIS AGREEMENT is by and between Colleton County, 109 Benson Street,
Walterboro, South Carolina

(hereinafter called "Owner") and _____

doing business as an **individual/a partnership/a corporation/a joint venture** (strike out inapplicable terms), with its primary office in the City of _____, County of _____, State of _____.

Owner and Contractor, in consideration of the mutual covenants set forth herein, agree as follows:

ARTICLE 1 - WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Professional Services for the renovation to the approximately ± 10,000 sf auditorium, lobby and accessory spaces; and the addition of approximately ± 500 sf to the back of the stage, and miscellaneous upgrades throughout the defined work area.

ARTICLE 2 - THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Professional Services for the renovation to the approximately ± 10,000 sf auditorium, lobby and accessory spaces; and the addition of approximately ± 500 sf to the back of the stage, and miscellaneous upgrades throughout the defined work area.

ARTICLE 3 - DESIGN

3.01 The Project has been designed by: Tych & Walker Architects, LLP., who is to act as the Construction Coordinator as the Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to the Construction Coordinator in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - CONTRACT TIMES

4.01 Time of the Essence

A. All time limits for Milestones for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Dates for Substantial Completion and Final Payment

Contractor agrees that the work: Professional Services for the renovation to the approximately ± 10,000 sf auditorium, lobby and accessory spaces; and the addition of approximately ± 500 sf to the back of the stage, and miscellaneous upgrades throughout

the defined work area. in Colleton County, South Carolina within three hundred (300) calendar days for the scope of work after the Notice to Proceed has been issued.

4.03 Liquidated Damages

- A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner \$500 for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 - CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A below:

- A. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in the Bid Form attached hereto as part of these Contract Documents.

ARTICLE 6 - PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

- A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by the Construction Coordinator as provided in the General Conditions.

6.02 Progress Payments; Retainage

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 15th day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:
1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as the Construction Coordinator may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:
 - a. **90%** of Work completed (with the balance being Retainage).
 - b. **90%** of cost of materials and equipment not incorporated in the Work (with the balance being Retainage).

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to **90%** of the Work completed, less such amounts as the Construction Coordinator shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less **10%** of the Construction Coordinator estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment

- A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by the Construction Coordinator as provided in said Paragraph 14.07.

ARTICLE 7 – CONTRACTOR’S REPRESENTATIONS

7.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

- A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
- B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in Paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in Paragraph 4.06 of the General Conditions.
- E. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.
- F. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

- I. Contractor has given the Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by the Owner is acceptable to Contractor.
- J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 8 - CONTRACT DOCUMENTS

- 8.01 A. The Contract Documents shall consist of all sections in the following divisions;

DIVISION 00 -- BIDDING AND CONTRACT REQUIREMENTS
DIVISION 01 – GENERAL CONDITIONS
DIVISION 1A --GENERAL REQUIREMENTS
DIVISION 02 – SITE CONSTRUCTION
DIVISION 03 – CONCRETE
DIVISION 04 – MASONRY
DIVISION 05 – METALS
DIVISION 06 – WOOD & PLASTICS
DIVISION 07 – THERMAL & MOISTURE PROTECTION
DIVISION 08 – DOORS & WINDOWS
DIVISION 09 – FINISHES
DIVISION 10 – SPECIALTIES
DIVISION 11 – SPECIAL EQUIPMENT
DIVISION 15 – MECHANICAL
DIVISION 16 – ELECTRICAL

All information contained within these Divisions and the requirements thereof are of the sole responsibility of the bidder.

- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 8.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 9 - MISCELLANEOUS

- 9.01 Terms

- A. Terms used in this Agreement will have the meanings stated in the General Conditions.

- 9.02 Assignment of Contract

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

- 9.03 Successors and Assigns

- A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal

representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

9.04 Severability

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

9.05 Waiver or Forbearance

Any delay or failure of Colleton County to insist upon strict performance of any obligation under this Agreement or to exercise any right or remedy provided under this Agreement shall not be a waiver of Colleton County's right to demand strict compliance, irrespective of the number or duration of any delay(s) or failure(s). No term or condition imposed on Contractor under this Agreement shall be waived and no breach by Contractor shall be excused unless that waiver or excuse of a breach has been put in writing and signed by both parties. No waiver in any instance of any right or remedy shall constitute waiver of any other right or remedy under this Agreement. No consent to or forbearance of any breach or substandard performance of any obligation under this Agreement shall constitute consent to modification or reduction of the other obligations or forbearance of any other breach.

- 9.06 Subject to the provisions below, the contract may be terminated by the County upon fifteen (15) days advance written notice to the other party; but if any work or service hereunder is in progress, but not completed as of the date of termination, then this contract may be extended upon written approval of the County until said work or services are completed and accepted.

a. Termination for Convenience

In the event that this contract is terminated or canceled upon request and for the convenience of the County, without the required fifteen (15) days advance written notice, then the County shall negotiate reasonable termination costs, if applicable.

b. Termination for Cause

Termination by the County for cause, default or negligence on the part of the contractor shall be excluded from the foregoing provision; termination costs, if any, shall not apply. The fifteen (15) days advance notice requirement is waived in the event of Termination for Cause.

c. Non-Appropriation:

It is understood and agreed by the parties that in the event funds are not appropriated in the current fiscal year or any subsequent fiscal years, this contract will become null and void and the County will only be required to pay for services completed to the satisfaction of the County.

Remainder of this page intentionally left blank

IN WITNESS, WHEREOF, Owner and Contractor have signed this Agreement. One counterpart each has been delivered to Owner, Contractor, Construction Coordinator and provided to the Contractor for his Bonding Agency. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

This Agreement will be effective on this _____ day of _____, 2017 (which is the Effective Date of the Agreement).

OWNER:

CONTRACTOR:

Colleton County

By: _____

J. Kevin Griffin

Title: **County Administrator**

[CORPORATE SEAL]

Attest: _____

Title: _____

Address for giving notices:

Capital Project and Purchasing Department

Attn: John Stieglitz

113 Mable T. Willis Boulevard

Walterboro, South Carolina, 29488

By: _____

Title: _____

[CORPORATE SEAL]

Attest: _____

Title: _____

Address for giving notices:

License No.: _____

(Where applicable)

Agent for service or
process:

Remainder of this page intentionally left blank

SECTION 2016-1705 – NOTICE OF AWARD

BID NUMBER – CPST-05

Dated _____

Project: <u>Professional Services for the renovation to the approximately ± 10,000 sf auditorium, lobby and accessory spaces; and the addition of approximately ± 500 sf to the back of the stage, and miscellaneous upgrades throughout the defined work area.</u>	Owner: Colleton County, 113 Mable T. Willis Blvd., Walterboro, South Carolina	Owner's Contract No.:
Contract: Professional Services for the renovations and additions to the Hampton Street Auditorium		

Bidder: _____

Bidder's Address: (send Certified Mail, Return Receipt Requested): _____

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for Professional Services for the renovations and addition to the Hampton Street Auditorium.

The Contract Price of your Contract is _____ (\$_____).

___ copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

___ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within seven (7) days of the date you receive this Notice of Award.

1. Deliver to the Owner four (4) fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), [and] General Conditions (Paragraph 5.01).
3. Other conditions precedent:
None

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award and declare your Bid security forfeited.

Within seven (7) days after you comply with the above conditions, Owner will return to you one (1) fully executed counterpart of the Contract Documents.

Colleton County
Owner

By: _____
Authorized Signature

Title

Acceptance of Notice

Receipt of the above Notice of Award is hereby acknowledged by _____

On this _____ day of _____, 2016.

Contractor

By: _____
Authorized Signature

Title

Copy to Purchasing

SECTION 2016-1706 – NOTICE TO PROCEED

BID NUMBER – CPST-05

Dated _____

Project: <u>Professional Services for the renovation to the approximately ± 10,000 sf auditorium, lobby and accessory spaces; and the addition of approximately ± 500 sf to the back of the stage, and miscellaneous upgrades throughout the defined work area.</u>	Owner: Colleton County, 113 Mable T. Willis Blvd., Walterboro, South Carolina	Owner's Contract No.:
--	--	-----------------------

Contract: Professional Services for the renovations and additions to the Hampton Street Auditorium	
---	--

Contractor:

Contractor's Address: [send Certified Mail, Return Receipt Requested]

You are notified that the Contract Times under the above contract will commence to run on _____ On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is _____ and the date of readiness for final payment is _____.

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to the Construction Coordinator and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

_____ Contractor	Colleton County Owner
by: _____ Authorized Signature	Given by: _____ John T. Stieglitz
_____ Title	_____ Capital Projects & Purchasing Director Title
_____ Date	_____ Date

Copy to Construction Coordinator

Colleton County

SECTION 2016-1707 - APPLICATION FOR PAYMENT

Contractor's Application for Payment No. _____

To (Owner): Colleton County, 113 Mable T. Willis Blvd., Walterboro, South Carolina	Application Period:	Application Date:
BID #: CPST-05	From (Contractor):	Via (Construction Coordinator) Michael Walker, AIA, LEED AP, Tych & Walker Architects, LLP
Project: <u>Professional Services for the renovation to the approximately ± 10,000 sf auditorium, lobby and accessory spaces; and the addition of approximately ± 500 sf to the back of the stage, and miscellaneous upgrades throughout the defined work area.</u>	Contract:	
Owner's Contract No.:	Contractor's Project No.:	

APPLICATION FOR PAYMENT Change Order Summary

Approved Change Orders	Additions	Deductions
Number		
TOTALS		
NET CHANGE BY		
CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE..... \$
2. Net change by Change Orders..... \$
3. CURRENT CONTRACT PRICE (Line 1 ± 2)..... \$
4. TOTAL COMPLETED AND STORED TO DATE
(Column F on Progress Estimate) \$
5. RETAINAGE:
 - a. _____ % x \$ _____ Work Completed \$
 - b. _____ % x \$ _____ Stored Material..... \$
 - c. Total Retainage (Line 5a + Line 5b) \$
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c) \$
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application) \$
8. AMOUNT DUE THIS APPLICATION \$
9. BALANCE TO FINISH, PLUS RETAINAGE
(Column G on Progress Estimate + Line 5 above) \$

CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Payment of: \$ _____
(Line 8 or other - attach explanation of another amount)

is recommended by: _____
Michael Walker, AIA, LEED AP, Construction Coordinator (Date)

Payment of: \$ _____
(Line 8 or other - attach explanation of another amount)

is approved by: _____
John T. Stieglitz III, Capital Projects & Purchasing Director (Date)

By: _____ Date: _____

Progress Estimate

Contractor’s Application

Application Period:		For (contract): Professional Services for the renovations and additions to the Hampton Street Auditorium									
Application Number:		Application Date:									
A		B		Work Completed		E		F		G	
Specification Section No.	Description	Scheduled Value	C From Previous Application (C + D)	D This Period	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F) (B)	Balance to Finish (B - F)			
									Totals		

Progress Estimate

Contractor's Application

For (contract): Professional Services for the renovations and additions to the Hampton Street Auditorium										
Application Period:		Application Number:								
		Application Date:								
A		B	C	D	E	F		G		
Bid Item No.	Description	Bid Quantity	Unit Price	Bid Value	Estimated Quantity Installed	Value	Materials Presently Stored and (not in C)	Total Completed and Stored to Date (D + E)	% (E) (B - F)	Balance to Finish (B - F)
Totals										

Stored Material Summary

Contractor's Application

For (contract): Professional Services for the renovations and additions to the Hampton Street Auditorium

Application Number:

Application Period:

Application Date:

A Invoice No.	B Shop Drawing Transmittal No.	C Materials Description	D		E		F		G Materials Remaining in Storage (\$) (D + E - F)
			Stored Previously Date (Month/Year)	Amount (\$)	Stored this Month Amount (\$)	Subtotal	Incorporated in Work Date (Month/Year)	Amount (\$)	
		Totals							

SECTION 2016-1708 – CERTIFICATE OF SUBSTANTIAL COMPLETION

Project: <u>Professional Services for the renovation to the approximately ± 10,000 sf auditorium, lobby and accessory spaces; and the addition of approximately ± 500 sf to the back of the stage, and miscellaneous upgrades throughout the defined work area.</u>	Owner: Colleton County, 113 Mable T. Willis Blvd., Walterboro, South Carolina	Owner's Contract No.:
Contract: Professional Services for the renovations and addition to the Hampton Street Auditorium, located in Colleton County, South Carolina		Date of Contract:
Contractor:		

This [tentative] [definitive] Certificate of Substantial Completion applies to:

- All Work under the Contract Documents: The following specified portions:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor and Engineer and or Architect, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [revised tentative] [definitive] list of items to be completed or corrected, is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

- Amended Responsibilities Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

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

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Construction Coordinator: Michael Walker, AIA, LEED AP, Tych & Walker Architects, LLP Date

Accepted by Contractor: Date

Accepted by Owner: John T. Stieglitz III, Capital Project & Purchasing Director Date

SECTION 2016-1709 – CONTRACTOR'S AFFIDAVIT

The State of _____ Date: _____

The County of _____

The City/Town of _____

_____ of _____
(Officer's Name) (Officer's Title) (Contractor's Name)

being duly sworn, deposes and says that _____
(Contractor's Name)

has furnished all labor and material entering into the **Professional Services for the renovations and addition to the Hampton Street Auditorium, in Colleton County, South Carolina**

called for in the Contract Documents dated _____ with _____

Colleton County states further that this officer has full knowledge of all obligations for such labor and materials, which have entered into and become part of that certain project known and designated above, and that this officer further deposes and says that all debts and other obligations for such labor and materials have been fully and completely paid for in good and lawful money of the United States of America and that there are no suits for damages against them proceeding, prospective and/or that there are no suits for damages against them proceeding, prospective, or otherwise, in consequence of their operations on the above said project.

The said _____ will hold the Owners,
(Contractor's Name)

Colleton County, South Carolina blameless of any and all mechanic's liens that may be hereafter entered or filed for record, so as to constitute charge against said premises for work or labor done or materials furnished by them.

IN WITNESS HEREOF, this officer has heretofore put his hand and seal: _____ (Seal)
(Officer's Name)

I, _____, Notary Public in and for the above-named County and State do

hereby certify that _____ personally known to me to be the affiant in the
(Officer's Name)

foregoing Affidavit, personally appeared before me this day and, having been duly sworn, deposes and says that the facts set forth in the above Affidavit are true and correct.

WITNESS my hand and seal this ____ day of _____, 2016

_____ (Seal)

Notary Public for the State of _____ My Commission Expires: _____

SECTION 2016-1710 – FIELD ORDER

No. _____

Date of Issuance: _____ Effective Date: _____

Project: <u>Professional Services for the renovation to the approximately ± 10,000 sf auditorium, lobby and accessory spaces; and the addition of approximately ± 500 sf to the back of the stage, and miscellaneous upgrades throughout the defined work area.</u>	Owner: Colleton County, 113 Mable T. Willis Blvd., Walterboro, South Carolina	Owner's Contract No.:
Contract: Professional Services for the renovation and addition to the Hampton Street Auditorium, in Colleton County, South Carolina		Date of Contract:
Contractor:		

Attention:

You are hereby directed to promptly execute this Field Order issued in accordance with General Conditions Paragraph 9.05A., for minor changes in the Work without changes in Contract Price or Contract Times. If you consider that a change in Contract Price or Contract Times is required, please notify the Construction Coordinator immediately and before proceeding with this Work.

Reference: _____ (Specification Section(s)) _____ (Drawing(s) / Detail(s))

Description:

Attachments:

Construction Coordinator: Michael Walker, AIA, LEED AP, Tych & Walker Architects, LLP

Receipt Acknowledged by (Contractor):	Date:
---------------------------------------	-------

Copy to Owner

SECTION 2016-1711 – WORK CHANGE DIRECTIVE

No. _____

Date of Issuance: _____ Effective Date: _____

Project: <u>Professional Services for the renovation to the approximately ± 10,000 sf auditorium, lobby and accessory spaces; and the addition of approximately ± 500 sf to the back of the stage, and miscellaneous upgrades throughout the defined work area.</u>	Owner: Colleton County, 109 Benson Street, Walterboro, South Carolina	Owner's Contract No.:
Contract: Professional Services for the renovations and addition to the Hampton Street Auditorium, located in Colleton County, South Carolina		Date of Contract:
Contractor:		

You are directed to proceed promptly with the following change(s):

Item No.	Description

Attachments (list documents supporting change):

Purpose for Work Change Directive:

- Authorization for Work described herein to proceed on the basis of Cost of the Work due to:
 - Non-agreement on pricing of proposed change.
 - Necessity to expedite Work described herein prior to agreeing to changes on Contract Price and Contract Time.

Estimated change in Contract Price and Contract Times:

Contract Price \$ _____ (increase/decrease) Contract Time _____ days (increase/decrease)

If the change involves an increase, the estimated amounts are not to be exceeded without further authorization.

Recommended for Approval by Construction Coordinator: Michael Walker, AIA, LEED AP, Tych & Walker Architects, LLP	Date
Authorized for Owner by:	Date
Accepted for Contractor by:	Date
Approved by Funding Agency (if applicable):	Date:

SECTION 2016-1712 – CHANGE ORDER No. _____

Date of Issuance: _____ Effective Date: _____

Project: Professional Services for the renovation to the approximately ± 10,000 sf auditorium, lobby and accessory spaces; and the addition of approximately ± 500 sf to the back of the stage, and miscellaneous upgrades throughout the defined work area.	Owner: Colleton County, 113 Mable T. Willis Blvd., Walterboro, South Carolina	Owner's Contract No.: _____
Contract: Professional Services for the renovations and addition to the Hampton Street Auditorium, located in Colleton County, South Carolina		Date of Contract: _____
Contractor: _____		_____

The Contract Documents are modified as follows upon execution of this Change Order:

Description: _____

Attachments: (List documents supporting change): _____

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price: \$ _____	Original Contract Times: <input type="checkbox"/> Working days <input type="checkbox"/> Calendar days Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: \$ _____	[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: Substantial completion (days): _____ Ready for final payment (days): _____
Contract Price prior to this Change Order: \$ _____	Contract Times prior to this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] of this Change Order: \$ _____	[Increase] [Decrease] of this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
Contract Price incorporating this Change Order: \$ _____	Contract Times with all approved Change Orders: Substantial completion (days or date): _____ Ready for final payment (days or date): _____

RECOMMENDED: By: _____ Contractor (Authorized Signature)	APPROVED: By: _____	APPROVED: By: _____ Construction Coordinator: Michael Walker, AIA, LEED AP, Tych & Walker Architects, LLP
Date: _____	Date: _____	Date: _____
Approved by Funding Agency (if applicable): _____		Date: _____



COLLETON COUNTY
SOUTH CAROLINA

ACKNOWLEDGMENT OF PRINCIPAL

BID NUMBER: CPST-05

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION:

State of: (_____)

County of: (_____)

On this _____ day of _____, 20 _____, before me personally came and appeared _____ to me Known, who, being by me duly sworn, did depose and say to me that he resides at _____, that he/she is the _____ of _____ the corporation described in and which executed the foregoing instrument is an impression of such seal; that it was so affixed by the order of the directors of said corporation, and that he signed his name thereto by like order.

(Seal) _____
Notary Public

THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID



ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP:

BID NUMBER: CPST-05

State of: (_____)

County of: (_____)

On this _____ day of _____ 20____, before me personally, came and appeared _____ to me known and known to me to described in and who executed the foregoing instrument and he acknowledged to me that he executed the same as and for the act and deed of said firm.

(Seal) _____
Notary Public

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL:

State of: (_____)

County of: (_____)

On this _____ day of _____ 20____, before me personally, came and appeared _____ to me known and known to me to be the person described in and who executed the forgoing instrument and acknowledged that he executed the same.

(Seal) _____
Notary Public

THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID



COLLETON COUNTY
SOUTH CAROLINA

ADDENDA ACKNOWLEDGMENT

BID NUMBER: CPST-05

The vendor has examined and carefully studied the Request for Bids and the following Addenda, receipt of all of which is hereby acknowledged:

Addendum No. _____

Addendum No _____

Addendum No. _____

Addendum No. _____

Authorized Representative (Signature)

Date

Authorized Representative/Title (Print)

Vendors must acknowledge any issued addenda. Proposals which fail to acknowledge the vendor's receipt of any addendum will result in the rejection of the offer if the addendum contained information which substantively changes the Owner's requirements or pricing.

THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID



BID NUMBER: CPST-05

The vendor must list a minimum of three (3) references along with pictures of the completed work.

1. Organization: _____
Address: _____
Contact: _____
Phone Number: _____ Email address: _____
Services provided: _____
Years of Service: _____

2. Organization: _____
Address: _____
Contact: _____
Phone Number: _____ Email address: _____
Services provided: _____
Years of Service: _____

3. Organization: _____
Address: _____
Contact: _____
Phone Number: _____ Email address: _____
Services provided: _____
Years of Service: _____

THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID



BID NUMBER: CPST-05

Company Name

Authorized Signature (As registered with the IRS)

Address

E-Mail Address(print)

City, State, Zip

Fax Number

Telephone Number

Toll Free Number

Federal Tax ID Number

Sales Tax Number

THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID



BID NUMBER: CPST-05

The Bidder / Proposer will indemnify and hold harmless the Owner, Colleton County and their agents and employees from and against all claims, damages, losses and expenses, including attorney’s fees, arising out of or resulting from the performance of the Work provided that any such claims, damages, loss, or expense is attributable to bodily injury, sickness, disease or death, injury to or destruction of tangible property, including the loss of use resulting there from, and is caused by any negligent or willful act or omission of the Bidder / Proposer, and anyone directly or indirectly employed by him/her or anyone for whose acts any of them may be liable.

In any and all claims against the Owner, Colleton County or any of their agents and / or employees by an employee of the Bidder / Proposer, and anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way to the amount or type of damages, compensation or benefits payable by or for the Bidder / Proposer under the Worker’s Compensation Acts, Disability Benefit Acts, or other employee benefit acts.

The obligation of the Bidder / Proposer under this paragraph shall not extend to the liability of Colleton County or its agents and / or employees arising out of the reports, surveys, Change Orders, designs or Technical Specifications.

BIDDER/PROPOSER: _____

BY: _____

DATE: _____

TELEPHONE NO.: _____

THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID



MATERIAL/PRODUCT SUBSTITUTION REQUEST

BID NUMBER: CPST-05

Date: _____

We hereby submit for your review, the following PRODUCT SUBSTITUTION of the specified material for the above listed project.

Section: _____

Paragraph: _____

Specified Material: _____

Attached is complete technical data of the PRODUCT SUBSTITUTION. Included is complete information on changes to the Project Manual Documents required by the proposed PRODUCT SUBSTITUTION for its proper installation.

A request constitutes a representation that Trade Contractor:

1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
2. Will provide same warranty for Substitution as for specified product.
3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension which may subsequently become apparent.
5. Will reimburse Owner and Architect/Engineer for review or redesign services associated with re-approval by authorities having jurisdiction or additional time expended by Architect/Engineer to review information.

It is understood that if the Architect or Engineer approves an approved substitution prior to receipt of bids in accordance with the project timeline, such approval will be set forth in an addendum. Bidders shall not rely upon approvals made in any other manner. If substitution requests are not addressed in the addendum, the substitution request shall be considered not approved. Architect's or Engineers decision of approval or disapproval of proposed substitution shall be final without dispute.

THE UNDERSIGNED Trade Contractor states that the function, appearance, and quality of the PRODUCT SUBSTITUTION are equivalent or superior to the specified item. In addition, I, as the Trade Contractor will assume all responsibility for any impact or delay the review and evaluation of the alternate product may cause. Your approval of the Substitute Product in no way will relieve me as the Trade Contractor of my responsibilities to conform with all requirements of the Contract Documents.

Submitted by: _____

THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID



LIST OF PRIME AND SUBCONTRACTORS

BID NUMBER: CPST-05

The undersigned states that the following is a full and complete list of proposed prime contractor and subcontractors on this Project and the class of work to be performed by each, and that such list will not be added to nor altered without the written consent of the Owner.

Class of Work to be Performed		Subcontractor
1)	Site Work	_____
2)	Electrical	_____
3)	Mechanical	_____
4)	Plumbing	_____
5)	Fire Protection	_____
6)	Painting	_____
7)	Window Manufacturer	_____
8)	AV Installation	_____

Listed subcontractors must meet all qualifications including documented experience set forth in specifications, including those sections specifying single source contractor requirements.

Firm Name: _____ **Date:** _____

Signed: _____ **Title:** _____

THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID



COLLETON COUNTY
SOUTH CAROLINA
CERTIFICATE OF FAMILIARITY

BID NUMBER: CPST-05

The undersigned, having fully familiarized him/her with the information contained within this entire solicitation and applicable amendments, submits the attached response, and other applicable information to the County, which I verify to be true and correct to the best of my knowledge. I further certify that this response is made without prior understanding, agreement, or connection with any corporation, Offeror or person submitting a response for the same materials, supplies or equipment, and is in all respects, fair and without collusion or fraud. I agree to abide by all conditions set forth in this solicitation and certify that I have signature authority to bind the company listed herein.

MAILING ADDRESS

_____ Mailing Address

_____ Printed Name

_____ City, State, Zip

_____ Title

_____ Date

_____ Phone Number/Fax Number

REMITTANCE ADDRESS

_____ Company Name

_____ Authorized Signature

_____ Address

_____ E-Mail Address

_____ City, State, Zip

_____ Phone Number

_____ Federal Tax ID Number

_____ SC Sales Tax Number

THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID



COLLETON COUNTY
SOUTH CAROLINA
MINORITY BUSINESS CERTIFICATE

BID NUMBER: CPST-05

Are you a minority business?

- ▶ **Yes** ____ (Women-owner ____ / ____ Disadvantaged) If yes, please submit a copy of your certificate with your response.
- ▶ **No** ____

MAILING ADDRESS

Mailing Address

Printed Name

City, State, Zip

Title

Date

Phone Number/Fax Number

REMITTANCE ADDRESS

Company Name

Authorized Signature

Address

E-Mail Address

City, State, Zip

Phone Number

Federal Tax ID Number

SC Sales Tax Number

PLEASE COMPLETE AND SUBMIT AS A PART OF YOUR BID IF YOU ARE A MINORITY BUSINESS



BID NUMBER: CPST-05

The vendor is certifying that they are not currently debarred from responding to any request for qualifications by any agency or subdivision of the State of South Carolina or the United States Federal Government, nor are they an agent of any person or entity that is currently debarred from submitting qualifications on contracts by any agency or subdivision of the State of South Carolina or the United States Federal Government.

SAM's No. _____

Cage Code. _____

DUN's No. _____

Authorized Representative(Signature)

Date

Authorized Representative/Title (Print)

THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID



CONTRACTOR/SUBCONTRACTOR QUALIFICATIONS

BID NUMBER: CPST-05

PART 1 - GENERAL

1.01 The following information and completed forms may be requested by the Owner of the three (3) lowest bidders. The request will be made the day of the Bid Opening or within five (5) days following the Bid Opening. If requested, this data must be submitted to the Construction Coordinator or Owner within five (5) days of the request. Failure to provide the data in this section, upon request, will subject bidder to disqualification.

1.02 DESCRIPTION

- A. Information provided will be used by the Construction Coordinator or Owner to determine the competency and ability of the Contractor and/or Subcontractor to perform the scheduled work in a manner that is satisfactory to the Construction Coordinator or Owner. The Construction Coordinator or Owner's decision shall be final.
- B. Any Subcontractor being used by the General Contractor, whose portion of the project exceeds 5% of the total bid price amount, will be required to provide the same information as the General Contractor.
- C. The Contractor and Subcontractor shall include with this section a detailed financial statement indicating the Contractor's or Subcontractor's financial resources. The information on that statement shall be certified by a Certified Public Accountant and shall be submitted on the Associated General Contractors of America form "Standard Questionnaires and Financial Statement for Bidders".
- D. The Contractor and Subcontractor shall certify by attaching his signature to this Section as provided that all information contained herein is complete and all statements and answers are accurate and true. Providing misinformation, incomplete information, inaccurate information, or failure to certify the information, will subject bidder to disqualification.

1.03 QUALIFICATIONS

A. Complete the following for General Contractor and any Subcontractors (attach additional sheets as required):

- 1. Name: _____
- 2. Address: _____
- 3. City, State, Zip: _____
- 4. Principle: _____

B. Number of years the company has been in business: _____

C. List and describe at least five (5) projects that have been completed, that are similar in size and type, and that has been completed within the last ten (10) years:

- 1. _____

- 2. _____

3. _____

4. _____

5. _____

D. For the projects listed above provide the following:

1. Project Owner: _____
 Contact Name and Title: _____
 Telephone Number: _____
2. Project Owner: _____
 Contact Name and Title: _____
 Telephone Number: _____
3. Project Owner: _____
 Contact Name and Title: _____
 Telephone Number: _____
4. Project Owner: _____
 Contact Name and Title: _____
 Telephone Number: _____
5. Project Owner: _____
 Contact Name and Title: _____
 Telephone Number: _____

E. For each of the projects listed in Items C & D provide the following:

1. Original Bid Amount: _____
 Final Construction Cost: _____
 Contract Period: _____
 Actual Contract Period: _____
 Explanation: _____
2. Original Bid Amount: _____
 Final Construction Cost: _____
 Contract Period: _____
 Actual Contract Period: _____
 Explanation: _____

3. Original Bid Amount: _____
 Final Construction Cost: _____
 Contract Period: _____
 Actual Contract Period: _____
 Explanation: _____

4. Original Bid Amount: _____
 Final Construction Cost: _____
 Contract Period: _____
 Actual Contract Period: _____
 Explanation: _____

5. Original Bid Amount: _____
 Final Construction Cost: _____
 Contract Period: _____
 Actual Contract Period: _____
 Explanation: _____

F. Provide the following for any portion of the work that is being subcontracted (5% or more of the Bid Amount):

1. Name of Subcontractor: _____
 Address: _____
 Telephone Number: _____
 Work being Completed: _____

2. Name of Subcontractor: _____
 Address City/State/Zip: _____
 Telephone Number: _____
 Work being Completed: _____

3. Name of Subcontractor: _____
 Address City/State/Zip: _____
 Telephone Number: _____
 Work being Completed: _____

4. Name of Subcontractor: _____
 Address City/State/Zip: _____
 Telephone Number: _____
 Work being Completed: _____

5. Name of Subcontractor: _____
 Address City/State/Zip: _____
 Telephone Number: _____
 Work being Completed: _____

G. Provide a list of equipment that is owned by the Contractor and is available for this project.

H. Provide a list of equipment that will be purchased, leased or rented for this project.

I. Provide a list of the superintendent(s) or others that will be in charge of this project (Provide resumes and qualifications):

J. Provide the following for current projects being completed:

1. Project Name: _____
Owner: _____
Current Status: _____
Estimated Schedule of Completion: _____

2. Project Name: _____
Owner: _____
Current Status: _____
Estimated Schedule of Completion: _____

3. Project Name: _____
Owner: _____
Current Status: _____
Estimated Schedule of Completion: _____

4. Project Name: _____
Owner: _____
Current Status: _____
Estimated Schedule of Completion: _____

5. Project Name: _____
Owner: _____
Current Status: _____
Estimated Schedule of Completion: _____

K. Provide a list of projects that has been completed with the Owner over the past fifteen (15) years:

1. Project Name: _____
Contact Name and Title: _____
Telephone Number: _____
2. Project Name: _____
Contact Name and Title: _____
Telephone Number: _____
3. Project Name: _____
Contact Name and Title: _____
Telephone Number: _____
4. Project Name: _____
Contact Name and Title: _____
Telephone Number: _____
5. Project Name: _____
Contact Name and Title: _____
Telephone Number: _____

L. Provide a list of projects that Bid with the Owner over the past fifteen (15) years:

1. Project Name: _____
Contact Name and Title: _____
Telephone Number: _____
2. Project Name: _____
Contact Name and Title: _____
Telephone Number: _____
3. Project Name: _____
Contact Name and Title: _____
Telephone Number: _____
4. Project Name: _____
Contact Name and Title: _____
Telephone Number: _____
5. Project Name: _____
Contact Name and Title: _____
Telephone Number: _____

M. Provide a list of projects completed with the Construction Coordinator over the past fifteen (15) years:

1. Project Name: _____
Project Engineer: _____
Original Bid Amount: _____
Final Construction Cost: _____
Contract Period: _____
Actual Contract Period: _____
Explanation: _____

2. Project Name: _____
Project Engineer: _____
Original Bid Amount: _____
Final Construction Cost: _____
Contract Period: _____
Actual Contract Period: _____
Explanation: _____

3. Project Name: _____
Project Engineer: _____
Original Bid Amount: _____
Final Construction Cost: _____
Contract Period: _____
Actual Contract Period: _____
Explanation: _____

4. Project Name: _____
Project Engineer: _____
Original Bid Amount: _____
Final Construction Cost: _____
Contract Period: _____
Actual Contract Period: _____
Explanation: _____

5. Project Name: _____
Project Engineer: _____
Original Bid Amount: _____
Final Construction Cost: _____
Contract Period: _____
Actual Contract Period: _____
Explanation: _____

N. Provide a list of projects involved with litigation, arbitration and/or mediation over the past twenty (20) years:

1. Project Name: _____
Project Owner: _____
Project Engineer: _____
Date: _____
Explanation: _____

2. Project Name: _____
Project Owner: _____
Project Engineer: _____
Date: _____
Explanation: _____

3. Project Name: _____
Project Owner: _____
Project Engineer: _____
Date: _____
Explanation: _____

4. Project Name: _____
Project Owner: _____
Project Engineer: _____
Date: _____
Explanation: _____

5. Project Name: _____
Project Owner: _____
Project Engineer: _____
Date: _____
Explanation: _____

O. Attach a rate schedule associated with equipment that includes labor, overhead and profit.
_____ Rate Schedule Attached.

P. Additional information if Necessary.

1. _____

1.04 I HEREBY CERTIFY that as a duly authorized representative of _____
 _____ (bidder), the information provided is to the best of
 my knowledge accurate and that failure to provide accurate information will result in disqualification of
 my bid.

 Signature

 Name (Please Print)

 Title

 Date

Notary Public for South Carolina
 My Commission Expires: _____

THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID

SECTION 2016-1714 – BID FORMS

ARTICLE 1 – BID RECIPIENT

- 1.01 This Bid is submitted to: Colleton County
Kaye B. Syfrett, Procurement Manager
113 Mable T. Willis Boulevard
Walterboro, SC 29488
- 1.02 Bids are to be delivered to: Colleton County
Kaye B. Syfrett, Procurement Manager
113 Mable T. Willis Boulevard
Walterboro, SC 29488
- 1.03 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - BIDDER'S ACKNOWLEDGEMENTS

- 2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for ninety (90) days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.
- 2.02 For additional work authorized after signing the Contract, the amount of overhead and the amount of profit to be added to base costs of labor and materials shall be (10%) total for overhead and profit on work performed by the Contractor's own forces and (15%) total on work by Subcontractors. Request of additional charges for site supervision, utilities, rentals, or administrative services will not be approved.

ARTICLE 3 - BIDDER'S REPRESENTATIONS

- 3.01 In submitting this Bid, Bidder represents that:
- A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged with the attached Addendum form, dated and signed.
 - B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.
 - C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.
 - D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities), which have been identified in Paragraph 4.02 of General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions that have been identified in Paragraph 4.06 of General Conditions.
 - E. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site, which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific

- F. Means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.
- G. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.
- H. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- 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 all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.
- J. Bidder has given the Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by the Owner is acceptable to Bidder.
- K. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.
- L. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Agreement.

ARTICLE 4 - FURTHER REPRESENTATIONS

4.01 Bidder further represents that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation.
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding.
- D. The bidder affirms that in making such Bid, neither he/she nor any company that they may represent, nor anyone in behalf of him/her or their company, directly or indirectly, has entered into any combination, collusion, undertaking or agreement with any other Bidder or Bidders to maintain the prices of said work, or any compact to prevent any other Bidder or Bidders from Bidding on said Contract or work and further affirms that such bid is made without regard or reference to any other Bidder or Proposer and without any agreement or understanding or combination either directly or indirectly with any other person or persons with reference to such Bidding in any way or manner whatsoever.
- E. Any attempt by the vendor to influence the opinion of Colleton County Staff or Colleton County Council by discussion, promotion, advertising, or misrepresentation of the submittal or purchasing process or any procedure to promote their offer will constitute a violation of the vendor submittal conditions and will cause the vendor's submittal to be declared null and void.

ARTICLE 5 - TIME OF COMPLETION

- 5.01 **Bidder agrees that the Work: Professional Services for the renovations and addition to the Hampton Street Auditorium, located in Colleton County, South Carolina to be completed within three hundred (300) days.**
- 5.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the Contract dates in the amount of \$500 per day for each calendar day required to complete the work in the manner and within the dates as stated in Paragraph 5.01 above.

ARTICLE 6 - ATTACHMENTS TO THIS BID

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

- A. Required Bid security in the form of five percent (5%) of the total bid amount.
- B. Power of Attorney.
- C. All forms listed in section 2016-1714

ARTICLE 7 - DEFINED TERMS

7.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders and General Conditions.

ARTICLE 8 - BID SUBMITTAL

8.01 This Bid submitted by:

An Individual

Name (typed or printed): _____

By: _____ (SEAL)

(Individual's signature)

Title: _____

Doing business as: _____

A Partnership

Partnership Name: _____

By: _____ (SEAL)

(Signature of general partner -- attach evidence of authority to sign)

Title: _____

Name (typed or printed): _____

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____

(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____ (CORPORATE SEAL)

Attest _____

Date of Authorization to do business in [South Carolina] is ____ / ____ / ____.

A Joint Venture

Name of Joint Venture: _____

First Joint Ventures Name: _____ (SEAL)

By: _____

(Signature of first joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Ventures Name: _____ (SEAL)

By: _____

(Signature of second joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venture must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Bidder's Business Address _____

Telephone No.: _____ Fax No.: _____

SUBMITTED on _____, 2016.

State Contractor License No. _____

***NOTE: If NOT BIDDING, Complete the attached "No Bid" Response Form and return to Colleton County.

Remainder of this page intentionally left blank

ARTICLE 9 – BASIS OF BID

BASE BID, UNIT PRICE & ALTERNATE BID SCHEDULE

When changes in the work are ordered by the Owner, and such changes involve the following items, the following unit prices will be used to calculate adjustments to the Contract Sum. These unit prices shall be for the Work as specified, including all labor, materials, equipment, accessories, shipping, preparation, insurance, testing, overhead, profit, applicable taxes, permits, fees, warranties and all other associated costs for the finished and completed Work. All unit prices for utility conduits shall include sweeps, bends, couplings, caps, fittings, etc. which shall be included in the unit price per linear foot. Unit prices for undercut soils shall include material in place, surveyed and compacted pursuant to the Contract Documents.

Submit unit price and proposal amount for the following items. This list may not include all components necessary to provide a completed product, therefore any applicable items necessary to provide a completed product should be considered in your unit price response.

In case of errors in the extension of prices, unit price governs. In case of error in summations, corrected bid amounts will be totaled and will govern.

Contractor shall be responsible for all necessary electric and water hookups.

Contractor shall make quantity take-offs using drawings to determine quantities to his satisfaction, reporting promptly any discrepancies which may affect bidding.

The Owner shall have the right to accept Alternates in any order or combination, and to determine the low bidder on the basis of the sum of the Base Bid and alternates accepted.

This is not a comprehensive list of items included in the contract documents, and represents only a portion of the project total.

Base Bid

BASE BID PROPOSAL: Bidder / Proposer agrees to perform all of the work described in the specifications, including allowances, and shown on the drawings, for the sum of:

_____ \$ _____

Included in the above base bid amount is the AV Package totaling \$ _____

Remainder of this page intentionally left blank

5.01 Bidder will complete the Work in accordance with the Contract Documents and the following unit prices are established for this project

Unit Prices - Renovations and Addition to the Hampton Street Auditorium					
<u>Item No.</u>	<u>Description</u>	<u>Unit</u>	<u>Estimated Quantity</u>	<u>Unit Price</u>	<u>Bid Price</u>
1	Plaster Repair Exceeding Base Bid Defined Area	SF	1	\$	\$
2	Existing Hardwood Floor – Sand and Refinish	SF	1	\$	\$
3	Repair Hardwood Floor – Remove Existing and Install New Frames	SF	1		
4	Paint Existing Interior Surfaces to Include clean, prep and paint, exceeding base bid area	SF	1		
5	Installation of R-19 Flooring Insulation	SF	1		
6	Installation of R-38 Attic Insulation	SF	1	\$	\$
7	Paint Exposed Sprinkler Pipe	SF	1	\$	\$
8	4" Thick Sidewalk	SF	1	\$	\$
9	Exterior 6" Fireline Pipe	LF	1	\$	\$
10	4" PVC waste line/underground	LF	1	\$	\$
11	2" Cooper water line/underground	LF	1	\$	\$

The above unit prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance, etc., to complete the finish work as stipulated in the Bid Documents.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids.

The following Base Bid Alternate prices will be used to calculate adjustments to the Contract Sum. These unit prices shall be for the Work as specified, including all labor, materials, equipment, accessories, shipping, preparation, insurance, testing, overhead, profit, applicable taxes, permits, fees, warranties and all other associated costs for the finished and completed Work. All Base Bid Alternate prices for utility conduits shall include sweeps, bends, couplings, caps, fittings, etc. which shall be included in the unit price per linear foot. Base Bid Alternate prices for undercut soils shall include material in place, surveyed and compacted pursuant to the Contract Documents.

Base Bid Alternate 1

5.02 Bidder will complete the Work in accordance with the Contract Documents for the following unit price(s):

ADD Alternate 1: Window Replacement		
<u>Item No.</u>	<u>Description</u>	<u>Cost</u>
1	Replacement of existing windows and associated work to include removal/reinstallation/patch plaster and paint. Owner will require a separate schedule of values for each window type from the successful bidder.	\$ _____
ADD Alternate 2: Painting		
<u>Item No.</u>	<u>Description</u>	<u>Cost</u>
2	All Painting defined on Room Finish Schedule for Rooms 116, 125, 126 for walls and ceiling	\$ _____
ADD Alternate 3: Floor Refinishing		
<u>Item No.</u>	<u>Description</u>	<u>Cost</u>
3	All Floor refinishing on Room Finish Schedule for Rooms 116, 125, 126.	\$ _____
ADD Alternate 4: Booster Pump		

<u>Item No.</u>	<u>Description</u>	<u>Cost</u>
4	Add a booster pump to be located in room 127. Provide an Underwriters Listed and Factory Mutual approved fire service pump and companion jockey pump, complete with motors, motor starters, controls, fittings and other appurtenances and accessories will be provided. The fire pump will axially split case, single stage, single or double volute type. A 40HP fire pump is anticipated for the building's sprinkler system. A dedicated pump room is required with direct outside entry and a 1-hour fire rated construction. To meet codes: NFPA 13 Sprinkler Systems, NFPA 20 Centrifugal Fire Pumps, NFPA 25 Inspection, Testing and Maintenance of Water Based Fire Protection Systems, NFPA 72 National Fire Alarm Code, International Building Code and Local Requirements of the Authority Having Jurisdiction. The designer shall use the version of the referenced NFPA standard required by the current version of the International Building Code unless otherwise approved by the Authority Having Jurisdiction.	\$ _____

ADD Alternate 1: Canopies

<u>Item No.</u>	<u>Description</u>	<u>Cost</u>
5	Repair canopies at Door 107, 108. Replace roof and paint.	\$ _____

ADD Alternate 6: Dry Wells

<u>Item No.</u>	<u>Description</u>	<u>Cost</u>
6	Add Dry Well as defined on Civil Drawings 002.	\$ _____

ADD Alternate 1: Sprinkler Pipe

<u>Item No.</u>	<u>Description</u>	<u>Cost</u>
7	Paint all exposed sprinkler pipe (both floors) in addition to Rooms 115, 116, 117.	\$ _____

ADD Alternate 8: Well Covers

<u>Item No.</u>	<u>Description</u>	<u>Cost</u>
8	Construction of Well Covers as per D1/A1.6 and D5/A1.6.	\$ _____

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids.

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END OF SECTION

DIVISION 01 – GENERAL CONDITIONS

BID NUMBER – CPST-04

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

PART 1 - DEFINITIONS AND TERMINOLOGY

1.01 Defined Terms

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified Parts and paragraphs, and the titles of other documents or forms.
1. Addenda – Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. Agreement – The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. Application for Payment – The form acceptable to the Construction Coordinator which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. Asbestos – Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. Bid – The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. Bidder – The individual or entity who submits a Bid directly to Owner.
 7. Bidding Documents – The Bidding Requirements, Contract Documents and the General Conditions (including all Addenda).
 8. Bidding Requirements – The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. Change Order – A document recommended by the Construction Coordinator which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 10. Claim – A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. Construction Coordinator - The person or firm in charge of the project. The person or firm will be selected by the owner and in some instances, the owner will self-perform, acting as the Construction Coordinator. The firm could be an Architectural Firm, Engineering Firm, or third party as so designated by the owner.

12. Contract – The entire and integrated written agreement between the Owner and Contractor including the General Conditions concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.
13. Contract Documents – Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement Are Contract Documents. Approved Shop Drawings, other Contractor’s submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
14. Contract Price – The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
15. Contract Times – The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer’s written recommendation of final payment.
16. Contractor – The individual or entity with whom Owner has entered into the Agreement.
17. Cost of the Work – See Paragraph 11.01.A for definition.
18. Drawings – That part of the Contract Documents prepared or approved by the Construction Coordinator which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
19. Effective Date of the Agreement – The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
20. Field Order – A written order issued by the Construction Coordinator which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. General Requirements – Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.
22. Hazardous Environmental Condition – The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.
23. Hazardous Waste – The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. Laws and Regulations; Laws or Regulations – Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. Liens – Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. Milestone – A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. Notice of Award – The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. Notice to Proceed – A written notice given by Owner or Construction Coordinator to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. Owner – The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. PCBs – Polychlorinated biphenyls.
31. Petroleum – Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. Progress Schedule – A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. Project – The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. Project Manual – The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. Radioactive Material – Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. Related Entity – An officer, director, partner, employee, agent, consultant, or subcontractor.
37. Resident Project Representative – The authorized representative of the Construction Coordinator who may be assigned to the Site or any part thereof.
38. Samples – Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
39. Schedule of Submittals – A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
40. Schedule of Values – A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
41. Shop Drawings – All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
42. Site – Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for

access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

43. Specifications – That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
44. Subcontractor – An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
45. Substantial Completion – The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of the Construction Coordinator, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
46. Successful Bidder – The Bidder submitting a responsive Bid to whom Owner makes an award.
47. Supplementary Conditions – That part of the Contract Documents which amends or supplements these General Conditions.
48. Supplier – A manufacturer, fabricator, supplier, distributor, material man, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.
49. Underground Facilities – All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
50. Unit Price Work – Work to be paid for on the basis of unit prices.
51. Work – The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
52. Work Change Directive – A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by the Construction Coordinator ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

- A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

B. Intent of Certain Terms or Adjectives

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by the Construction Coordinator. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of the Construction Coordinator as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to the Construction Coordinator any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. Day

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
2. The wording “business day” means any day Monday thru Friday.

D. Defective

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents, or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or
 - c. has been damaged prior to the Construction Coordinator recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. Furnish, Install, Perform, Provide

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.

- F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

PART 2 - PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. Evidence of Insurance: Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the General Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Part 5.

2.02 Copies of Documents

- A. Owner shall furnish to Contractor up to three (3) printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 Commencement of Contract Times; Notice to Proceed

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event, will the Contract Times commence to run later than the thirtieth day after the Effective Date of the Agreement.

2.04 Starting the Work

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 Before Starting Construction

- A. *Preliminary Schedules:* Within ten (10) days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to the Construction Coordinator for timely review:
 - 1. a preliminary Progress Schedule; indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 Preconstruction Conference

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, the Construction Coordinator, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 Initial Acceptance of Schedules

- A. At least ten (10) days before submission of the first Application for Payment a conference attended by Contractor, the Construction Coordinator, and others as appropriate will be held to review for acceptability to the Construction Coordinator as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional ten (10) days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to the Construction Coordinator.
 - 1. The Progress Schedule will be acceptable to the Construction Coordinator if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on the Construction Coordinator responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 - 2. Contractor's Schedule of Submittals will be acceptable to the Construction Coordinator if it provides a workable arrangement for reviewing and processing the required submittals.
 - 3. Contractor's Schedule of Values will be acceptable to the Construction Coordinator as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

PART 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 Intent

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by the Construction Coordinator as provided in Part 9.

3.02 Reference Standards

- A. Standards, Specifications, Codes, Laws, and Regulations
 - 1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 - 2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or the Construction Coordinator, or any of their subcontractors, consultants, agents, employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or the Construction Coordinator, or any

of, their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 Reporting and Resolving Discrepancies

A. Reporting Discrepancies

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to the Construction Coordinator any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from the Construction Coordinator before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to the Construction Coordinator in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or the Construction Coordinator for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. Resolving Discrepancies

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 Amending and Supplementing Contract Documents

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
 1. A Field Order;
 2. Construction Coordinator approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or

3. Construction Coordinator written interpretation or clarification.

3.05 Reuse of Documents

- A. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, shall not:
 1. Have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Architects, Engineer or Architects and or Engineer's consultants, including electronic media editions; or
 2. Reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Architect or Engineer and specific written verification or adaption by Architect or Engineer.
- B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 Electronic Data

- A. Copies of data furnished by Owner or the Construction Coordinator to Contractor or Contractor to Owner or the Construction Coordinator that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

PART 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 Availability of Lands

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 Subsurface and Physical Conditions

- A. Reports and Drawings: Reports of explorations and tests of conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents including the Limited Asbestos Survey that has been completed for the project by Shepard & Associates, dated September 22, 2015.

4.03 Differing Subsurface or Physical Conditions

- A. Notice: If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:
 - 1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
 - 2. is of such a nature as to require a change in the Contract Documents; or
 - 3. differs materially from that shown or indicated in the Contract Documents; or
 - 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents; then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and the Construction Coordinator in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.
- B. Construction Coordinator Review: After receipt of written notice as required by Paragraph 4.03.A, Construction Coordinator will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of the Construction Coordinator findings and conclusions.
- C. Possible Price and Times Adjustments
 - 1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and the Construction Coordinator, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 Underground Facilities

- A. Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or the Construction Coordinator by the owners of such Underground Facilities, including Owner, or by others:
 1. Owner and Construction Coordinator shall not be responsible for the accuracy or completeness of any such information or data; and
 2. The cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data,
 - b. locating all Underground Facilities shown or indicated in the Contract Documents,
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.
- B. Not Shown or Indicated
 1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and the Construction Coordinator. Construction Coordinator will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the

Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If the Construction Coordinator concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 Reference Points

- A. Owner shall provide engineering surveys to establish reference points for construction which in the Construction Coordinator judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to the Construction Coordinator whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 Hazardous Environmental Condition at Site

- A. Reports of explorations and tests of conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents including the Limited Asbestos Survey that has been completed for the project by Shepard & Associates, dated September 22, 2015.

PART 5 - BONDS AND INSURANCE

5.01 Performance, Payment, and Other Bonds

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and the Construction Coordinator and shall, within 20 days after the event giving rise

to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 Licensed Sureties and Insurers

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications.

5.03 Certificates of Insurance

- A. Contractor shall deliver to Owner, with copies to each additional insured, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of full compliance with these insurance requirements or failure of Owner to identify a deficiency from evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. By requiring such insurance and insurance limits herein, Owner does not represent that coverage and limits will necessarily be adequate to protect contractor and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 Contractor's Liability Insurance

- A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:
1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insured (subject to any customary exclusion regarding professional liability) Owner and Construction Coordinator, and any other individuals or entities, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
 2. include at least the specific coverages and be written for not less than the limits of liability provided or required by Laws or Regulations, whichever is greater;
 3. include completed operations insurance;
 4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
 5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days' prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
 6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
 7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.
 - a. Contractor shall furnish Owner and each other additional insured to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.
- C. The limits of liability for the insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:
1. Workers' Compensation, and related coverages under Paragraphs 5.04.A.1 and A.2 of the General Conditions:
 - a. State: South Carolina
Statutory Benefits
 - b. Applicable Federal (e.g., Longshoreman's): Statutory
 - c. Employer's Liability:

Each Accident	\$1,000,000
Disease-Policy Limit	\$500,000

- | | |
|-----------------------|-----------|
| Disease-Each Employee | \$500,000 |
|-----------------------|-----------|
2. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor and for this project only:
 - a. General Aggregate \$2,000,000
 - b. Products - Completed Operations Aggregate \$2,000,000
 - c. Personal and Advertising Injury \$1,000,000
 - d. Each Occurrence (Bodily Injury and Property Damage) \$1,000,000
 - e. Fire Damage (any one (1) fire) \$50,000
 - f. Medical Expense (any one (1) person) \$5,000
 - g. Property Damage liability insurance will provide Explosion, Collapse, and Under-ground coverages where applicable.
 - h. Excess or Umbrella Liability
 - 1) General Aggregate \$2,000,000
 - 2) Each Occurrence \$2,000,000
 3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:
 - a. Include coverage for all owned, hired and non-owned automobiles.
 - b. Combined Single Limit of \$1,000,000
 - c. Each Occurrence \$1,000,000
 - d. Limits Medical Expense \$5,000
 4. The Contractual Liability coverage required by Paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:
 - a. Bodily Injury:

Each Accident	\$2,000,000
Annual Aggregate	\$2,000,000
 - b. Property Damage:

Each Accident	\$2,000,000
Annual Aggregate	\$2,000,000
 5. Flood Insurance: The Contractor is required to carry flood insurance for projects located in designated flood hazard areas in which Federal Flood Insurance is available.

5.05 Owner's Liability Insurance

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 Property Insurance

- A. Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof.
1. This insurance shall:
 - a. includes the interests of Owner, Contractor, Subcontractors, Construction Coordinator and any other individuals or entities identified herein, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;
 - b. in addition to the individuals and entities specified, include as additional insureds, the following:
 - c. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss and damage to the Work, temporary buildings, falsework, and materials and equipment in transit and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required;
 - d. includes expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 - e. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by the Construction Coordinator;
 - f. allows for partial utilization of the Work by Owner;
 - g. includes testing and startup; and
 - h. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor and the Construction Coordinator with 30 days' written notice to each other additional insured to whom a certificate of insurance has been issued.
 2. Contractor shall be responsible for any deductible or self-insured retention.
 3. The policies of insurance required to be purchased and maintained by Contractor in accordance with this Paragraph SC-5.06.A shall comply with the requirements of paragraph 5.06.C of the General Conditions.
- B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Construction Coordinator, and any other

individuals or entities identified, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least thirty (30) days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.07 Waiver of Rights

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Construction Coordinator, and all other individuals or entities identified to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and the Construction Coordinator, and all other individuals or entities identified to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or the Construction Coordinator, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 Receipt and Application of Insurance Proceeds

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so

received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 Acceptance of Bonds and Insurance; Option to Replace

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Part 5 on the basis of nonconformance with the Contract Documents, the objecting party shall so notify the other party in writing within ten (10) days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 Partial Utilization, Acknowledgment of Property Insurer

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

PART 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 Supervision and Superintendence

- A. **When working is being performed on site the superintendent must be present, without exception.**
- B. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or the Construction Coordinator in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- C. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and the Construction Coordinator except under extraordinary circumstances. The superintendent will

be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

6.02 Labor; Working Hours

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed on business days during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to the Construction Coordinator.

6.03 Services, Materials, and Equipment

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, startup, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by the Construction Coordinator, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 Progress Schedule

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to the Construction Coordinator for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Part 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 Substitutes and "Or-Equals"

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or

equipment or material or equipment of other Suppliers may be submitted to the Construction Coordinator for review under the circumstances described below.

1. "Or-Equal" Items: If in the Construction Coordinators sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

- 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
- 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole,
- 3) it has a proven record of performance and availability of responsive service; and

b. Contractor certifies that, if approved and incorporated into the Work:

- 1) there will be no increase in cost to the Owner or increase in Contract Times, and
- 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. Substitute Items

a. If in the Construction Coordinators sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow the Construction Coordinator to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by the Construction Coordinator from anyone other than Contractor.

c. The requirements for review by the Construction Coordinator will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as the Construction Coordinator may decide is appropriate under the circumstances.

d. Contractor shall make written application to the Construction Coordinator for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

- a) perform adequately the functions and achieve the results called for by the general design,
- b) be similar in substance to that specified, and

- c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;
 - b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
 - c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services;
 - 4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,
- B. Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by the Construction Coordinator. Contractor shall submit sufficient information to allow the Construction Coordinator, in the Construction Coordinator's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by the Construction Coordinator will be similar to those provided in Paragraph 6.05.A.2.
- C. Construction Coordinator Evaluation: The Construction Coordinator will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. The Construction Coordinator may require Contractor to furnish additional data about the proposed substitute item. The Construction Coordinator will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until the Construction Coordinator's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or-equal." The Construction Coordinator will advise Contractor in writing of any negative determination.
- D. Special Guarantee: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. Cost Reimbursement: The Construction Coordinator will record the Architect or Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not the Construction Coordinator approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of the Architect or Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of the Architect or Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. Contractor's Expense: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 Concerning Subcontractors, Suppliers, and Others

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. The identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or the Construction Coordinator to reject defective Work.
- C. Contractor shall be fully responsible to Owner and the Construction Coordinator for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
 - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or the Construction Coordinator and any such Subcontractor, Supplier or other individual or entity, nor
 - 2. shall anything in the Contract Documents create any obligation on the part of Owner or the Construction Coordinator to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with the Construction Coordinator through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Construction Coordinator. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Construction Coordinator,, and all other individuals or entities to be listed as insureds or additional insureds (and the officers,

directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

- H. Owner or Construction Coordinator may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by a particular Subcontractor or Supplier.

6.07 Patent Fees and Royalties

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Construction Coordinator its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Construction Coordinator, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 Permits

- A. Contractor shall obtain and pay for all construction permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement.

6.09 Laws and Regulations

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Construction Coordinator shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or

extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 Taxes

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 Use of Site and Other Areas

- A. Limitation on Use of Site and Other Areas
 - 1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
 - 2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
 - 3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Construction Coordinator, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by party against Owner, Construction Coordinator, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work, Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work, Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 Record Documents

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Construction Coordinator for reference.

Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Construction Coordinator for Owner in digital format as an as-built file.

6.13 Safety and Protection

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Construction Coordinator or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Construction Coordinator has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 Safety Representative

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 Hazard Communication Programs

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations. All MSDS Sheets shall be kept on site in good order as outlined in OSHA, laws, rules and regulations.

6.16 Emergencies

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Construction Coordinator prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 Shop Drawings and Samples

- A. Contractor shall submit Shop Drawings and Samples to Construction Coordinator for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Construction Coordinator may require.
 - 1. Shop Drawings
 - a. Submit number of copies specified in the General Requirements.
 - b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Construction Coordinator the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.
 - 2. Samples: Contractor shall also submit Samples to Construction Coordinator for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.
 - a. Submit number of Samples specified in the Specifications.
 - b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Construction Coordinator may require to enable Construction Coordinator to review the submittal for the limited purposes required by Paragraph 6.17.D.
- B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Construction Coordinator's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. Submittal Procedures
 - 1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:
 - a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

- c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and
 - d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.
2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
 3. With each submittal, Contractor shall give Construction Coordinator specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separated from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Construction Coordinator for review and approval of each such variation.

D. Construction Coordinator's Review

1. Construction Coordinator will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Construction Coordinator. Construction Coordinator's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Construction Coordinator's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Construction Coordinator's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Construction Coordinator has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Construction Coordinator's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. Resubmittal Procedures

1. Contractor shall make corrections required by Construction Coordinator and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by the Construction Coordinator on previous submittals.
- F. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than three (3) submittals. Construction Coordinator will record the Architect or Engineer's time for reviewing subsequent submittals of Shop Drawings, samples or other items requiring approval and Contractor shall reimburse Owner for the Architect or Engineer's charges for such time.

- G. In the event that Contractor requests a substitution for a previously approved item, Contractor shall reimburse Owner for the Architect or Engineer's charges for such time unless the need for such substitution is beyond the control of Contractor.

6.18 Continuing the Work

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 Contractor's General Warranty and Guarantee

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Construction Coordinator and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
 - 1. observations by Construction Coordinator;
 - 2. recommendation by Construction Coordinator or payment by Owner of any progress or final payment;
 - 3. the issuance of a certificate of Substantial Completion by Construction Coordinator or any payment related thereto by Owner;
 - 4. use or occupancy of the Work or any part thereof by Owner;
 - 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Construction Coordinator;
 - 6. any inspection, test, or approval by others; or
 - 7. any correction of defective Work by Owner.
- D. The Contractor's General Warranty and Guarantee shall be for a period of one (1) year after work has been accepted and final payment made to the Contractor. In the case of Water and Wastewater lines, the warranty period will start after acceptance of these lines into the utility provider's system for ownership, operation, and maintenance. The Contractor accepts the transference of all warranties and guarantees to the utility provider owning and operating the new lines.

6.20 Indemnification

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Construction Coordinator, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .
- B. In any and all claims against Owner or Construction Coordinator or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Construction Coordinator and Construction Coordinator's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 Delegation of Professional Design Services

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Construction Coordinator will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Construction Coordinator.
- C. Owner and Construction Coordinator shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design

professionals, provided Owner and Construction Coordinator have specified to Contractor all performance and design criteria that such services must satisfy.

- D. Pursuant to this Paragraph 6.21, Construction Coordinator's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Construction Coordinator's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

PART 7 - OTHER WORK AT THE SITE

7.01 Related Work at Site

- A. Owner may perform other work related to the Project at the Site with Owner's employees or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Construction Coordinator and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Part 7, Contractor shall inspect such other work and promptly report to Construction Coordinator in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 Coordination

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth:
 - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 - 3. the extent of such authority and responsibilities will be provided.

- B. Owner shall have sole authority and responsibility for such coordination.

7.03 Legal Relationships

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

7.04 Claims Between Contractors

- A. Should Contractor cause damage to the work or property of any other contractor at the Site, or should any claim arising out of Contractor's performance of the Work at the Site be made by any other contractor against Contractor, Owner, Construction Coordinator, or Contractor shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law.
- B. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner, the Construction Coordinator and the officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages (including, but not limited to, fees and charges of engineers, architects, attorneys, and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any other contractor against Owner, Construction Coordinator, Construction Coordinator's Consultants to the extent said claim is based on or arises out of Contractor's performance of the Work. Should another contractor cause damage to the Work or property of Contractor or should the performance of work by any other contractor at the Site give rise to any other Claim, Contractor shall not institute any action, legal or equitable, against Owner, or the Construction Coordinator or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from Owner, or the Construction Coordinator on account of any such damage or Claim.
- C. If Contractor is delayed at any time in performing or furnishing Work by any act or neglect of another contractor, and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a Claim for an extension of times in accordance with Part 12. An extension of the Contract Times shall be Contractor's exclusive remedy with respect to Owner, and construction coordinator for any delay, disruption, interference, or hindrance caused by any other contractor. This paragraph does not prevent recovery from Owner, or construction coordinator for activities that are their respective responsibilities.

PART 8 - OWNER'S RESPONSIBILITIES

8.01 Communications to Contractor

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through the Construction Coordinator.

8.02 Replacement of Construction Coordinator

- A. In case of termination of the employment of the Construction Coordinator, Owner shall appoint a Construction Coordinator to whose status under the Contract Documents shall be that of the former Construction Coordinator.

8.03 Furnish Data

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 Pay When Due

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 Lands and Easements; Reports and Tests

- A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by the Architect or Engineer in preparing the Contract Documents.

8.06 Insurance

- A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Part 5.

8.07 Change Orders

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 Inspections, Tests, and Approvals

- A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 Limitations on Owner's Responsibilities

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 Undisclosed Hazardous Environmental Condition

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 Evidence of Financial Arrangements

- A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth.

PART 9 - Construction Coordinator's STATUS DURING CONSTRUCTION

9.01 Owner's Representative

- A. Construction Coordinator will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Construction Coordinator as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Construction Coordinator.

9.02 Visits to Site

- A. Construction Coordinator will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Construction Coordinator, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Construction Coordinator will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Construction Coordinator's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Construction Coordinator will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Construction Coordinator's visits and observations are subject to all the limitations on Construction Coordinator's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Construction Coordinator's visits or observations of Contractor's Work Construction Coordinator will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 Project Representative

- A. If Owner and Construction Coordinator agree; Construction Coordinator will furnish a Resident Project Representative to assist Construction Coordinator in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Construction Coordinator's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in Paragraph 9.09.

9.04 Authorized Variations in Work

- A. Construction Coordinator may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 Rejecting Defective Work

- A. Construction Coordinator will have authority to reject Work which Construction Coordinator believes to be defective, or that Construction Coordinator believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Construction Coordinator will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 Shop Drawings, Change Orders and Payments

- A. In connection with Construction Coordinator's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Construction Coordinator's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Construction Coordinator's authority as to Change Orders, see Parts 10, 11, and 12.
- D. In connection with Construction Coordinator's authority as to Applications for Payment, see Part 14.

9.07 Determinations for Unit Price Work

- A. Construction Coordinator will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Construction Coordinator will review with Contractor the Construction Coordinator's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Construction Coordinator's written decision thereon will be final and binding (except as modified by Construction Coordinator to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 Decisions on Requirements of Contract Documents and Acceptability of Work

- A. Construction Coordinator will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to the Construction Coordinator in writing within 30 days of the event giving rise to the question
- B. Construction Coordinator will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Construction Coordinator's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Construction Coordinator's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Construction Coordinator will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 Limitations on Construction Coordinator's Authority and Responsibilities

- A. Neither Construction Coordinator's authority or responsibility under this Part 9 or under any other provision of the Contract Documents nor any decision made by Construction Coordinator in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Construction Coordinator shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Construction Coordinator to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Construction Coordinator will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Construction Coordinator will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Construction Coordinator will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Construction Coordinator's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to, the Resident Project Representative, if any, and assistants, if any.

PART 10 - CHANGES IN THE WORK; CLAIMS

10.01 Authorized Changes in the Work

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 Unauthorized Changes in the Work

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 Execution of Change Orders

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Construction Coordinator covering:
 - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 - 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Construction Coordinator pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 Notification to Surety

- A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 Claims

- A. Construction Coordinator's Decision Required: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Construction Coordinator for decision. A decision by Construction Coordinator shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. Notice: Written notice stating the general nature of each Claim shall be delivered by the claimant to Construction Coordinator and the other party to the Contract promptly (but in no event, later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Construction Coordinator and the other party to the Contract within 60 days after the start of such event (unless Construction Coordinator allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Construction Coordinator and the claimant within 30 days after receipt of the claimant's last submittal (unless Construction Coordinator allows additional time).
- C. Construction Coordinator's Action: Construction Coordinator will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,
 2. approve the Claim, or
 3. notify the parties that the Construction Coordinator is unable to resolve the Claim if, in the Construction Coordinator's sole discretion, it would be inappropriate for the Construction Coordinator to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Construction Coordinator does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Non-withstanding anything herein final approval rests with the Owner.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

PART 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 Cost of the Work

- A. Costs Included: The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
 3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Construction Coordinator, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis

of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to Engineers, Architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
 5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Construction Coordinator, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
 - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
 - g. The cost of utilities, fuel, and sanitary facilities at the Site.
 - h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expresses, and similar petty cash items in connection with the Work.
 - i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.
- B. Costs Excluded: The term Cost of the Work shall not include any of the following items:
1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers,

architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.
- C. Contractor's Fee: When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.
- D. Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Construction Coordinator.
- B. Cash Allowances
1. Contractor agrees that:
 - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. Contingency Allowance

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Construction Coordinator to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

- A. Initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by the Owner subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 2. there is no corresponding adjustment with respect any other item of Work; and
 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

PART 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 Change of Contract Price

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Construction Coordinator and the other party to the Contract in accordance with the provisions of Paragraph 10.05. Final approval of all change orders rests with the owner.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
 1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on

the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

- C. Contractor's Fee: The Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 Change of Contract Times

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Construction Coordinator and the other party to the Contract in accordance with the provisions of Paragraph 10.05. Final approval of all change orders rests with the owner.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Part 12.

12.03 Delays

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Part 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Construction Coordinator, or other contractors or utility owners performing other work for Owner as contemplated by Part 7, or anyone for whom Owner is responsible,

delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.
- D. Owner, Construction Coordinator and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, Architects, Attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.
- F. All claims for delays shall be submitted at the submission of any application for payment or within fifteen (15) days of the event causing the delay. Any claims made after the allowable time shall be denied.

PART 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 Notice of Defects

- A. Prompt notice of all defective Work of which Owner or Construction Coordinator has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Part 13.

13.02 Access to Work

- A. Owner, Construction Coordinator, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 Tests and Inspections

- A. Contractor shall give Construction Coordinator timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Contractor shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents.

- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Construction Coordinator the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Construction Coordinator's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by third party organizations acceptable to Owner and Construction Coordinator.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Construction Coordinator, it must, if requested by Construction Coordinator, be uncovered for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Construction Coordinator timely notice of Contractor's intention to cover the same and Construction Coordinator has not acted with reasonable promptness in response to such notice.

13.04 Uncovering Work

- A. If any Work is covered contrary to the written request of Construction Coordinator, it must, if requested by Construction Coordinator, be uncovered for Construction Coordinator's observation and replaced at Contractor's expense.
- B. If Construction Coordinator considers it necessary or advisable that covered Work be observed by Construction Coordinator or inspected or tested by others, Contractor, at Construction Coordinator's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Construction Coordinator may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of Construction Coordinator, Engineers, Architects, Attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 Owner May Stop the Work

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of

Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 Correction or Removal of Defective Work

- A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Construction Coordinator, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of construction coordinator, engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 Correction Period

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. repair such defective land or areas; or
 - 2. correct such defective Work; or
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of construction coordinator, engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 Acceptance of Defective Work

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Construction Coordinator's recommendation of final payment, Construction Coordinator) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of construction coordinator, engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Construction Coordinator as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Construction Coordinator's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 Owner May Correct Defective Work

- A. If Contractor fails within a reasonable time after written notice from Construction Coordinator to correct defective Work or to remove and replace rejected Work as required by Construction Coordinator in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven (7) days written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Construction Coordinator and Construction Coordinator's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of construction coordinator, engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

PART 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 Schedule of Values

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the Construction Coordinator. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 Progress Payments

A. Applications for Payments

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to the Construction Coordinator for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. The date of the pay application must be the last day of the month. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. Review of Applications

1. Construction Coordinator will, within fifteen (15) days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Construction Coordinator's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Construction Coordinator's recommendation of any payment requested in an Application for Payment will constitute a representation by Construction Coordinator to Owner, based on Construction Coordinator's observations on the Site of the executed Work as an experienced and qualified design professional and on Construction Coordinator's review of the Application for Payment and the accompanying data and schedules, that to the best of Construction Coordinator's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;

- b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Construction Coordinator's responsibility to observe the Work.
- 3. By recommending any such payment Construction Coordinator will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Construction Coordinator in the Contract Documents; or
 - b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
- 4. Neither Construction Coordinator's review of Contractor's Work for the purposes of recommending payments nor Construction Coordinator's recommendation of any payment, including final payment, will impose responsibility on Construction Coordinator:
 - a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
- 5. Construction Coordinator may refuse to recommend the whole or any part of any payment if, in Construction Coordinator's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Construction Coordinator may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Construction Coordinator's opinion to protect Owner from loss because:
 - a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

- d. Construction Coordinator has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due

1. Fifteen (15) days after presentation of the Application for Payment to Owner with Construction Coordinator's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment

1. Owner may refuse to make payment of the full amount recommended by Construction Coordinator because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items entitling Owner to a set-off against the amount recommended;
or
 - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Construction Coordinator, Owner will give Contractor immediate written notice (with a copy to Construction Coordinator) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.
3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 Contractor's Warranty of Title

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 Substantial Completion

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Construction Coordinator in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Construction Coordinator issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Construction Coordinator shall make an inspection of the Work to determine the status of completion. If Construction Coordinator does not consider the Work substantially complete, Construction Coordinator will notify Contractor in writing giving the reasons therefor.

- C. If Construction Coordinator considers the Work substantially complete, the Construction Coordinator will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven (7) days after receipt of the tentative certificate during which to make written objection to Construction Coordinator as to any provisions of the certificate or attached list. If, after considering such objections, Construction Coordinator concludes that the Work is not substantially complete, Construction Coordinator will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, the Construction Coordinator considers the Work substantially complete, the Construction Coordinator will within be said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Construction Coordinator believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Construction Coordinator will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so informs the Construction Coordinator in writing prior to Construction Coordinator's issuing the definitive certificate of Substantial Completion, Construction Coordinator's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 Partial Utilization

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Construction Coordinator, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.
 - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work Which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Construction Coordinator that such part of the Work is substantially complete and request Construction Coordinator to issue a certificate of Substantial Completion for that part of the Work.
 - 2. Contractor at any time may notify Owner and Construction Coordinator in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Construction Coordinator to issue a certificate of Substantial Completion for that part of the Work. Said work should have, at a minimum, a temporary Certificate of Occupancy from the authority having jurisdiction.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Construction Coordinator shall make an inspection of that part of the Work to determine its status of completion. If Construction Coordinator does not consider that part of the Work to be substantially complete, Construction Coordinator will notify Owner and Contractor in writing giving the reasons therefor. If Construction Coordinator considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with

respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 Final Inspection

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Construction Coordinator will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 Final Payment

A. Application for Payment

1. After Contractor has, in the opinion of Construction Coordinator, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance, training and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents to include digital as-buils of the project (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. Construction Coordinator's Review of Application and Acceptance

1. If, on the basis of Construction Coordinator's observation of the Work during construction and final inspection, and Construction Coordinator's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Construction Coordinator is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Construction Coordinator will, within ten (10) days after receipt of the final Application for Payment,

indicate in writing Construction Coordinator's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Construction Coordinator will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Construction Coordinator will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty (30) days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Construction Coordinator, less any sum Owner is entitled to set off against Construction Coordinator's recommendation, including but not limited to liquidated damages, will become due and, will be paid by Owner to Contractor.

14.08 Final Completion Delayed

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Construction Coordinator so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Construction Coordinator, 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 to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to the Construction Coordinator with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 Waiver of Claims

- A. The making and acceptance of final payment will constitute:
 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

PART 15 - SUSPENSION OF WORK AND TERMINATION

15.01 Owner May Suspend Work

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Construction Coordinator which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 Owner May Terminate for Cause

- A. The occurrence of any one or more of the following events will justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's disregard of the authority of the Construction Coordinator; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven (7) days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),
 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of construction coordinator, engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by the Construction Coordinator as to their reasonableness and, when so approved by the Construction Coordinator, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven (7) days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 Owner May Terminate for Convenience

- A. Upon fifteen (15) days written notice to Contractor and Construction Coordinator, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 - 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 - 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 Contractor May Stop Work or Terminate

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Construction Coordinator fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven (7) days written notice to Owner and Construction Coordinator, and provided Owner or Construction Coordinator do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Construction Coordinator has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven (7) days after written notice to Owner and Construction Coordinator, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

PART 16 - DISPUTE RESOLUTION

16.01 Methods and Procedures

- A. Either Owner or Contractor may request mediation of any Claim submitted to Construction Coordinator for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Mediation Rules of the South Carolina Supreme Court in effect as of the Effective Date of the Agreement. The request for mediation shall stay the effect of paragraph 10.05.E.

- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of the request.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
 - 1. agrees with the other party to submit the Claim to another dispute resolution process, or
 - 2. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

PART 17 - MISCELLANEOUS

17.01 Giving Notice

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 - 1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or
 - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 Computation of Times

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 Cumulative Remedies

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 Survival of Obligations

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 Controlling Law

- A. This Contract is to be governed by the law of the State of South Carolina.

17.06 Headings

- A. Part and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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Shepard & Associates

Waterproofing and Building Solutions

Limited Asbestos Survey


September 22, 2015

Site Location: The Colleton Center Auditorium
494 Hampton St. Walterboro, SC 29488

Prepared for: Tych & Walker Architects, LLP Phone: (843) 651-7151
PO Box 1507 Fax: (843) 651-7176
Murrells Inlet, SC 29576

Prepared by: Shepard & Associates, LLC Phone: (803)407-8284
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PF #: 2004.013.004

Inspection Performed by: 
Richard C. Parrish SCDHEC # Lic. Exp Date
BI - 01213 10/21/15

Report Prepared by: 
Richard C. Parrish SCDHEC # Lic. Exp Date
BI - 01213 10/21/15

Report Reviewed by: 
Tom Blount Shepard SCDHEC # Lic. Exp Date
BI - 00847 07/20/16

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Summary of Work

Shepard & Associates, LLC has been retained by Tych & Walker Architects, LLP to perform a limited asbestos survey at the Colleton Center Auditorium. The objective of this survey is to identify, sample and physically assess materials on the building interior for the presence or absence of asbestos containing materials.

The Auditorium interior spaces were broken down into Homogeneous Areas (HA) by functional use and a physical and visual assessment of the materials in each space. The Auditorium was considered HA #1 with the backstage area being assigned HA #2. The Women's Restroom was assigned HA #3 and the Men's Restroom was considered HA #4. The lobby area was determined to be HA #5 and the basement classrooms were given the designation of HA #6.

Random sampling was conducted at each HA and 3 samples of each suspect material were taken and analyzed for the presence of asbestos. Samples were delivered by 2-Day US Mail courier service to EMSL Analytical, Inc. for analysis using Polarized Light Microscopy (PLM) and Transmission Electron Microscopy (TEM). The materials found to be asbestos containing materials (ACM) within the subject area included approximately 50 Sq. Ft. of vinyl flooring and 144 Sq. Ft. of rubber stair tread.

Limitations

Isolated locations were inaccessible during this inspection due to the doors leading to these areas being locked. In the lobby there were two closet areas where the Owner's representative did not have keys to open doors. The gallery was locked after the Design Teams meeting before lunch and there was nobody onsite after lunch to open the gallery. Therefore materials in these locations were not tested.

The stage light wiring, glue in ceiling tiles over the stage and sheetrock, tape and joint compound on the ceiling backstage were not able to be reached during this inspection. Therefore materials in these locations were not tested.

In the event the Design Team or Contractor finds materials suspected to be asbestos containing materials not covered in this report, then the Design Team or Contractor shall stop all work in the affected area and notify the Owner and Architect to have materials tested for the presence or absence of asbestos.

This survey and report have been executed at the request of Mr. Michael Walker and the Colleton Center and are intended solely for their use. All work related to this project has been conducted in keeping with accepted standards of environmental consulting as practiced in the state of South Carolina. No unnecessary destructive measures were undertaken during this survey. Shepard & Associates, LLC has relied, in part, on information derived from secondary sources, and, except as set forth herein, Shepard & Associates, LLC has made no independent investigation as to the accuracy or completeness of the information derived from such secondary sources. No warranty is expressed or implied.

A breakdown of the suspect materials, the associated bulk samples and the laboratory results can be found in the report that follows.

ASBESTOS – SUSPECT MATERIAL DATA SHEET

Project Name: The Colleton Center Auditorium
Facility: The Colleton Center Auditorium
Address: 494 Hampton St. Walterboro, SC 29488

Date: September 22, 2015

Suspect Mat. No.	Material Description	Cat. (S,T,M)	# Samples	Approx. Quantity	Present Cond.	Potential Distrib.	Asbestos Finding (P or N)	Hazard Ranking
HM - 01	Brown Carpet Padding & Mastic	M	3	15 SF	G	PSD	N	N/A
HM - 02	Green Carpet & Mastic	M	3	1,530 SF	G	PSD	N	N/A
HM - 03	12x12 Ceiling Tile	M	3	600 SF	G	PSD	N	N/A
HM - 04	12x12 Blue Tile	M	3	50 SF	G	PSD	N	N/A
HM - 05	Vinyl Flooring	M	3	50 SF	G	PSD	P	3
HM - 06	12x12 Royal Blue Tile	M	3	112 SF	G	PSD	N	N/A
HM - 07	Drop In Ceiling Tile	M	3	112 SF	G	PSD	N	N/A
HM - 08	Brown Floor Tile	M	3	42 SF	G	PSD	N	N/A
HM - 09	White Floor Tile	M	3	20 SF	G	PSD	N	N/A
HM - 10	12x12 Blue Tile	M	3	40 SF	G	PSD	N	N/A
HM - 11	Drop In Ceiling Tile	M	3	65 SF	G	PSD	N	N/A
HM - 12	Rubber Stair Tread	M	3	144 SF	G	PSD	P	3
HM - 13	Stair Landing material	M	3	32 SF	SD	PSD	N	N/A
HM - 14	Rubber Molding	M	3	120 LF	G	PSD	N	N/A

Present Condition

F = Friable G = Good (Very localized limited damage)
 NF = Non-Friable D = Damaged (Damage of less Than 10% distributed and less that 25% localized)
 SD = Significantly Damaged (Damage equal to or greater than 10% distributed / 25% localized)

Potential for Future Disturbance

LPD = Low Potential for Disturbance (Contact, Vibrations, and Air Erosion all of Low Concern)
 PD = Potential for Damage (Contact, Vibration, or Air Erosion of Moderate Concern)
 PSD = Potential for Significant Damage (Contact, Vibration, and Air Erosion of High Concern)

Category

S = Surfacing Material (Spray- applied or trowel applied)
 T = Thermal System Insulation (Inhibits heat transfer or prohibits condensation)
 M = Miscellaneous Materials (Refer to as "Other" materials by OSHA)

Asbestos Finding

P = Positive; meets definition of Asbestos-containing Material (ACM) i.e.>1% asbestos)
 N = Negative; does not meet definition of ACM
 A = Assumed to be ACM; no samples collected

Hazard Ranking = 7 thru 1; (7 being the worst i.e. significantly damaged material)

ASBESTOS - BULK SAMPLE DATA SHEET

Project Name: The Colleton Center Auditorium
Facility: The Colleton Center Auditorium
Address: 494 Hampton St. Walterboro, SC 29488

Date: September 22, 2015

Laboratory Sample #	S&A Sample #	Suspect Material #	Material Description	HA #	Type * Asbestos	Percent Asbestos
411506099-0001	0001	HM - 01	Brown Carpet Padding & Mastic	HA 1	NAD	
411506099-0001A					NAD	
411506099-0001B					NAD	
411506099-0002	0002	HM - 01	Brown Carpet Padding & Mastic	HA 1	NAD	
411506099-0002A					NAD	
411506099-0003	0003	HM - 01	Brown Carpet Padding & Mastic	HA 1	NAD	
411506099-0004	0004	HM - 02	Green Carpet & Mastic	HA 1	NAD	
411506099-0004A					NAD	
411506099-0005	0005	HM - 02	Green Carpet & Mastic	HA 1	NAD	
411506099-0005A					NAD	
411506099-0006	0006	HM - 02	Green Carpet & Mastic	HA 1	NAD	
411506099-0007	0007	HM - 03	12x12 Ceiling Tile	HA 1	NAD	
411506099-0008	0008	HM - 03	12x12 Ceiling Tile	HA 1	NAD	
411506099-0009	0009	HM - 03	12x12 Ceiling Tile	HA 1	NAD	
411506099-0010	0010	HM - 04	12x12 Blue Tile	HA 2	NAD	
411506099-0010A					NAD	
411506099-0011	0011	HM - 04	12x12 Blue Tile	HA 2	NAD	
411506099-0011A					NAD	
411506099-0012	0013	HM - 05	Vinyl Flooring	HA 2	Chry.	10%
411506099-0012A					NAD	
411506099-0013	0014	HM - 05	Vinyl Flooring	HA 2	DNA	
411506099-0013A					NAD	
411506099-0014	0016	HM - 06	12x12 Royal Blue Tile	HA3	NAD	
411506099-0014A					NAD	

Chry = Chrysotile **Amos** = Amosite **Croc** = Crocidolite **NAD** = No Asbestos Detected **DNA** = Did Not Analyze

✓ Positive; meets definition of Asbestos-containing Material (ACM) (i.e. >1% asbestos)

ASBESTOS - BULK SAMPLE DATA SHEET – CONT'D

Project Name: The Colleton Center Auditorium
Facility: The Colleton Center Auditorium
Address: 494 Hampton St. Walterboro, SC 29488

Date: September 22, 2015

Laboratory Sample #	S&A Sample #	Suspect Material #	Material Description	HA #	Type * Asbestos	Percent Asbestos
411506099-0015	0017	HM - 06	12x12 Royal Blue Tile	HA 3	NAD	
411506099-0015A					NAD	
411506099-0016	0019	HM - 07	Drop In Ceiling Tile	HA 3	NAD	
411506099-0017	0020	HM - 07	Drop In Ceiling Tile	HA 3	NAD	
411506099-0018	0021	HM - 07	Drop In Ceiling Tile	HA 3	NAD	
411506099-0019	0022	HM - 08	Brown Floor Tile	HA 4	NAD	
411506099-0019A					NAD	
411506099-0020	0023	HM - 08	Brown Floor Tile	HA 4	NAD	
411506099-0020A					NAD	
411506099-0021	0025	HM - 09	White Floor Tile	HA 4	NAD	
411506099-0021A					NAD	
411506099-0021B					NAD	
411506099-0022	0026	HM - 09	White Floor Tile	HA 4	NAD	
411506099-0022A					NAD	
411506099-0023	0028	HM - 10	12x12 Blue Tile	HA 5	NAD	
411506099-0024	0029	HM - 10	12x12 Blue Tile	HA 5	NAD	
411506099-0025	0031	HM - 11	Drop In Ceiling Tile	HA 4	NAD	
411506099-0026	0032	HM - 11	Drop In Ceiling Tile	HA 4	NAD	
411506099-0027	0033	HM - 11	Drop In Ceiling Tile	HA 4	NAD	
411506099-0028	0034	HM - 12	Rubber Stair Tread	HA 5	Chry.	3%
411506099-0028A					NAD	
411506099-0028B					NAD	
411506099-0029	0035	HM - 12	Rubber Stair Tread	HA 5	DNA	

Chry = Chrysotile **Amos** = Amosite **Croc** = Crocidolite **NAD** = No Asbestos Detected **DNA** = Did Not Analyze

Positive; meets definition of Asbestos-containing Material (ACM) (i.e. >1% asbestos)

ASBESTOS - BULK SAMPLE DATA SHEET – CONT'D

Project Name: The Colleton Center Auditorium
Facility: The Colleton Center Auditorium
Address: 494 Hampton St. Walterboro, SC 29488

Date: September 22, 2015

Laboratory Sample #	S&A Sample #	Suspect Material #	Material Description	HA #	Type * Asbestos	Percent Asbestos
411506099-0029A	0035	HM - 12	Rubber Stair Tread	HA 5	NAD	
411506099-0030	0037	HM - 13	Stair Landing Material	HA 5	NAD	
411506099-0031	0038	HM - 13	Stair Landing Material	HA 5	NAD	
411506099-0032	0039	HM - 13	Stair Landing Material	HA 5	NAD	
411506099-0033	0040	HM - 14	Rubber Molding	HA 6	NAD	
411506099-0033A					NAD	
411506099-0034	0041	HM - 14	Rubber Molding	HA 6	NAD	
411506099-0034A					NAD	
411506099-0035	0003	HM - 01	Brown Carpet & Padding	HA 1	NAD	
411506099-0036	0006	HM - 02	Green Carpet & Mastic	HA 1	NAD	
411506099-0037	0012	HM - 04	12x12 Blue Tile	HA 2	NAD	
411506099-0038					NAD	
411506099-0039	0015	HM - 05	Vinyl Flooring	HA 2	NAD	
411506099-0040	0018	HM - 06	12x12 Royal Blue Tile	HA 3	NAD	
411506099-0041					NAD	
411506099-0042	0024	HM - 08	Brown Floor Tile	HA 4	NAD	
411506099-0043					NAD	
411506099-0044	0027	HM - 09	White Floor Tile	HA 4	NAD	
411506099-0045					NAD	
411506099-0046	0030	HM - 10	12x12 Blue Tile	HA 5	NAD	
411506099-0047	0036	HM - 12	Rubber Stair Tread	HA 5	NAD	
411506099-0048	0042	HM - 14	Rubber Molding	HA 6	NAD	
411506099-0049					NAD	

Chry = Chrysotile **Amos** = Amosite **Croc** = Crocidolite **NAD** = No Asbestos Detected **DNA** = Did Not Analyze

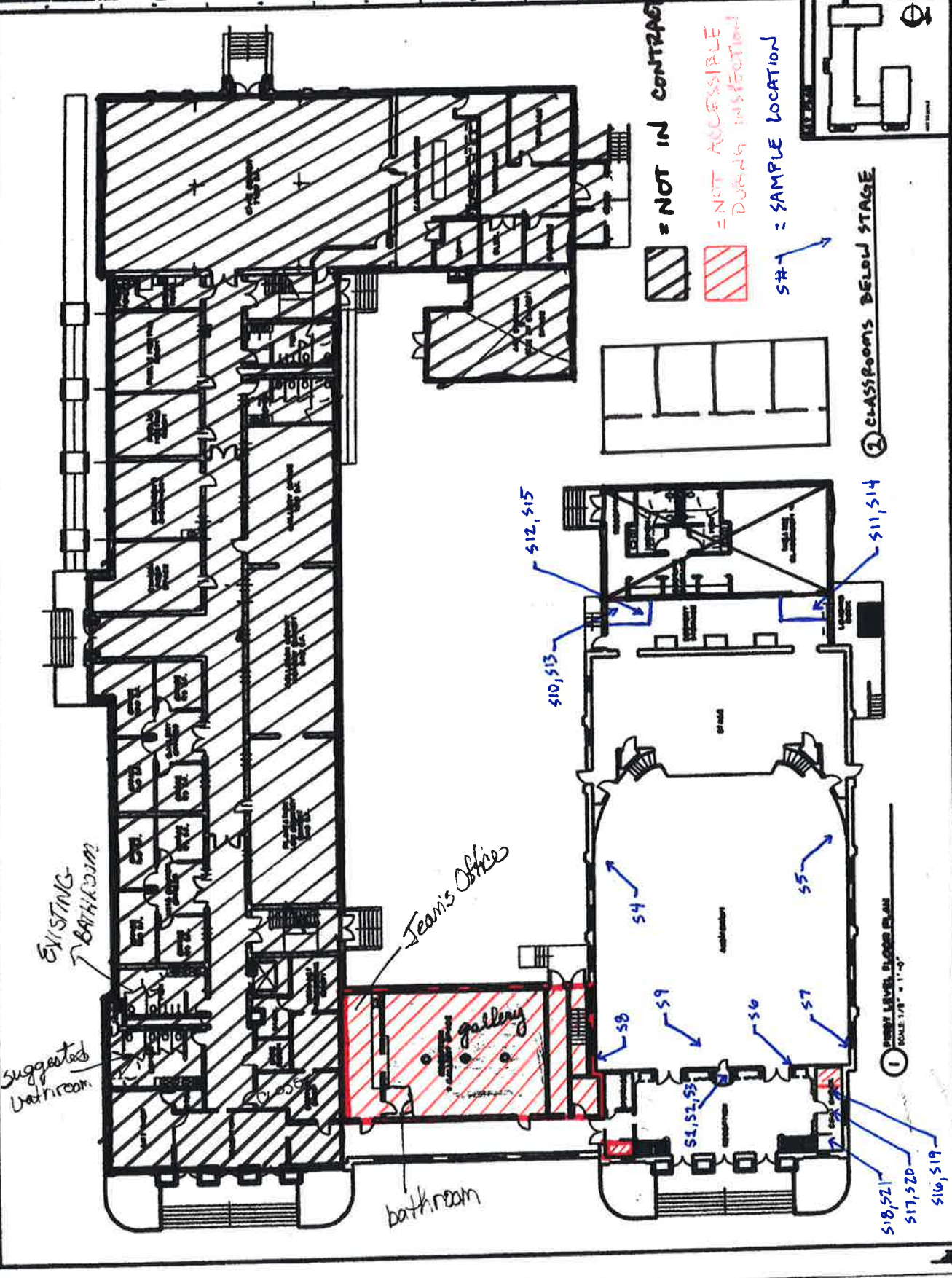
Positive; meets definition of Asbestos-containing Material (ACM) (i.e. >1% asbestos)

1185

STANDARD SPECIFICATIONS
FOR CONSTRUCTION
OF BUILDINGS
SECTION 05 00 00
PAINTS AND COATINGS

CONTRACT NO. 111-11-11-11
PROJECT NO. 111-11-11-11
DATE: 11/11/11

CONTRACT NO. 111-11-11-11
PROJECT NO. 111-11-11-11
DATE: 11/11/11



NOT IN CONTRACT

NOT ACCESSIBLE DURING INSPECTION

SAMPLE LOCATION

CLASSROOMS BELOW STAGE

FIRST LEVEL, EXISTING PLAN
SCALE: 1/8" = 1'-0"

EXISTING BATHROOM

Suggested Bathroom

Team's Office

Gallery

bathroom

\$12, \$15

\$10, \$15

\$11, \$14

\$18, \$21

\$17, \$20

\$16, \$19

54

55

58

59

56

57

51, 52, 53

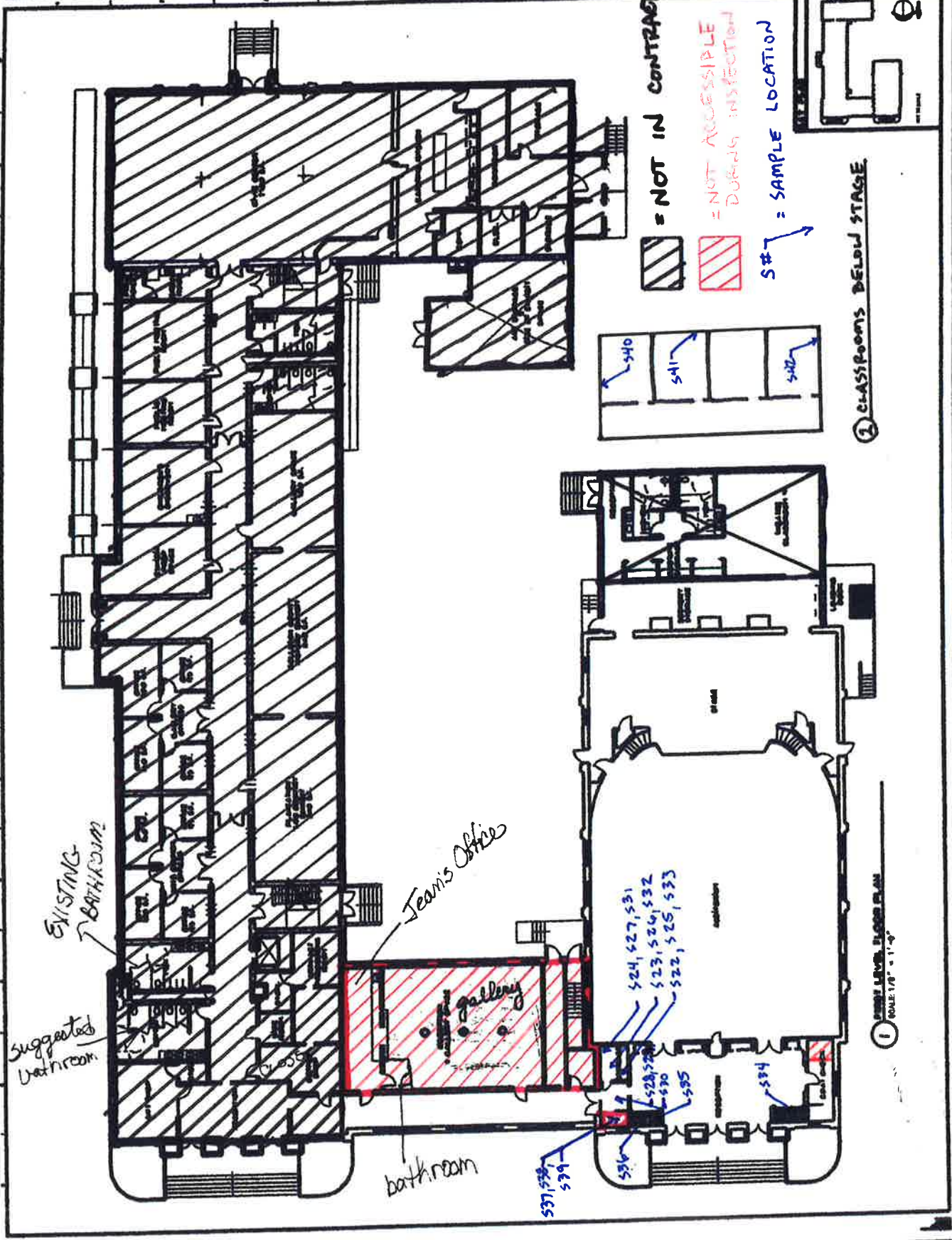


1185

1185
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1185
1185



EXISTING BATHROOM

SUGGESTED
BATHROOM

Teams Office

Gallery

bathroom

= NOT IN CONTRACT

= NOT ACCESSIBLE
DURING INSPECTION

S# = SAMPLE LOCATION

CLASSROOMS BELOW STAGE

FIRST LEVEL, SECOND PLAN
SCALE: 1/8" = 1'-0"

536
537, 538
539
540
541
542
524, 527, 531
523, 524, 532
522, 525, 533
528, 529
530
535
534

Laboratory Results

**EMSL Analytical, Inc.**

376 Crompton Street, Charlotte, NC 28273
 Phone/Fax: (704) 525-2205 / (704) 525-2382
<http://www.EMSL.com> charlottelab@emsl.com

EMSL Order: 411506099
 CustomerID: SHEP78
 CustomerPO:
 ProjectID:

Attn: **Richard Parish**
Shepard & Associates, LLC
3547 Dreher Shoals Road
Suite 6
Irmo, SC 29063

Phone: (803) 407-8284
 Fax: (803) 407-8206
 Received: 08/28/15 3:00 PM
 Analysis Date: 9/2/2015
 Collected:

Project: **PF 2004.013.007/ Tych & Walker Arch./ Hampton Auditorium/ 494 Hampton Street, Walterboro, SC**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
0001-Carpet 411506099-0001	- Brown Carpet Padding & Mastic	Tan Fibrous Homogeneous	98% Synthetic	2% Non-fibrous (other)	None Detected
0001-Padding 411506099-0001A	- Brown Carpet Padding & Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
0001-Mastic 411506099-0001B	- Brown Carpet Padding & Mastic	Tan Non-Fibrous Homogeneous		5% Ca Carbonate 95% Non-fibrous (other)	None Detected
0002-Padding 411506099-0002	- Brown Carpet Padding & Mastic	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
0002-Mastic 411506099-0002A	- Brown Carpet Padding & Mastic	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
0003-Padding 411506099-0003	- Brown Carpet Padding & Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
0004-Carpet 411506099-0004	- Green Carpet & Mastic	Gray/Green Fibrous Homogeneous	98% Synthetic	2% Non-fibrous (other)	None Detected
0004-Mastic 411506099-0004A	- Green Carpet & Mastic	Tan Non-Fibrous Homogeneous	<1% Synthetic	10% Ca Carbonate 90% Non-fibrous (other)	None Detected

Analyst(s)

Eric Loomis (21)
 Maria Cao (32)

Lee Plumley, Laboratory Manager
 or other approved signatory

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 Samples analyzed by EMSL Analytical, Inc. Charlotte, NC NVLAP Lab Code 200841-0, VA 3333 00312

Initial report from 09/02/2015 11:18:37

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Project: **PF 2004.013.007/ Tych & Walker Arch./ Hampton Auditorium/ 494 Hampton Street, Walterboro, SC**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
0005-Carpet 411506099-0005	- Green Carpet & Mastic	Gray/Blue/Green Fibrous Homogeneous	80% Synthetic	20% Non-fibrous (other)	None Detected
0005-Mastic 411506099-0005A	- Green Carpet & Mastic	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
0006-Carpet 411506099-0006	- Green Carpet & Mastic	Gray/Green Fibrous Homogeneous	98% Synthetic	2% Non-fibrous (other)	None Detected
0007 411506099-0007	- 12x12 Ceiling Tile	Gray Fibrous Homogeneous	80% Min. Wool <1% Cellulose	5% Ca Carbonate 15% Non-fibrous (other)	None Detected
0008 411506099-0008	- 12x12 Ceiling Tile	Gray Fibrous Homogeneous	80% Min. Wool <1% Cellulose	10% Ca Carbonate 10% Non-fibrous (other)	None Detected
0009 411506099-0009	- 12x12 Ceiling Tile	Gray/White Fibrous Heterogeneous	2% Cellulose 80% Min. Wool	5% Ca Carbonate 13% Non-fibrous (other)	None Detected
0010-Floor Tile 411506099-0010	- 12x12 Blue Tile	Gray Non-Fibrous Homogeneous		30% Ca Carbonate 70% Non-fibrous (other)	None Detected
0010-Mastic 411506099-0010A	- 12x12 Blue Tile	Tan Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	None Detected

Analyst(s)

Eric Loomis (21)
 Maria Cao (32)

Lee Plumley, Laboratory Manager
 or other approved signatory

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Project: **PF 2004.013.007/ Tych & Walker Arch./ Hampton Auditorium/ 494 Hampton Street, Walterboro, SC**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
0011-Floor Tile 411506099-0011	- 12x12 Blue Tile	Gray Non-Fibrous Homogeneous		35% Ca Carbonate 65% Non-fibrous (other)	None Detected
0011-Mastic 411506099-0011A	- 12x12 Blue Tile	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
0013-Flooring 411506099-0012	- Vinyl Flooring	Tan Fibrous Homogeneous	2% Cellulose	88% Non-fibrous (other)	10% Chrysotile
0013-Mastic 411506099-0012A	- Vinyl Flooring	Tan Fibrous Homogeneous	2% Cellulose	98% Non-fibrous (other)	None Detected
0014-Flooring 411506099-0013	- Vinyl Flooring				Stop Positive (Not Analyzed)
0014-Mastic 411506099-0013A	- Vinyl Flooring	Tan Non-Fibrous Homogeneous	1% Cellulose	99% Non-fibrous (other)	None Detected
0016-Floor Tile 411506099-0014	- 12x12 Royal Blue Tile	Blue Non-Fibrous Homogeneous		35% Ca Carbonate 65% Non-fibrous (other)	None Detected
0016-Mastic 411506099-0014A	- 12x12 Royal Blue Tile	Tan Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	None Detected

Analyst(s)

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 Maria Cao (32)

Lee Plumley, Laboratory Manager
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Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
0017-Floor Tile 411506099-0015	- 12x12 Royal Blue Tile	Blue Non-Fibrous Homogeneous		35% Ca Carbonate 65% Non-fibrous (other)	None Detected
0017-Mastic 411506099-0015A	- 12x12 Royal Blue Tile	Tan Non-Fibrous Homogeneous		5% Ca Carbonate 95% Non-fibrous (other)	None Detected
0019 411506099-0016	- Drop-In Ceiling Tile	Gray Fibrous Homogeneous	60% Cellulose 5% Min. Wool	10% Perlite 25% Non-fibrous (other)	None Detected
0020 411506099-0017	- Drop-In Ceiling Tile	Gray Fibrous Homogeneous	60% Cellulose 10% Min. Wool	10% Perlite 20% Non-fibrous (other)	None Detected
0021 411506099-0018	- Drop-In Ceiling Tile	Gray/White Fibrous Heterogeneous	50% Cellulose 15% Min. Wool	10% Perlite 25% Non-fibrous (other)	None Detected
0022-Floor Tile 411506099-0019	- Brown Floor Tile	Brown Non-Fibrous Homogeneous		35% Ca Carbonate 65% Non-fibrous (other)	None Detected
0022-Mastic 411506099-0019A	- Brown Floor Tile	Brown/Tan Fibrous Homogeneous	1% Cellulose	99% Non-fibrous (other)	None Detected
0023-Floor Tile 411506099-0020	- Brown Floor Tile	Brown Non-Fibrous Homogeneous		30% Ca Carbonate 70% Non-fibrous (other)	None Detected

Analyst(s)

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 Maria Cao (32)

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Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
0023-Mastic 411506099-0020A	- Brown Floor Tile	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
0025-Floor Tile 411506099-0021	- White Floor Tile	Gray Non-Fibrous Homogeneous		30% Ca Carbonate 70% Non-fibrous (other)	None Detected
0025-Mastic 411506099-0021A	- White Floor Tile	Tan Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	None Detected
0025-Leveler 411506099-0021B	- White Floor Tile	Tan Non-Fibrous Homogeneous		5% Ca Carbonate 95% Non-fibrous (other)	None Detected
0026-Floor Tile 411506099-0022	- White Floor Tile	Tan Non-Fibrous Homogeneous		30% Ca Carbonate 70% Non-fibrous (other)	None Detected
0026-Mastic 411506099-0022A	- White Floor Tile	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
0028 411506099-0023	- 12x12 Blue Tile	Gray Non-Fibrous Homogeneous		35% Ca Carbonate 65% Non-fibrous (other)	None Detected
0029 411506099-0024	- 12x12 Blue Tile	Gray Non-Fibrous Homogeneous		30% Ca Carbonate 70% Non-fibrous (other)	None Detected

Analyst(s)

Eric Loomis (21)
Maria Cau (32)

Lee Plumley, Laboratory Manager
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc. Charlotte, NC NVLAP Lab Code 200841-0, VA 3333 00312

Initial report from 09/02/2015 11:18:37

**EMSL Analytical, Inc.**

376 Crompton Street, Charlotte, NC 28273
 Phone/Fax: (704) 525-2205 / (704) 525-2382
<http://www.EMSL.com> charlotte@emsl.com

EMSL Order: 411506099
 CustomerID: SHEP78
 CustomerPO:
 ProjectID:

Attn: **Richard Parish**
Shepard & Associates, LLC
3547 Dreher Shoals Road
Suite 6
Irmo, SC 29063

Phone: (803) 407-8284
 Fax: (803) 407-8206
 Received: 08/28/15 3:00 PM
 Analysis Date: 9/2/2015
 Collected:

Project: PF 2004.013.007/ Tych & Walker Arch./ Hampton Auditorium/ 494 Hampton Street, Walterboro, SC

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
0031 411506099-0025	- Drop-In Ceiling Tile	Gray Fibrous Homogeneous	55% Cellulose 8% Min. Wool	15% Perlite 22% Non-fibrous (other)	None Detected
0032 411506099-0026	- Drop-In Ceiling Tile	Gray Fibrous Homogeneous	60% Cellulose 3% Min. Wool	15% Perlite 22% Non-fibrous (other)	None Detected
0033 411506099-0027	- Drop-In Ceiling Tile	Gray/White Fibrous Heterogeneous	60% Cellulose 6% Min. Wool	10% Perlite 24% Non-fibrous (other)	None Detected
0034-Stair Tread 411506099-0028	- Rubber Stair Tread	Brown Fibrous Homogeneous		10% Ca Carbonate 87% Non-fibrous (other)	3% Chrysotile
0034-Mastic 411506099-0028A	- Rubber Stair Tread	Beige Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	None Detected
0034-Leveler 411506099-0028B	- Rubber Stair Tread	Gray Non-Fibrous Homogeneous	1% Cellulose	5% Quartz 5% Ca Carbonate 89% Non-fibrous (other)	None Detected
0035-Stair Tread 411506099-0029	- Rubber Stair Tread				Stop Positive (Not Analyzed)
0035-Mastic 411506099-0029A	- Rubber Stair Tread	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected

Analyst(s)

Eric Loomis (21)
 Maria Cao (32)

Lee Plumley, Laboratory Manager
 or other approved signatory

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 Samples analyzed by EMSL Analytical, Inc. Charlotte, NC NVLAP Lab Code 200841-0, VA 3333 00312

Initial report from 09/02/2015 11:18:37

**EMSL Analytical, Inc.**

376 Crompton Street, Charlotte, NC 28273
 Phone/Fax: (704) 525-2205 / (704) 525-2382
<http://www.EMSL.com> charlottelab@emsl.com

EMSL Order: 411506099
 CustomerID: SHEP78
 CustomerPO:
 ProjectID:

Attn: **Richard Parish**
Shepard & Associates, LLC
3547 Dreher Shoals Road
Suite 6
Irmo, SC 29063

Phone: (803) 407-8284
 Fax: (803) 407-8206
 Received: 08/28/15 3:00 PM
 Analysis Date: 9/2/2015
 Collected:

Project: **PF 2004.013.007/ Tych & Walker Arch./ Hampton Auditorium/ 494 Hampton Street, Walterboro, SC**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
0037 411506099-0030	- Stair Landing Material	Brown Fibrous Heterogeneous	15% Cellulose	10% Ca Carbonate 75% Non-fibrous (other)	None Detected
0038 411506099-0031	- Stair Landing Material	Brown Fibrous Heterogeneous	15% Cellulose	10% Ca Carbonate 75% Non-fibrous (other)	None Detected
0039 411506099-0032	- Stair Landing Material	Brown/Tan Non-Fibrous Homogeneous	15% Cellulose	10% Ca Carbonate 75% Non-fibrous (other)	None Detected
0040-Cove Base 411506099-0033	- Rubber Moulding	Gray Non-Fibrous Homogeneous		5% Ca Carbonate 95% Non-fibrous (other)	None Detected
0040-Mastic 411506099-0033A	- Rubber Moulding	Clear Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
0041-Cove Base 411506099-0034	- Rubber Moulding	Gray Non-Fibrous Homogeneous		5% Ca Carbonate 95% Non-fibrous (other)	None Detected
0041-Mastic 411506099-0034A	- Rubber Moulding	Clear Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected

Analyst(s)

Eric Loomis (21)
 Maria Cao (32)

Lee Plumley, Laboratory Manager
 or other approved signatory

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 Samples analyzed by EMSL Analytical, Inc. Charlotte, NC NVLAP Lab Code 200841-0, VA 3333 00312

Initial report from 09/02/2015 11:18:37

**EMSL Analytical, Inc.**

376 Crompton Street, Charlotte, NC 28273
 Phone/Fax: (704) 525-2205 / (704) 525-2382
<http://www.EMSL.com> charlottelab@emsl.com

EMSL Order: 411506099
 CustomerID: SHEP78
 CustomerPO:
 ProjectID:

Attn: **Richard Parish** Phone: (803) 407-8284
Shepard & Associates, LLC Fax: (803) 407-8206
3547 Dreher Shoals Road Received: 09/02/15 12:00 PM
Suite 6 Analysis Date: 9/9/2015
Irmo, SC 29063 Collected:

Project: **PF 2004.013.007/ Tych & Walker Arch./ Hampton Auditorium/ 494 Hampton Street, Walterboro, SC**

**Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by TEM
 via EPA/600/R-93/116 Section 2.5.5.1**

SAMPLE ID	DESCRIPTION	APPEARANCE	% MATRIX MATERIAL	% NON-ASBESTOS FIBERS	ASBESTOS TYPES
0003-Mastic 411506099-0035	- Brown Carpet Padding & Mastic	Tan Non-Fibrous Homogeneous	100	<0.27 Fibrous (other)	No Asbestos Detected
0006-Mastic 411506099-0036	- Green Carpet & Mastic	Tan Fibrous Homogeneous	100	None	No Asbestos Detected
0012-Floor Tile 411506099-0037	- 12x12 Blue Tile	Gray Non-Fibrous Homogeneous	100	None	No Asbestos Detected
0012-Mastic 411506099-0038	- 12x12 Blue Tile	Tan/Beige Non-Fibrous Heterogeneous	100	None	No Asbestos Detected
0015-Mastic 411506099-0039	- Vinyl Flooring	Tan/Beige Non-Fibrous Heterogeneous	100	<0.44 Fibrous (other)	No Asbestos Detected
0018-Floor Tile 411506099-0040	- 12x12 Royal Blue Tile	Blue Non-Fibrous Homogeneous	100	None	No Asbestos Detected
0018-Mastic 411506099-0041	- 12x12 Royal Blue Tile	Tan Non-Fibrous Homogeneous	100	<0.28 Fibrous (other)	No Asbestos Detected
0024-Floor Tile 411506099-0042	- Brown Floor Tile	Brown Non-Fibrous Homogeneous	100	None	No Asbestos Detected
0024-Mastic 411506099-0043	- Brown Floor Tile	Tan/Beige Non-Fibrous Heterogeneous	100	<0.49 Fibrous (other)	No Asbestos Detected

Analyst(s)

Charles Harris (15)

Lee Plumley, Laboratory Manager
 or other approved signatory

This laboratory is not responsible for % asbestos in total sample when the residue only is submitted for analysis. The above report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.
 Samples analyzed by EMSL Analytical, Inc. Charlotte, NC

Initial report from 09/10/2015 08:34:13

**EMSL Analytical, Inc.**

376 Crompton Street, Charlotte, NC 28273
 Phone/Fax: (704) 525-2205 / (704) 525-2382
<http://www.EMSL.com> charottelab@emsl.com

EMSL Order: 411506099
 CustomerID: SHEP78
 CustomerPO:
 ProjectID:

Attn: **Richard Parish**
Shepard & Associates, LLC
3547 Dreher Shoals Road
Suite 6
Irmo, SC 29063

Phone: (803) 407-8284
 Fax: (803) 407-8206
 Received: 09/02/15 12:00 PM
 Analysis Date: 9/9/2015
 Collected:

Project: **PF 2004.013.007/ Tych & Walker Arch./ Hampton Auditorium/ 494 Hampton Street, Walterboro, SC**

**Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by TEM
 via EPA/600/R-93/116 Section 2.5.5.1**

SAMPLE ID	DESCRIPTION	APPEARANCE	% MATRIX MATERIAL	% NON-ASBESTOS FIBERS	ASBESTOS TYPES
0027-Floor Tile 411506099-0044	- White Floor Tile	Gray Non-Fibrous Homogeneous	100	None	No Asbestos Detected
0027-Mastic 411506099-0045	- White Floor Tile	Brown/Tan Non-Fibrous Heterogeneous	100	<0.45 Fibrous (other)	No Asbestos Detected
0030 411506099-0046	- 12x12 Blue Tile	Gray Non-Fibrous Homogeneous	100	None	No Asbestos Detected
0036-Mastic 411506099-0047	- Rubber Stair Tread	Beige Non-Fibrous Heterogeneous	99.5	0.50 Fibrous (other)	No Asbestos Detected
0042-Cove Base 411506099-0048	- Rubber Moulding	Gray Non-Fibrous Homogeneous	100	None	No Asbestos Detected
0042-Mastic 411506099-0049	- Rubber Moulding	Clear Non-Fibrous Homogeneous	100	<0.34 Fibrous (other)	No Asbestos Detected

Analyst(s)
 Charles Harris (15)

Lee Plumley, Laboratory Manager
 or other approved signatory

This laboratory is not responsible for % asbestos in total sample when the residue only is submitted for analysis. The above report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.
 Samples analyzed by EMSL Analytical, Inc. Charlotte, NC

Initial report from 09/10/2015 08:34:13



Shepard & Associates, LLC
 3547 Dreher Shoals Road, Suite 6
 Irmo, South Carolina 29063

Date Sent: August 17, 2015
 Project ID#: PF 2004.013.007
 Client Name: Tych & Walker Arch.
 Project Name: Hampton Auditorium
 Physical Address: 494 Hampton Street Walterboro, SC
 Number of Samples:

Fax Results: Yes or No
 Shipping Info: #

Turn Around:

24HR 48HR 72HR 5DAY

Other: ONE WEEK ON T.E.M

Type of Analysis:

PCM PLM TEM AAS Other
 Air Bulk Air Chips/
 Bulk Wipes
 Water

Special Instructions: * STOP POSITIVE*
 IF FIRST TWO SAMPLES OF ANY TYPE I-NF MATERIAL
 COME BACK NEGATIVE, TEST THIRD USING T.E.M. PER
 S.C. REGULATIONS

Sample ID#	DESCRIPTION OF SAMPLE	IF ASBESTOS BULK			
		AMOUNT	I,II-NF,F	COND.	PFD
0001	BROWN CARPET PADDING & MASTIC	15 SF	F	G	PSD
0002	BROWN CARPET PADDING & MASTIC	15 SF	F	G	PSD
0003	BROWN CARPET PADDING & MASTIC	15 SF	F	G	PSD
0004	GREEN CARPET & MASTIC	1530 SF	F	G	PSD
0005	GREEN CARPET & MASTIC	1530 SF	F	G	PSD
0006	GREEN CARPET & MASTIC	1530 SF	F	G	PSD
0007	12x12 CEILING TILE	600SF	F	D	PSD
0008	12x12 CEILING TILE	600SF	F	D	PSD
0009	12x12 CEILING TILE	600SF	F	D	PSD
0010	12x12 BLUE TILE	50SF	I-NF	G	PSD
0011	12x12 BLUE TILE	50SF	I-NF	G	PSD
0012	12x12 BLUE TILE	50SF	I-NF	G	PSD
0013	VINYL FLOORING	50SF	I-NF	G	PSD
0014	VINYL FLOORING	50SF	I-NF	G	PSD
0015	VINYL FLOORING	50SF	I-NF	G	PSD
0016	12x12 ROYAL BLUE TILE	112 SF	I-NF	G	PSD
0017	12x12 ROYAL BLUE TILE	112 SF	I-NF	G	PSD
0018	12x12 ROYAL BLUE TILE	112 SF	I-NF	G	PSD
0019	DROP-IN CEILING TILE	112 SF	F	D	PSD
0020	DROP-IN CEILING TILE	112 SF	F	D	PSD
0021	DROP-IN CEILING TILE	112 SF	F	D	PSD
0022	BROWN FLOOR TILE	42 SF	I-NF	G	PSD
0023	BROWN FLOOR TILE	42 SF	I-NF	G	PSD
0024	BROWN FLOOR TILE	42 SF	I-NF	G	PSD

Signature & Date Handlers

Relinquished By: 8/24/15
 Relinquished By: _____
 Relinquished By: _____

Received By: 8/23/15 3:00pm
 Received By: USMAIL
 Received By: _____



Shepard & Associates, LLC
 3347 Dreher Shoals Road, Suite 6
 Irmo, South Carolina 29063

Date Sent: August 17, 2015
 Project ID#: PF 2004.013.007
 Client Name: Tych & Walker Arch.
 Project Name: Hampton Auditorium
 Physical Address: 494 Hampton Street Walterboro, SC

Number of Samples: _____
 Fax Results: Yes or No
 Shipping Info: # _____

Turn Around:
 24HR 48HR 72HR 5DAY
 Other: _____

Type of Analysis:
 PCM PLM TEM AAS Other
 Air Bulk Air _____ Chips/ _____
 Bulk _____ Wipes _____
 Water _____

Special Instructions:

Sample ID#	DESCRIPTION OF SAMPLE	IF ASBESTOS BULK			
		AMOUNT	I,II-NF,F	COND.	PSD
0025	WHITE FLOOR TILE	20 SF	1-NF	G	PSD
0026	WHITE FLOOR TILE	20 SF	1-NF	G	PSD
0027	WHITE FLOOR TILE	20 SF	1-NF	G	PSD
0028	12x12 BLUE TILE	40 SF	1-NF	G	PSD
0029	12 x 12 BLUE TILE	40 SF	1-NF	G	PSD
0030	12 x 12 BLUE TILE	40 SF	1-NF	G	PSD
0031	DROP-IN CEILING TILE	65 SF	F	G	PSD
0032	DROP-IN CEILING TILE	65 SF	F	G	PSD
0033	DROP-IN CEILING TILE	65 SF	F	G	PSD
0034	RUBBER STAIR TREAD	144 SF	1-NF	G	PSD
0035	RUBBER STAIR TREAD	144 SF	1-NF	G	PSD
0036	RUBBER STAIR TREAD	144 SF	1-NF	G	PSD
0037	STAIR LANDING MATERIAL	32 SF	F	SD	PSD
0038	STAIR LANDING MATERIAL	32 SF	F	SD	PSD
0039	STAIR LANDING MATERIAL	32 SF	F	SD	PSD
0040	RUBBER MOULDING	120 LF	1-NF	G	PSD
0041	RUBBER MOULDING	120 LF	1-NF	G	PSD
0042	RUBBER MOULDING	120 LF	1-NF	G	PSD
0043					
0044					
0045					
0046					
0047					
0048					

Signature & Date Handlers
 Relinquished By: _____ Received By: _____
 Relinquished By: _____ Received By: _____
 Relinquished By: _____ Received By: _____

Asbestos I.D. Card

SCDHEC ISSUED
Asbestos ID Card

Richard C Parrish



CONSULTBI

Expires
BI-01213 10/21/15

SCDHEC ISSUED
Asbestos ID Card

Blount Shepard



CONSULTBI

Expires
BI-00847 07/20/16

SECTION 01100
SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contract description.
- B. Work by Owner.
- C. Owner supplied products.
- D. Contractor's use of site and premises.
- E. Future work.
- F. Work sequence.
- G. Owner occupancy.
- H. Specification Conventions.
- I. Liquidated Damages
- J. Construction Timeline
- K. Construction Rain Delays

1.2 CONTRACT DESCRIPTION

- A. Work of the Project includes key improvements to the existing auditorium to include stage lighting, stage audio system and interior building aesthetics. The project includes updates to the existing facility, upgrade/replacement of stage lighting, restroom improvements, an addition to the back stage area.
- B. Perform Work of Contract under a stipulated sum contract with Owner in accordance with Conditions of Contract.

1.3 WORK BY OWNER

- A. Work under this contract includes:
 - 1. Refer *The Project Manual, Division 1, Section 01200, Price and Payment Procedures, 1.2 Allowances* for construction related fees.
- B. Items noted NIC (Not in Contract), movable cabinets, furnishings, minor equipment, will be furnished and installed by Owner before the project is occupied.

1.4 OWNER SUPPLIED PRODUCTS

- A. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner-reviewed Shop Drawings, Product Data, and Samples, to Contractor.
 - 2. Arrange and pay for delivery to site.

3. On delivery, inspect products jointly with Contractor.
 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 5. Arrange for manufacturers' warranties, inspections, and service.
- B. Contractor's Responsibilities:
1. Review Owner-reviewed Shop Drawings, Product Data, and Samples.
 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 3. Handle, store, install and finish products.
 4. Repair or replace items damaged after receipt.
 5. The Contractor will be responsible for final connections to all workstation that are indicated on the Electrical floor plans.
- C. Products furnished to site and installed by Owner:
1. Not Applicable
- D. Items furnished by Owner for installation by Contractor:
1. Not Applicable
- 1.5 CONTRACTOR'S USE OF SITE AND PREMISES
- A. Limit use of site and premises to allow:
1. Owner occupancy.
 2. Work by Others and Work by Owner.
 3. Use of site and premises by the public is to be limited and controlled.
- 1.6 WORK SEQUENCE
- A. Construct Work in accordance with scheduling requirements as defined in *The Project Manual, Division 1, Section 01323, Network Analysis Schedule*.
- B. The General Contractor shall conduct a site meeting prior to the commencement of any construction in accordance with *The Project Manual, Division 1, Section 01300, Administrative Requirements*. Prior to this meeting in which the Architect and Owner's Representative shall be in attendance, the General Contractor shall verify and identify the existing conditions and review construction sequence.
- C. It is understood that the General Contractor will be fully responsible for coordination of all items identified in *The Project Manual, Division 1, Section 01200, Price and Payment Procedures*.
- 1.7 OWNER OCCUPANCY
- A. The Owner will occupy portions of the building during the entire period of construction.
- 1.8 SPECIFICATION CONVENTIONS
- A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

- 1.9 LIQUIDATED DAMAGES – See: Bidding and Contract Requirements
- 1.10 CONSTRUCTION TIMELINE – See: Bidding and Contract Requirements
- 1.11 CONSTRUCTION RAIN DELAYS- See Bidding and Contract Requirements

END OF SECTION

SECTION 01200
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cash allowances.
- B. Contingency allowances.
- C. Testing and inspection allowances.
- D. Schedule of values.
- E. Applications for payment.
- F. Change procedures.
- G. Defect assessment.
- H. Unit prices.
- I. Alternates.

1.2 CASH ALLOWANCES

- A. Costs Included in Cash Allowances: Cost of product to Contractor or Subcontractor, less applicable trade discounts.
- B. Costs Not Included in Cash Allowances But Included in Contract Sum/Price: Handling at site, including unloading, uncrating, and storage; protection of products from elements and from damage.
- C. Architect/Engineer Responsibilities:
 - 1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
 - 2. Select products in consultation with Owner and transmit decision to Contractor.
 - 3. Prepare Change Order.
 - 4. Assist to obtain proposals from suppliers and installers and offer recommendations. All proposals will be delivered and/or copied to the office of the Architect prior to final decisions.
- D. Contractor Responsibilities:
 - 1. Assist Architect/Engineer in selection of products, suppliers and installers.
 - 2. Upon notification of selection by Architect/Engineer, execute purchase agreement with designated supplier and installer. The Contractor shall not execute any agreements with an allowance supplier or subcontractor without written approval from the Architect.
 - 3. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - 4. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

- E. Differences in costs that are approved by Architect will be adjusted by Change Order. Any amounts remaining at close out will be refunded to the Owner.
- F. Allowances Schedule: The Architect reserves the right to assign a contract or purchase order to the General Contractor/Subcontractor. The General Contractor shall not issue a contract on the allowance without the prior approval of the Architect. The Owner will have no financial responsibility to the General Contractor if the above referenced procedures are not followed.

<u>Division 1</u>	<u>Permitting</u>	
	The City of Walterboro permit and review fees \$6,000.00	\$6000.00
<u>Division 1</u>	<u>Roof Monitoring</u>	
	The stipulated sum for the roof monitoring services for periodic inspections will be provided by: Shepard & Associates, LLC 3547 Dreher Shoals Rd, Suite 6 Irmo, SC 29063 803-407-8284	\$2,500.00
<u>Section 04810</u>	<u>Unit Masonry Accessories</u>	
	For brick material only	\$400/ 1000 bricks
<u>Section 08710</u>	<u>Door Hardware</u>	
	Include the stipulated sum/price for the door hardware as specified in Section 08710 Door Hardware. Installation of hardware is to be included as part of the General Contractor's base bid.	\$14,000.00
<u>Section 09686</u>	<u>Sheet Carpet</u>	
	The General Contractor shall allow the stipulated sum for the furnishing and installation of sheet carpet as per Section 09686 Sheet Carpet.	\$10,000.00
<u>Owner Contingency</u>		
	A stipulated sum/price for use by the Owner to address unforeseen conditions. Written approval from the Architect must be obtained prior to any authorized allocation of funds.	\$25,000.00
	ALLOWANCE TOTAL	\$65,050.00

1.3 CONTINGENCY ALLOWANCES

- A. Include in the Contract, a stipulated sum/price for use upon Owner's instruction (as indicated on item 10 Owner Contingency above).
- B. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will not be included in Change Orders authorizing expenditure of funds from this Contingency Allowance. This shall be in base bid.
- C. Funds will be drawn from Contingency Allowance only by Change Order.
- D. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.4 TESTING AND INSPECTION - As provided by General Contractor

- A. Costs Included in Testing and Inspecting: Cost of engaging testing and inspecting agency; execution of tests and inspecting; and reporting results.
- B. Costs Not Included in Testing and Inspecting But Included in Contract Sum/Price:
 - 1. Costs of incidental labor and facilities required to assist testing or inspecting agency.
 - 2. Costs of testing services used by Contractor separate from Contract Document requirements.
 - 3. Costs of retesting upon failure of previous tests as determined by Architect/Engineer.
- C. Payment Procedures:
 - 1. Submit one copy of inspecting or testing firm's invoice with next application for payment.
 - 2. Pay invoice on approval by Architect/Engineer.

1.5 SCHEDULE OF VALUES

- A. Submit printed schedule on AIA Form G703 - Continuation Sheet for G702. Contractor's standard form or electronic media printout will be considered.
- B. Submit Schedule of Values in duplicate within fifteen days after date established in Notice to Proceed.
- C. Format: Utilize Table of Contents of this Project Manual. Identify each line item with number and title of major specification Section. Identify site mobilization, bonds and insurance as separate line items. Architect will require a breakdown of major items, i.e. rough-in electric below slabs, above slabs, fixtures, trim etc.
- D. Include in each line item, amount of Allowances specified in this section.
- E. Contractor overhead and profit shall be displayed as a separate line item and not incorporated within each line item.
- F. Revise schedule to list approved Change Orders, with each Application For Payment.

- 1.6 APPLICATIONS FOR PAYMENT – See: Bidding and Contracting Requirements.
- 1.7 CHANGE PROCEDURES – See: Bidding and Contracting Requirements.
- 1.8 DEFECT ASSESSMENT
- A. Replace the Work, or portions of the Work, not conforming to specified requirements.
 - B. If, in the opinion of the Architect/Engineer, it is not practical to remove and replace the Work, the Architect/Engineer will direct appropriate remedy or adjust payment.
 - C. The defective Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of Architect/Engineer.
 - D. Defective Work will be partially repaired to instructions of Architect/Engineer, and unit sum/price will be adjusted to new sum/price at discretion of Architect/Engineer.
 - E. Individual specification sections may modify these options or may identify specific formula or percentage sum/price reduction.
 - F. Authority of Architect/Engineer to assess defects and identify payment adjustments is final.
 - G. Non-Payment For Rejected Products: Payment will not be made for rejected products for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from transporting vehicle.
 - 4. Products placed beyond lines and levels of required Work.
 - 5. Products remaining on hand after completion of the Work.
 - 6. Loading, hauling, and disposing of rejected products.
- 1.9 UNIT PRICES – See: Bidding and Contracting Requirements
- 1.10 ALTERNATES
- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in Owner-Contractor Agreement.
 - B. Coordinate related work and modify surrounding work.
 - C. The Owner shall have the right to accept Alternates in any order or combination, and to determine the low bidder on the basis of the sum of the Base Bid and alternates accepted.
 - D. Schedule of Alternates:
See: Bidding and Contracting Requirements, Article 9.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01300
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination and project conditions.
- B. Field engineering.
- C. Preconstruction meeting.
- D. Site mobilization meeting.
- E. Progress meetings.
- F. Pre-installation meetings.
- G. Cutting and patching.
- H. Special procedures.
- I. Composite above ceiling drawing submittal.

1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs. Have all pertinent subcontractors review and sign off on all related shop drawings.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 FIELD ENGINEERING

- A. Employ Land Surveyor registered in State of South Carolina and acceptable to Architect/Engineer.
- B. Locate and protect survey control and reference points. Promptly notify Architect/Engineer of discrepancies discovered.
- C. Control datum for survey is that shown on Drawings.
- D. Verify set-backs and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Submit copy of site drawing and certificate signed by Land Surveyor certifying elevations and locations of the Work are in conformance with Contract Documents.
- G. Maintain complete and accurate log of control and survey work as Work progresses.
- H. On completion of foundation walls and major site improvements, prepare certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.
- I. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- J. Promptly report to Architect/Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- K. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect/Engineer.

1.4 PRECONSTRUCTION MEETING

- A. Owner will schedule meeting after Notice of Award.
- B. Attendance Required: Owner, Architect/Engineer, and Contractor.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
 - 5. Designation of personnel representing parties in Contract, and Architect/Engineer.
 - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 7. Scheduling.
 - 8. Scheduling activities of Geotechnical Engineer.
- D. The Contractor shall record minutes and distribute copies within two days after meeting to participants, with two copies to Architect/Engineer, and those affected by decisions made.

1.5 SITE MOBILIZATION MEETING

- A. Architect/Engineer will schedule meeting at Project site prior to Contractor occupancy.
- B. Attendance Required: Architect/Engineer, Special Consultants, and Contractor, Contractor's Superintendent, and major Subcontractors.
- C. Agenda:
 - 1. Use of premises by Owner and Contractor.
 - 2. Owner's requirements and partial occupancy.
 - 3. Construction facilities and controls provided by Owner.
 - 4. Temporary utilities provided by Owner.
 - 5. Survey and building layout.
 - 6. Security and housekeeping procedures.
 - 7. Schedules.
 - 8. Application for payment procedures.
 - 9. Procedures for testing.
 - 10. Procedures for maintaining record documents.
 - 11. Requirements for start-up of equipment.
 - 12. Inspection and acceptance of equipment put into service during construction period.
- D. The Contractor shall record minutes and distribute copies within two days after meeting to participants, with two copies to Architect/Engineer, Owner, and those affected by decisions made.

1.6 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required: Job superintendent, major subcontractors and suppliers, Architect/Engineer, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems impeding planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.

 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Other business relating to Work.
- E. The Contractor shall record minutes and distribute copies within two days after meeting to participants, with two copies to Architect/Engineer, and those affected by decisions made.

1.7 PRE-INSTALLATION MEETINGS

- A. When required in individual specification sections, convene pre-installation meetings at Project site prior to commencing work of specific section.
- B. Require attendance of parties directly affecting, or affected by, Work of specific section.
- C. Notify Architect/Engineer seven days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of installation, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. The Contractor shall record minutes and distribute copies within two days after meeting to participants, with two copies to Architect/Engineer, Owner and those affected by decisions made.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements affecting:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
 - 1. Fit the several parts together, to integrate with other Work.
 - 2. Uncover Work to install or correct ill-timed Work.
 - 3. Remove and replace defective and non-conforming Work.
 - 4. Remove samples of installed Work for testing.
 - 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.
- E. Cut masonry and concrete materials using masonry saw or core drill.
- F. Restore Work with new products in accordance with requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07840, to full thickness of penetrated element.
- J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.
- K. Identify hazardous substances or conditions exposed during the Work to Architect/Engineer for decision or remedy.

3.2 SPECIAL PROCEDURES

- A. Materials: As specified in product sections; match existing with new products and salvaged products for patching and extending work.
- B. Employ skilled and experienced installer to perform alteration work.
- C. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.
- D. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
- E. Remove debris and abandoned items from area and from concealed spaces.
- F. Prepare surface and remove surface finishes to permit installation of new work and finishes.
- G. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- H. Finish surfaces as specified in individual product sections.

3.3 COMPOSITE ABOVE CEILING DRAWING SUBMITTAL

- A. Submit and obtain approval prior to any field work commencement.
- B. Submit as defined in Section 15010-3.3: Cooperation with Other Trades.
- C. The submittal shall clearly note elevation points of installed item from finish floor.
- D. The submittal must be signed off by all major subcontractors that will have work that is above the ceiling.

END OF SECTION

SECTION 01323
NETWORK ANALYSIS SCHEDULES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. References.
- B. Quality assurance.
- C. Format.
- D. Schedules.
- E. Submittals.
- F. Review and evaluation.
- G. Updating schedules.
- H. Distribution.

1.2 REFERENCES

- A. The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry, Washington, D.C., The Associated General Contractors of America (AGC).

1.3 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel specializing in CPM scheduling with two years minimum experience in scheduling construction work of complexity comparable to this Project, and having use of computer facilities capable of delivering detailed graphic printout within 48 hours of request.
- B. Contractor's Administrative Personnel: Five years minimum experience in using and monitoring CPM schedules on comparable projects.

1.4 FORMAT

- A. Listings: Reading from left to right, in ascending order for each activity. Identify each activity with applicable specification section number.
- B. Diagram Sheet Size: 24 inches high x 36 inches wide.
- C. Scale and Spacing: To allow for notations and revisions.

1.5 SCHEDULES

- A. Prepare network analysis diagrams and supporting mathematical analyses using Critical Path Method, under concepts and methods outlined in AGC's "The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry".

- B. Illustrate order and interdependence of activities and sequence of work; how start of given activity depends on completion of preceding activities, and how completion of activity may restrain start of subsequent activities.
 - C. Illustrate complete sequence of construction by activity, identifying work of separate floors. Indicate dates for submittals including dates for Owner furnished items and return of submittals; dates for procurement and delivery of critical products; and dates for installation and provision for testing. Include legend for symbols and abbreviations used.
 - D. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers.
 - 2. Activity description.
 - 3. Estimated duration of activity, in maximum fifteen day intervals.
 - 4. Earliest start date.
 - 5. Earliest finish date.
 - 6. Actual start date.
 - 7. Actual finish date.
 - 8. Latest start date.
 - 9. Latest finish date.
 - 10. Total and free float; accrue float time to Owner and to Owner's benefit.
 - 11. Monetary value of activity, keyed to Schedule of Values.
 - 12. Percentage of activity completed.
 - 13. Responsibility.
 - E. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, of accepting revised completion dates, and re-computation of scheduled dates and float.
 - F. Required Sorts: List activities in sorts or groups:
 - 1. By preceding work item or event number from lowest to highest.
 - 2. By longest float, then in order of early start.
 - 3. By responsibility in order of earliest possible start date.
 - 4. In order of latest allowable start dates.
 - 5. In order of latest allowable finish dates.
 - 6. Contractor's periodic payment request sorted by Schedule of Values listings specifications sections.
 - 7. Listing of basic input data generating report.
 - 8. Listing of activities on critical path.
 - G. Prepare sub-schedules for each stage of Work identified in Section 01100 - Summary.
 - H. Coordinate contents with schedule of values in Section 01330 - Submittal Procedures.
- 1.6 SUBMITTALS
- A. Within ten days after date established in Notice to Proceed, submit proposed preliminary network diagram defining planned operations for first sixty days of Work, with general outline for remainder of Work.
 - B. Participate in review of preliminary and complete network diagrams jointly with Architect/Engineer.
 - C. Within twenty days after joint review of proposed preliminary network diagram, submit draft of proposed complete network diagram for review. Include written certification that major Subcontractors have reviewed and accepted proposed schedule.

- D. Within ten days after joint review, submit complete network analysis consisting of network diagrams and mathematical analysis.
- E. Submit updated network schedules with each Application for Payment every thirty days.
- F. Submit number of opaque reproductions Contractor requires, plus two copies Architect/Engineer will retain.
- G. Submit under transmittal letter form specified in Section 01330 – Submittal Procedures.

1.7 REVIEW AND EVALUATION

- A. Participate in joint review and evaluation of network diagrams and analysis with Architect/Engineer at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise network diagrams and analysis incorporating results of review, and resubmit within ten days.

1.8 UPDATING SCHEDULES

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity. Update diagrams to graphically depict current status of Work.
- C. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- D. Indicate changes required to maintain Date of Substantial Completion.
- E. Submit sorts required to support recommended changes.
- F. Prepare narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect.

1.9 DISTRIBUTION

- A. Following joint review, distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect/Engineer, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01330
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittal procedures.
- B. Contractor's Use of Architect's CADD Files.
- C. Construction progress schedules.
- D. Proposed products list.
- E. Product data.
- F. Shop drawings.
- G. Samples.
- H. Design data.
- I. Test reports.
- J. Certificates.
- K. Manufacturer's instructions.
- L. Manufacturer's field reports.
- M. Erection drawings.
- N. Construction photographs.

1.2 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Architect/Engineer accepted form attached.
- B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.
- C. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and specification section number, appropriate to submittal.
- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite Project, and deliver to Architect/Engineer at business address. Coordinate submission of related items.

- F. For each submittal for review, allow thirty working days excluding delivery time to and from Contractor.
- G. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work.
- H. Allow space on submittals for Contractor and Architect/Engineer review stamps.
- I. When revised for resubmission, identify changes made since previous submission.
- J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
- K. Submittals not requested will not be recognized or processed.
- L. The Architect will take the following actions upon receipt of submittal:
 - 1. Check each submittal for Contractor's signature. If a submittal does not bear the Contractor's signature, return submittal without review for resubmittal by the Contractor.
 - 2. Log in the submittal and distribute to appropriate consultant, if applicable.
 - 3. Check the submittal to make sure it is in the proper form, and that all information required to be filled in by the Contractor has been completed.
 - 4. Review the submittal for conformance with the requirements of the Contract Documents.
 - 5. Mark sepia and make one print for Architect's file; Sepia and only one print will be returned to Contractor.
 - 6. Stamp each item in the submittal, and indicate Architect's Action (+/-). Make sure consultant has indicated recommended action (+/-) as well, if applicable.
 - 7. If a resubmittal appears to be the result of a misunderstanding of a requirement of the Contract Documents, add notes of guidance to expedite a correct resubmittal wherever practicable.
 - 8. Fill in date of review.
 - 9. Sign full name of reviewer. If consultant reviewed the submittal, make sure his signature appears as well.
 - 10. Note the distribution of the reviewed submittal.
 - 11. Log the submittal out.
 - 12. Return the submittal by mail (or, if requested by Contractor, hold for pick-up.)

1.3 CONTRACTOR'S USE OF ARCHITECT'S CADD FILES

- A. CADD Drawings: CADD files on electronic media are available to the Contractor from the Architect at fees stipulated and in accordance with the "CADD File Letter of Agreement" attached at the end of this Section. Only architectural plan files will be available; detail sheet files will not be available. Consultant drawings are not made available on electronic media, including but not limited to Structural, Plumbing/Fire Protection, Mechanical and Electrical.
- B. CADD files are provided as available information only and are not to be considered Contract Documents as defined by the Contract for Construction.
- C. Contractor shall submit written request for CADD files, accompanied by signed copy of the attached CADD File Letter of Agreement prior to release of these documents.

1.4 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial schedules within twenty days after date established in Notice to Proceed. After review, resubmit required revised data within ten days.
- B. Submit revised Progress Schedules with each Application for Payment.
- C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.
- D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.
- E. Submit computer generated network analysis diagram as specified in Section 01323 - Network Analysis Schedules.
- F. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.
- G. Indicate estimated percentage of completion for each item of Work at each submission.
- H. Submit separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished products and products identified under Allowances, and dates reviewed submittals will be required from Architect/Engineer. Indicate decision dates for selection of finishes.
- I. Indicate delivery dates for Owner furnished products and products identified under Allowances.
- J. Revisions To Schedules:
 - 1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
 - 2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
 - 3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including effect of changes on schedules of separate contractors.

1.5 PROPOSED PRODUCTS LIST

- A. Within fifteen days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.6 PRODUCT DATA

- A. Product Data: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Submit number of copies Contractor requires, plus two copies Architect/Engineer will retain.

- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01700 - Execution Requirements.

1.7 SHOP DRAWINGS

- A. Shop Drawings: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. When required by individual specification sections, provide shop drawings signed and sealed by professional engineer responsible for designing components shown on shop drawings.
 - 1. Include signed and sealed calculations to support design from an engineer registered in the State of South Carolina.
 - 2. Submit drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
 - 3. Make revisions and provide additional information when required by authorities having jurisdiction.
- D. Submit in form of one reproducible transparency and two opaque reproductions.
- E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01700 - Execution Requirements.

1.8 SAMPLES

- A. Samples: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Samples For Selection as Specified in Product Sections:
 - 1. Submit to Architect/Engineer for aesthetic, color, or finish selection.
 - 2. Submit samples of finishes from full range of manufacturers' standard colors, in custom colors selected, textures, and patterns for Architect/Engineer selection.
- C. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- D. Include identification on each sample, with full Project information.
- E. Submit number of samples specified in individual specification sections; Architect/Engineer will retain one sample.

- F. Reviewed samples which may be used in the Work are indicated in individual specification sections.
 - G. Samples will not be used for testing purposes unless specifically stated in specification section.
 - H. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in Section 01700 - Execution Requirements.
- 1.9 DESIGN DATA
- A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.
 - B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
- 1.10 TEST REPORTS
- A. Submit for Architect/Engineer's knowledge as contract administrator and to the Owner.
 - B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
- 1.11 CERTIFICATES
- A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.
 - B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.
- 1.12 MANUFACTURER'S INSTRUCTIONS
- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect/Engineer for delivery to Owner in quantities specified for Product Data.
 - B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- 1.13 MANUFACTURER'S FIELD REPORTS
- A. Submit reports for Architect/Engineer's benefit as contract administrator or for Owner.
 - B. Submit report in duplicate within five days of observation to Architect/Engineer for information.
 - C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.14 ERECTION DRAWINGS

- A. Submit drawings for Architect/Engineer's benefit as contract administrator and to the Owner.
- B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
- C. Data indicating inappropriate or unacceptable Work may be subject to action by Architect/Engineer or Owner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

ATTACHMENTS:

SA Form
CADD File Letter of Agreement

The following is a list of submittals required within the Project Manual; refer to each section for specific requirements. The list is for information only and does not override the specification section requirements of each.

DIVISION 3 - CONCRETE
03200 Concrete Reinforcement
03300 Cast-In-Place Concrete
03305 Site Concrete

DIVISION 4 - MASONRY

04810 Unit Masonry

DIVISION 5 - METALS

05120 Structural Steel

05400 Cold-Formed Structural Framing

DIVISION 6 - WOOD AND PLASTICS

06100 Rough Carpentry

06114 Wood Blocking and Curbing

06193 Plate Connected Wood Trusses

06200 Finish Carpentry

06410 Architectural Wood Casework

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

07310 Asphalt Shingles

07460 Fiber Cement Siding

07613 Manufactured Sheet Metal Roofing

07620 Sheet Metal Flashing and Trim

07714 Gutters and Downspouts

07720 Aluminum Ladder

07840 Firestopping

07900 Joint Sealers

DIVISION 8 - DOORS AND WINDOWS

08111 Standard Steel Doors and Frames

08212 Wood Doors

08350 Side Folding Grilles

08410 Metal-Framed Storefronts

08525 Extruded Aluminum Clad Wood Windows

08710 Door Hardware

08800 Glazing

08830 Mirror Glass

DIVISION 9 - FINISHES

09260 Gypsum Board Systems

09300 Ceramic Tile Floor and Wall Finish

09510 Acoustical Ceilings

09650 Resilient Flooring

09686 Sheet Carpet

09900 Paints and Coatings

DIVISION 10 - SPECIALTIES

10170 Toilet Compartments

10350 Flagpoles

10440 Signage

10523 Fire Extinguishers and Cabinets

10800 Toilet and Bath Accessories

DIVISION 15 - MECHANICAL

15180	Testing, Adjusting, and Balancing
15250	Insulation
15410	Basic Materials and Methods (Plumbing)
15420	Domestic Water Supply Piping
15440	Soil, Waste, Vent and Drain Piping
15450	Plumbing Fixtures and Equipment
15500	Fire Protection
15620	Piping
15665	Split System Heat Pump
15762	Electronic Wall Insert Heaters
15810	Air Distribution
15862	Spilt System Heat Pump (ductless)
15900	Automatic Temperature Controls

DIVISION 16 - ELECTRICAL

16120	Conductors
16122	Metal-Clad Cable Systems
16130	Grounding and Bonding
16140	Boxes
16150	Wiring Devices
16160	Raceway and Outlet Systems
16190	Miscellaneous Materials
16420	Panelboards
16500	Lighting Fixtures and Accessories
16511	Low Voltage Switching Systems
16702	Fire Alarm System, Addressable
16620	Engine-Generator System

END OF SECTION

SUBMITTAL ACTION

CONTRACTOR'S SUBMITTAL

for use by contractor

SA

ARCHITECT'S REVIEW

FROM: **TYCH & WALKER ARCHITECTS, LLP**
 P.O. Box 509
 Pawleys Island, SC 29585
 843-651-7151

FROM:

DATE OF SUBMITTAL _____

SUBMITTAL NUMBER _____
 provide separate form for each Section

SPECIFICATION SECTION NUMBER _____

- FORM OF SUBMITTAL**
- P Prints
 - S Septia or other transparency
 - CC Catalog cuts
 - Sa Sample
 - Cx Calculations
 - L Letter
 - C Certificate
 - M Maint. mat. or extra stock

T Test of inspect. Other _____

SUBMITTED BY: _____
 MAIL HAND EXPRESS

NOTE: UPPER PORTION OF BOX
 DENOTES CONSULTANT'S ACTION;
 LOWER PORTION DENOTES
 ARCHITECT'S ACTION.

PROJECT NO. **TWA-2015-04**

PROJECT: **Renovations to Hampton St. Auditorium**
 Walterboro, Colleton County, SC

ACTION REQ'D. OF CONTRACTOR		ARCHITECT'S ACTION/CONSULTANT'S ACTION	
+	--	+	--
DO NOT RESUBMIT (OK)	REVISE AND RESUBMIT (RR)	MAKE NEW CONFORM. SUBMITTAL (NS)	CONFORMS NOTE COMMENTS (CC) REJECTED (R)

ARCHITECTS REVIEW IS ONLY FOR CONFORMANCE WITH DESIGN CONCEPT AND INFORMATION IN THE CONTRACT DOCUMENTS

Contractor shall inform Architect of deviations in writing. Request substitutions only by the specified procedures, not by the submittal process. Marks and comments shall not relieve the Contractor from responsibility for deviations there from, nor from any responsibility for errors and omissions in his submittal. Approval of a specific item does not include approval of the assembly of which the item is a component. Contractor is responsible for details and accuracy, for confirming quantities, dimensions and fit, for fabrication process, for the means, methods, sequences and techniques of assembly and construction, for safe performance of the work, and for the coordination of the work of all trades. Contractor shall not fabricate or install unless positive action is granted by the Architect.

TYCH & WALKER ARCHITECTS, LLP
 reviewed by: _____ Date: _____

Consultant reviewed by: _____ Date: _____

ITEM (a, b, c, etc.)	NO. OF COPIES	FORM	SECTION PARAGRAPH NO. OR DWG. & DET. REF. NO.	DESCRIPTION OF SUBMITTAL	SOURCE (NAME OF MNF, FABRICATOR, OF GEN. CONTR.

THIS SUBMITTAL DEVIATES FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS IN THE FOLLOWING WAYS: _____

ATTACH ANOTHER SHEET IF REQUIRED

I/WE HAVE CHECKED, COORDINATED, AND APPROVED THIS SUBMITTAL. THIS SUBMITTAL, EXCEPT FOR THE DEVIATIONS NOTED ABOVE, IS IN CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS

CONTRACTOR APPROVAL BY: _____

FULL SIGNATURE, NOT INITIALS

PO Box 509
Pawleys Island, SC 29585
843.651.7151

CADD FILE LETTER OF AGREEMENT

An Agreement Between the Architect and General Contractor
for Transfer of Computer Aided Drafting and Design (CADD) Files on Electronic Media.

Date:

Architect: Tych & Walker Architects, LLP
P.O. Box 509
Pawleys Island, SC 29585

Contractor:

Project Name: Renovations to Hampton St. Auditorium

Architects Project No.: TWA-2015-04

The Architect will provide the following CADD files, dated _____, to the General Contractor only for information purposes only:

LIST OF FILES REQUESTED

Consultant drawings can be made available on electronic media, including but not limited to Structural, Plumbing/Fire Protection, Mechanical and Electrical.

Drawing(s) were prepared using the following:

Software: AutoCadd Version: ADT 2014

Drawing(s) are to be delivered on the following media:

The General Contractor shall pay the Architect a service fee which reflects the Architect's costs for assembling, copying and transmitting the file(s), in accordance with the following rate schedule:

DOCUMENT TYPE	AMOUNT	QTY OF FILES	SUBTOTAL
AutoCAD	\$25 per File		\$
Adobe PDF	\$10 per File		\$
TOTAL			\$

NOTE: File = for example Sheet A2.0 = 1 drawing file.

TERMS AND CONDITIONS

1. The Architect makes no representation as to the compatibility of the CADD files with any hardware or software. The General Contractor shall notify the Architect within 7 days of any problems associated the compatibility of the data contained on the media provided.
2. Since the information set forth on the CADD files can be modified unintentionally or otherwise, the Architect will remove all indications of ownership and/or involvement from each electronic display.
3. All information on the CADD files is considered instruments of service of the Architect and shall not be used for other projects, for additions to this project, or completion of this project by others. CADD files shall remain the property of the Architect, and in no case shall the transfer of these files be considered a sale.
4. The Architect makes no representation regarding the accuracy, completeness or permanence of CADD files. Addenda information or revisions made after the date indicated on the CADD files may not have been incorporated. In the event of a conflict between the Architect's sealed contract drawings and CADD files, the sealed contract drawings shall govern. It is the General Contractor's responsibility to determine if any conflicts exist. The CADD files shall not be considered to be Contract Documents as defined by the General Conditions of the Contract for Construction.
5. The use of CADD files prepared by the Architect shall not in any way relieve the Contractor's responsibility for the proper checking and coordination of dimensions, details and quantities of materials as required to facilitate complete and accurate construction of the Project.
6. The General Contractor shall, to the fullest extent permitted by law, indemnify, defend and hold harmless the Architect, and its subconsultants from any and all claims, damages, losses, expenses, penalties and liabilities of any kind, including attorney's fees, arising out of or resulting from the use of the CADD files by the General Contractor, or by third party General Contractors of the CADD files from the General Contractor.
7. The General Contractor shall take all reasonable steps necessary to maintain in effect with each of the General Contractor's employees, agents, and subcontractors, a policy of protection of Architect's rights to the information covered by this Agreement.
8. The Architect believes that no licensing or copyright fees are due to others on account of the transfer of the CADD files, but to the extent any are, the General Contractor will pay the appropriate fees and hold the Architect harmless from such claims.
9. Any purchase order number provided by the General Contractor is for General Contractor's accounting purposes only. Purchase order items and conditions are void and are not part of this agreement.
10. Payment of the service fee is due prior to receipt of the CADD Files.
11. This agreement shall be governed by the laws of the principal place of business of the Architect.

AUTHORIZED ACCEPTANCE

by Architect:

by General Contractor:

Signature

Signature

Printed Name and Title

Printed Name and Title

Date

Date

SECTION 01400
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality control and control of installation.
- B. Tolerances.
- C. References.
- D. Labeling.
- E. Mock-up requirements.
- F. Testing and inspection services.
- G. Manufacturers' field services.
- H. Examination.
- I. Preparation.

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. When manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce required and specified quality.
- F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

- C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date of Contract Documents, except where specific date is established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. When specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.5 LABELING

- A. Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.
- B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.

1.6 MOCK-UP REQUIREMENTS

- A. Tests will be performed under provisions identified in this section and identified in respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be comparison standard for remaining Work.
- D. Where mock-up has been accepted by Architect/Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by Architect/Engineer.

1.7 TESTING AND INSPECTION SERVICES

- A. The General Contractor **will employ and pay for services** of an independent firm to perform testing and inspection, complete, as described in this section and elsewhere in the contract documents.
- B. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and section in Division 1 of these specifications.
- C. Requirements for testing may be described in various sections of these specifications.

- D. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time registered Engineer specialist and responsible officer.
- E. The independent firm will perform tests, inspections and other services specified in individual specification sections and as required by Architect/Engineer.
1. Laboratory: Authorized to operate at Project location in State of South Carolina.
 2. Laboratory Staff: Maintain full time registered Engineer on staff to review services.
 3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.
- F. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing as required by Architect/Engineer or Owner.
- G. Reports will be submitted by independent firm to Architect/Engineer, Contractor, and authority having jurisdiction, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
1. Submit final report indicating correction of Work previously reported as non-compliant.
- H. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
1. Notify Architect/Engineer and independent firm 24 hours prior to expected time for operations requiring services.
 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- I. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
1. Laboratory is not authorized to release, revoke, alter or enlarge on requirements of contract documents, approve or accept any portion of the work, perform any duties of contractor.
- J. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Architect/Engineer. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.
- K. Agency Responsibilities:
1. Test samples of mixes submitted by Contractor.
 2. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.
 3. Perform specified sampling and testing of products in accordance with specified standards.
 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 5. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or products.
 6. Perform additional tests required by Architect/Engineer.
 7. Attend preconstruction meetings and progress meetings.
- L. Agency Reports: After each test, promptly submit two copies of report to Architect/Engineer, Contractor, and authority having jurisdiction. When requested by Architect/Engineer, provide interpretation of test results. Include the following:
1. Date issued.
 2. Project title and number.

3. Name of inspector.
 4. Date and time of sampling or inspection.
 5. Identification of product and specifications section.
 6. Location in Project.
 7. Type of inspection or test.
 8. Date of test.
 9. Results of tests.
 10. Conformance with Contract Documents.
- M. Limits On Testing Authority:
1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency or laboratory may not approve or accept any portion of the Work.
 3. Agency or laboratory may not assume duties of Contractor.
 4. Agency or laboratory has no authority to stop the Work.
- N. Testing (the following items are paid for by the General Contractor as referenced in Section 01200 Price and Payment Procedures and Division 2):
Testing laboratory inspection, sampling and/or testing is required for, but is not necessarily limited to, the following:
Section 03200 - Concrete Reinforcement: Placement of Reinforcement
Section 03300 - Cast-in-Place Concrete: Placement of Concrete
1. SOIL INSPECTING AND TESTING
 - a. Make required inspections and tests including, but not necessarily limited to:
 - b. Visually inspect on-site and imported fill and backfill, making such tests and retests as are necessary to determine compliance with the Contract requirements and suitability for the proposed purpose.
 - c. Make field density tests on samples from in-place material as required.
 - d. As pertinent, inspect and test the scarifying and recompacting of cleaned subgrade; inspect the progress of excavating, filling and grading; make density tests at fills and backfills; and verify compliance with provisions of the contract documents and governmental agencies having jurisdiction.
 - e. Make and distribute necessary reports and certificates.
 2. CONCRETE INSPECTING AND TESTING
 - a. Portland Cement:
 - 1) Secure from the cement manufacturer Certificates of Compliance delivered directly to the concrete producer for further delivery directly to the testing laboratory.
 - 2) Require the Certificates of Compliance to positively identify the cement as to production lot, bin or silo number, dating and routing of shipment, and compliance with the specific standards.
 - 3) If so required by the Architect, promptly provide such other specific physical and chemical data as requested.
 - b. Aggregate:
 - 1) Provide one test unless character of materials changes, material is substituted, or additional test is required by the Architect.
 - 2) Sample from conveyor belts or batching gates at the ready-mix plant:
 - 3) Sieve analysis to determine compliance with specified standards and grading.
 - 4) Specific gravity test for compliance with specified standards.
 - c. Laboratory Design Mix:

- 1) After approval of aggregate, and whenever character or source of materials is changed, provide mix design in accordance with ACI 613.
 - 2) Provide designs for all mixes prepared by a licensed civil engineer.
3. QUALITY CONTROL CONCRETE TESTING DURING CONSTRUCTION
- a. Sampling and testing for quality control during placement of concrete shall include sampling fresh concrete (ASTM C 172), except modified for slump to comply with (ASTM C 94) and shall further include the following:
 - 1) Slump: ASTM C143; one test for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.
 - 2) Air Content: ASTM C 173; volumetric method for normal weight concrete; ASTM C 231 pressure for normal weight concrete; one for each set of compressive strength test specimens.
 - 3) Concrete Temperature: Test hourly when air temperature is 40 degrees F (4 degrees C) and below, and when 80 degrees F (27 degrees C) and above; and each time a set of compression test specimens is made.
 - 4) Compression Test Specimen: ASTM C 31; one set of 6 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
 - 5) Compressive Strength Tests: ASTM C 39; one set for each 100 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 5,000 sq. ft. or fraction thereof of surface area placed; 2 specimens tested at 7 days, 2 specimens tested at 28 days, and two specimens retained in reserve for later testing if required.
 - b. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 - c. When total quantity of a given class of concrete is less than 50 cu. yds, strength test may be waived by Architect if, in his judgment, adequate evidence of satisfactory strength is provided.
 - d. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive by more than 500 psi.
 - e. Test results will be reported in writing directly to Architect/Engineer and Contractor no later than one day after tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
 - f. The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect/Engineer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

4. CONCRETE REINFORCEMENT INSPECTING AND TESTING
 - a. Prior to use, test all reinforcement steel bars for compliance with the specified standards:
 - 1) Materials identified by mill test reports and certified by the testing laboratory does not require additional testing. Require the supplier to furnish mill test reports to the testing laboratory for certification.
 - 2) Tag identified steel at the supplier's shop. When steel arrives at the job site without such tags, test it as identified steel.
 - 3) Unidentified steel:
 - a) Have the testing laboratory select samples consisting of two pieces, each 18 mg. in size.
 - b) Have the testing laboratory make one tensile test and one bend test for each
 - 4) 2-1/2 tons or fraction thereof of each size of unidentified steel.
 - 5) Provide continuous inspection for all welding of reinforcement steel.

1.8 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Refer to Section 01330 - Submittal Procedures, MANUFACTURERS' FIELD REPORTS article.

1.9 WAIVER OF INSPECTION AND/OR TESTS

- A. Specified inspections and/or tests may be waived only by the specific approval of the Architect/Engineer and such waivers will be expected to result in credit to the Owner, equal to normal cost of such inspection and/or test.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION

SECTION 01500
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities:
 - 1. Temporary electricity.
 - 2. Temporary lighting for construction purposes.
 - 3. Temporary heating.
 - 4. Temporary cooling.
 - 5. Temporary ventilation.
 - 6. Telephone service.
 - 7. Facsimile service.
 - 8. Temporary water service.
 - 9. Temporary sanitary facilities.

 - B. Construction Facilities:
 - 1. Field offices and sheds.
 - 2. Vehicular access.
 - 3. Parking.
 - 4. Progress cleaning and waste removal.
 - 5. Project identification.
 - 6. Traffic regulation.
 - 7. Fire prevention facilities.

 - C. Temporary Controls:
 - 1. Barriers.
 - 2. Enclosures and fencing.
 - 3. Security.
 - 4. Water control.
 - 5. Dust control.
 - 6. Erosion and sediment control.
 - 7. Noise control.
 - 8. Pest control.
 - 9. Pollution control.
 - 10. Rodent control.

 - D. Removal of utilities, facilities, and controls.
- 1.2 TEMPORARY ELECTRICITY
- A. Provide and pay for power service required from utility source as needed for construction operation.

 - B. Provide temporary electric feeder from electrical service at location as directed by Architect/Engineer. Do not disrupt Owner's use of service.

 - C. Complement existing power service capacity and characteristics as required for construction operations.

 - D. Provide power outlets, with branch wiring and distribution boxes located as required for construction operations. Provide flexible power cords as required for portable construction tools and equipment.

- E. Provide main service disconnect and over-current protection at convenient location.
- F. Permanent convenience receptacles may be utilized during construction.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain incandescent lighting for construction operations to achieve minimum lighting level of 2 watt/sq ft.
- B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas entire site after dark for security purposes.
- C. Provide and maintain 0.25 watt/sq ft HID lighting to interior work areas after dark for security purposes.
- D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps for specified lighting levels.
- E. Maintain lighting and provide routine repairs.
- F. Permanent building lighting may not be utilized during construction.

1.4 TEMPORARY HEATING

- A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Prior to operation of permanent equipment for temporary heating purposes, verify installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
- C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in product sections.

1.5 TEMPORARY COOLING

- A. Provide and pay for cooling devices and cooling as needed to maintain specified conditions for construction operations. Provide separate metering and reimburse Owner for cost of energy used.
- B. Prior to operation of permanent equipment for temporary cooling purposes, verify installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
- C. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.6 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.7 TELEPHONE SERVICE

- A. Provide, maintain, and pay for telephone service to field office at time of project mobilization.

1.8 TEMPORARY WATER SERVICE

- A. Provide and pay for suitable quality water service as needed to maintain specified conditions for construction operations. Connect to existing water source.
- B. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

1.9 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of project mobilization.
- B. At end of construction, existing facilities at Building "C" shall be demolished..

1.10 FIELD OFFICES AND SHEDS

- A. Designated existing spaces may be used for field offices:
 - 1. Building "C" as defined on the Civil Drawings and within the sequence of work defined in the Summary of Work.
- B. If not used provide the following:
 - 1. Office: Weather tight, with lighting, electrical outlets, heating, cooling and ventilating equipment, and equipped with sturdy furniture drawing rack, and drawing display table.
 - 2. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
 - 3. Locate offices and sheds minimum distance of 20 feet from existing and new structures.
 - 4. When permanent facilities are enclosed with operable utilities, relocate offices and storage into building, with written agreement of Owner, and remove temporary buildings.
 - 5. Construction: Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations with steps and landings at entrance doors.
 - a. Construction: Structurally sound, secure, weather tight enclosures for office and storage spaces. Maintain during progress of Work; remove when no longer needed.
 - b. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.
 - c. Exterior Materials: Weather resistant, finished in one color acceptable to Architect/Engineer.
 - d. Interior Materials in Offices: Sheet type materials for walls and ceilings, pre-finished or painted; resilient floors and bases.
 - e. Lighting for Offices: 50 ft C at desk top height, exterior lighting at entrance doors.
 - f. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.
- C. Environmental Control:

1. Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain comfort conditions.
 2. Storage Spaces: Heating and ventilation as needed to maintain products in accordance with Contract Documents; lighting for maintenance and inspection of products.
- D. Storage Areas And Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 01600 - Product Requirements.
- E. Preparation: Fill and grade sites for temporary structures sloped for drainage away from buildings.
- F. Installation:
1. Install office spaces ready for occupancy fifteen days after date fixed in Notice to Proceed.
 2. Employee Residential Occupancy: Not allowed on Owner's property.
- G. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

1.11 VEHICULAR ACCESS

- A. Construct temporary access roads from public thoroughfares to serve construction area, of width and load bearing capacity to accommodate unimpeded traffic for construction purposes as indicated on Civil Drawings.
- B. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.
- C. Extend and relocate vehicular access as Work progress requires, provide detours as necessary for unimpeded traffic flow.
- D. Location approved by Architect/Engineer.
- E. Provide unimpeded access for emergency vehicles. Maintain 20 feet wide driveways with turning space between and around combustible materials.
- F. Provide and maintain access to fire hydrants and control valves free of obstructions.
- G. Provide means of removing mud from vehicle wheels before entering streets.
- H. Use designated existing on-site roads for construction traffic.

1.12 PARKING

- A. Construct temporary gravel surface parking areas to accommodate construction personnel. Refer to Civil Drawings for parking area for personnel. Final location to be determined at pile construction meeting.
- B. Locate as approved by Architect/Engineer.
- C. When site space is not adequate, provide additional off-site parking.
- D. Use of designated existing on-site streets and driveways used for construction traffic is permitted. Tracked vehicles not allowed on paved areas.

- E. Use of existing parking facilities used by construction personnel is not permitted.
- F. Do not allow heavy vehicles or construction equipment in parking areas.
- G. Do not allow vehicle parking on existing pavement.
- H. Permanent Pavements And Parking Facilities:
 - 1. Prior to Substantial Completion, bases for permanent roads and parking areas may be used for construction traffic.
 - 2. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.
 - 3. Use of permanent parking structures is not permitted.
- I. Maintenance:
 - 1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
 - 2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.
- J. Removal, Repair:
 - 1. Remove temporary materials and construction before Substantial Completion.
 - 2. Remove underground work and compacted materials to depth of 2 feet; fill and grade site as specified.
 - 3. Repair existing facilities damaged by use, to original condition.
- K. Mud From Site Vehicles: Provide means of removing mud from vehicle wheels before entering streets.
- L. Establish temporary parking surface for Department of Special Needs Building "A" at corner of Dozier and Church streets with an ADA accessible path to their building entry.

1.13 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing spaces.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect waste materials, debris, and rubbish. The material shall be sorted in separate dumpster bins as provided by Georgetown County. Georgetown County will remove dumpsters and replace dumpsters weekly. The Contractor shall coordinate with Georgetown County concerning quantity and timing. It is the intent that the Contractor recycle as much construction waste as possible. There will be no landfill fee.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.14 PROJECT IDENTIFICATION

- A. Project Identification Sign:
 - 1. One painted sign, 32 sq ft area, bottom 6 feet above ground.

2. Content:
 - a. Project title, logo and name of Owner as indicated on Contract Documents.
 - b. Names and titles of authorities.
 - c. Names and titles of Architect/Engineer and Consultants.
 - d. Name of Prime Contractor and major Subcontractors.
 3. Graphic Design, Colors, Style of Lettering: Designated by Architect/Engineer.
- B. Project Informational Signs:
1. Painted informational signs of same colors and lettering as Project Identification sign, or standard products; size lettering for legibility at 100 feet distance.
 2. Provide sign at each field office, storage shed, and directional signs to direct traffic into and within site. Relocate as Work progress requires.
 3. No other signs are allowed except those required by law.
- C. Design sign and structure to withstand 60 miles/hr wind velocity.
- D. Sign Painter: Experienced as professional sign painter for minimum three years.
- E. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.
- F. Show content, layout, lettering, color, foundation, structure, sizes, and grades of members.
- G. Sign Materials:
1. Structure and Framing: New, wood, structurally adequate.
 2. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inches thick, standard large sizes to minimize joints.
 3. Rough Hardware: Galvanized.
 4. Paint and Primers: Exterior quality, two coats; sign background of color as selected.
 5. Lettering: Exterior quality paint, contrasting colors as selected.
- H. Installation:
1. Install project identification sign within 15 days after date fixed by Notice to Proceed.
 2. Erect at designated location.
 3. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
 4. Install sign surface plumb and level, with butt joints. Anchor securely.
 5. Paint exposed surfaces of sign, supports, and framing.
- I. Maintenance: Maintain signs and supports clean, repair deterioration and damage.
- J. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.15 TRAFFIC REGULATION

- A. Haul Routes:
1. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
 2. Confine construction traffic to designated haul routes.
 3. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

- B. Removal:
 - 1. Remove equipment and devices when no longer required or at Substantial Completion.
 - 2. Repair damage caused by installation.
 - 3. Remove post settings to depth of 2 feet.

1.16 FIRE PREVENTION FACILITIES

- A. Prohibit smoking with buildings under construction and demolition. Designate area on site where smoking is permitted. Provide approved ashtrays in designated smoking areas.
- B. Establish fire watch for cutting and welding and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.
- C. Standpipes: Install minimum one standpipe for use during construction before building reaches 40 feet in height.
- D. Portable Fire Extinguishers: NFPA 10; 10 pound capacity, 4A-60B: C UL rating.
 - 1. Provide one fire extinguisher at each stair on each floor of buildings under construction and demolition.
 - 2. Provide minimum one fire extinguisher in every construction trailer and storage shed.
 - 3. Provide minimum one fire extinguisher on roof during roofing operations using heat producing equipment.

1.17 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.18 ENCLOSURES AND FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide 6 feet high fence around construction site; equip with vehicular and pedestrian gates with locks as defined in units of construction on Civil Drawings.
- C. Exterior Enclosures:
 - 1. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.19 SECURITY

- A. Security Program:
 - 1. Protect Work existing premises from theft, vandalism, and unauthorized entry.
 - 2. Initiate program at project mobilization.
 - 3. Maintain program throughout construction period until Owner occupancy.
- B. Entry Control:
 - 1. Restrict entrance of persons and vehicles into Project site.
 - 2. Allow entrance only to authorized persons with proper identification.
 - 3. Maintain log of workers and visitors, make available to Owner on request.

1.20 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.21 DUST CONTROL

- A. Execute Work by methods to minimize raising dust from construction operations and in conformance with City of Georgetown ordinance or SC DHEC regulations.
- B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.22 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize surface area of bare soil exposed at one time.
- C. Provide temporary measures including berms, dikes, and drains, and other devices to prevent water flow.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.23 NOISE CONTROL

- A. Provide methods, means, and facilities to minimize noise from and noise produced by construction operations.

1.24 PEST CONTROL

- A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work and entering facility.

1.25 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.
- B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.26 RODENT CONTROL

- A. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

1.27 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, and materials prior to Substantial Completion inspection.
- B. Remove underground installations to minimum depth of 2 feet. Grade site as indicated on Drawings.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01600
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.
- E. Product substitution procedures.
- F. Equipment electrical characteristics and components.

1.2 PRODUCTS

- A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.
- C. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.
- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.
- E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
- J. Material Moisture and Mold Control: Comply with recommendations contained in Associated General Contractors (AGC) document "Managing the Risk of Mold in the Construction of Buildings." Prepare and submit plan for protecting materials from water damage, including the following:
 - 1. Indicate delivery, checking and storage operations affected by water damage control efforts.
 - 2. Indicate procedures for protecting porous materials from water damage, and how damaged materials will be handled.
 - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet work has dried sufficiently to permit installation of related finish materials.
 - 4. Describe protocol for dealing with large and unexpected water intrusion into completed portions of building. Indicate procedures for investigation of cause and effects, and methods for dealing with both.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTION PROCEDURES

- A. Instructions to Bidders Section 00100 specify time restrictions for submitting requests for Substitutions during bidding period to requirements specified in this section.
 - 1. **No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.**

2. If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner. If substitution is not addressed in an Addendum, it shall be considered not approved.
 3. No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.
- B. Substitutions may be considered by the Architect when a product becomes unavailable through no fault of Contractor.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A request constitutes a representation that Contractor:
1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 2. Will provide same warranty for Substitution as for specified product.
 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 4. Waives claims for additional costs or time extension which may subsequently become apparent.
 5. Will reimburse Owner and Architect/Engineer for review or redesign services associated with re-approval by authorities having jurisdiction or additional time expended by Architect/Engineer to review information.
- E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Contract Documents.
- F. Substitution Submittal Procedure:
1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
 2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
 3. Architect/Engineer will notify Contractor in writing of decision to accept or reject request. The architect decision will be final.
 4. Architect/Engineer will notify the Contractor if redesign services or additional review services will be charged to the Contractor.

PART 2 PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.
- B. Cord and Plug: Furnish minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01700
EXECUTION REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Starting of systems.
- D. Demonstration and instructions.
- E. Testing, adjusting and balancing.
- F. Protecting installed construction.
- G. Project record documents.
- H. Operation and maintenance data.
- I. Manual for materials and finishes.
- J. Manual for equipment and systems.
- K. Spare parts and maintenance products.
- L. Product warranties and product bonds.
- M. Maintenance service.
- N. Moisture and Mold Control

1.2 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.
- B. Provide submittals to Architect/Engineer required by authorities having jurisdiction.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

- C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.
- D. Replace filters of operating equipment. Filters shall be MERV rated.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 STARTING OF SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect/Engineer seven days prior to start-up of each item.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative or Contractors' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 01330 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of final inspection. The demonstration will be documented by the Contractor with a full sign-in sheet of all in attendance.
- B. Demonstrate Project equipment and instruct in classroom environment located at project site and instructed by qualified manufacturer's representative who is knowledgeable about the Project.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at designated location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. Required instruction time for each item of equipment and system is specified in individual sections.

1.6 TESTING, ADJUSTING AND BALANCING

- A. Owner will appoint and employ services of independent firm to perform testing, adjusting, and balancing. Contractor shall pay for services.
- B. Reports will be submitted by independent firm to Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.7 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.
- G. Protect elevator cabs. They will not be allowed for use during construction.

1.8 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.

- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first main floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract drawings.
- G. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.9 OPERATION AND MAINTENANCE DATA

- A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.

- d. Originals of warranties and bonds.

1.10 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes fifteen days prior to final inspection. Draft copy be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within ten days after final inspection.
- E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations.
- F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.
- H. Additional Requirements: As specified in individual product specification sections.
- I. Include listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.11 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes fifteen days prior to final inspection. Draft copy be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within ten days after final inspection.
- E. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

- F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
 - G. Include color coded wiring diagrams as installed.
 - H. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and special operating instructions.
 - I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
 - J. Include servicing and lubrication schedule, and list of lubricants required.
 - K. Include manufacturer's printed operation and maintenance instructions.
 - L. Include sequence of operation by controls manufacturer.
 - M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
 - N. Include control diagrams by controls manufacturer as installed.
 - O. Include Contractor's coordination drawings, with color coded piping diagrams as installed.
 - P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
 - Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
 - R. Include test and balancing reports as specified in Section 01400 - Quality Requirements.
 - S. Additional Requirements: As specified in individual product specification sections.
 - T. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
- 1.12 SPARE PARTS AND MAINTENANCE PRODUCTS
- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.
 - B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.
- 1.13 PRODUCT WARRANTIES AND PRODUCT BONDS
- A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

- B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.
- F. Submit prior to final Application for Payment.
- G. Time Of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
 - 2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.14 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections for one year from date of Substantial Completion during warranty period.
- B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.
- D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

1.15 MOISTURE AND MOLD CONTROL

- A. General: Coordinate requirements in Contractor's approved Material and Mold Control Plan as describe in Section 01600 "Product Requirements". Avoid trapping water in finished work. Document visible signs of mold that may appear during construction. Comply with recommendations contained in Associated General Contractors (AGC) document "Managing the Risk of Mold in the Construction of Buildings," including the following:
 - 1. Exposed Phase of Construction
 - a. Protect porous materials from water damage.
 - b. Protect stored and installed material from flowing or standing water.
 - c. Keep porous and organic materials from coming into prolonged contact with concrete.
 - d. Remove standing water from decks.
 - e. Keep deck openings covered or dammed.
 - f. Use dunnage to create space between concrete decks and stored drywall.
 - 2. Partially Enclosed Phase of Construction:

- a. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - b. Keep interior spaces reasonably clean and protected from water damage.
 - c. Periodically collect and remove waste containing cellulose or other organic matter.
 - d. Discard or replace water-damaged material.
 - e. Do not install material that is wet.
 - f. Discard, replace or clean stored or installed material that begins to grow mold.
 - g. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
3. Controlled Phase of Construction:
 - a. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 - b. Utilize permanent HVAC system to control humidity.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01730 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.

1.3 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, which results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety.

1.4 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Existing Utility Services: Where existing operational services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed.

END OF SECTION 01730

SECTION 02220 - SITE CLEARING AND EROSION CONTROL

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 the following:
 - 1. Protecting existing vegetation to remain.
 - 2. Removing existing vegetation.
 - 3. Clearing and grubbing.
 - 4. Stripping, stockpiling and removing topsoil.
 - 5. Temporary erosion and sedimentation control measures.

1.3 REGULATORY REQUIREMENTS

- A. Site clearing and erosion control shall comply with the following:
 - 1. South Carolina DHEC Bureau of Water and City of Walterboro Stormwater Program Permitting Standards and Procedures Manual, latest edition.
 - 2. Materials and execution requirements that are not covered in this Section shall comply with DHEC standards.
 - 3. Materials and execution requirements that are covered, but are in conflict with SC DHEC standards, shall comply with DHEC and City of Walterboro Stormwater Program Permitting Standards and Procedures Manual, latest edition.
 - 4. Contractor is responsible for all measures necessary for erosion control in compliance with DHEC and City of Walterboro Stormwater Program Permitting Standards and Procedures Manual, latest edition, including, but not limited to the following:
 - a. Construction of diversion ditches.
 - b. Temporary seeding.
 - c. Erosion control blankets (ECBs).
 - d. Turf reinforcement mats (TRMs).
 - e. Flexible growth matrix (FGM).
 - f. Permanent seeding.
 - g. Sodding.
 - h. Riprap.
 - i. Outlet protection.
 - j. Dust control.

TYCH & WALKER ARCHITECTS, LLP

1.4 DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other non-soil materials.
- B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.5 MATERIAL OWNERSHIP

- A. Except for stripped topsoil to be stockpiled on site or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.6 SUBMITTALS

- A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.
- B. Record drawings, according to Division 01 Section "Project Record Documents," identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.
- C. Minutes of preconstruction conference.

1.7 QUALITY ASSURANCE

- A. Preconstruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination" and the requirements of the NPDES Permit.
- B. Authorities Having Jurisdiction: Conform to requirements of all authorities having jurisdiction.
 - 1. Where conflicts exist between the requirements of the Contract Documents and those of authorities having jurisdiction, the higher quality or more restrictive requirement shall apply.

1.8 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, bike paths or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

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- B. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing. Do not proceed with operations until existing utilities are located and clearly marked.
- C. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.
- D. Suspend clearing operations during wet conditions unless otherwise directed by the Owner and/or Engineer.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Satisfactory Soils: ASTM D 2487 Soil Classification Groups SC, SM, GC, GM or ML; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter, or as approved by geotechnical engineer.
 - 1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

2.2 EROSION CONTROL MATERIALS

- A. Silt Fence Geotextile: Woven geotextile fabric, manufactured for silt fence applications, made from polyolefins or polyesters; with elongation less than 20 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Grab Tensile Strength: 500 lbf; ASTM D 4632.
 - 2. Tear Strength: 275 lbf; ASTM D 4533.
 - 3. Permittivity: 0.10 per second, minimum; ASTM D 4491.
 - 4. UV Stability: 70 percent after 500 hours' exposure; ASTM D 4355.
- B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Survivability: Class 2; AASHTO M 288.
 - 2. Grab Tensile Strength: 247 lbf; ASTM D 4632.
 - 3. Sewn Seam Strength: 222 lbf; ASTM D 4632.
 - 4. Tear Strength: 90 lbf; ASTM D 4533.
 - 5. Puncture Strength: 90 lbf; ASTM D 4833.
 - 6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
 - 7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
 - 8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.
- C. Silt Fence Post: Steel, either integrally manufactured with the silt fence as part of a complete system or separately provided. Where separately provided, the following shall apply:
 - 1. Steel posts: T cross-sectional shape with nominal face width of 1.38 inches. Minimum weight 1.3 pounds per foot. Shall have projections to aid in fastening wire of fabric. Shall have a metal plate welded near the bottom such that, when driven to proper depth, it will be below ground and will aid stability. Painted with water-based enamel paint.
 - 2. Fasteners: Galvanized wire or other fasteners as required for a secure installation.
 - 3. Maximum Spacing: 6 feet on center.
- D. Woven Wire Fabric: ASTM A 116, Class1, wire and opening sizes as indicated.

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- E. Erosion Control Blankets (ECBs): Products composed primarily of biologically, photochemically or otherwise degradable constituents such as wheat straw, coconut fiber, or aged curled excelsior wood product with longevity of approximately 1- to 3-years, complying with South Carolina DHEC Storm Water Management BMP Handbook.
- F. Turf Reinforcement Mats (TRMs): products composed primarily of non-degradable products that enhance the ability of living plants to stabilize soils. They bind with roots to reinforce the soil matrix with longevity greater than 5 years, complying with South Carolina DHEC Storm Water Management BMP Handbook.
- G. Erosion Control Aggregate: Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements for Coarse Aggregate #57 as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
 - 1. Material shall be free of shale, clay, friable material, debris, waste, frozen materials, vegetation, organic material, or other deleterious matter.
- H. Riprap: Broken, irregular size and shape, graded stone conforming to Section 804 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
 - 1. Gradation: Class B.

2.3 TREE PROTECTION MATERIALS

- A. Fence Material: As indicated. Orange polypropylene safety mesh, as indicated. Minimum weight 16 lbs per 4 foot x 100 foot roll.
- B. Wood Posts and Rails: As indicated. 2 inch x 4 inch framing lumber. Minimum post length is 6 feet.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly flag trees and vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to South Carolina DHEC Storm Water Management BMP Handbook or the requirements of authorities having jurisdiction, whichever is more stringent.
- B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

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- C. When directed by Engineer, remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE PROTECTION (As needed)

- A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
 - 1. Do not store construction materials, debris, or excavated material within fenced area.
 - 2. Do not permit vehicles, equipment, or foot traffic within fenced area.
 - 3. Maintain fenced area free of weeds and trash.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-line spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
 - 1. Cover exposed roots with burlap and water regularly.
 - 2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 - 3. Coat cut faces of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
 - 4. Backfill with soil as soon as possible.
- D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Engineer.
 - 1. Employ an arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
 - 2. Replace trees that cannot be repaired and restored to full-growth status, as determined by Engineer.

3.4 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. Arrange with utility companies to shut off indicated utilities.
 - 2. Owner will arrange to shut off indicated utilities when requested by Contractor.
- B. Excavate for and remove underground utilities indicated to be removed.
- C. Fill depressions caused by utility removal operations with satisfactory soil material unless further excavation or earthwork is indicated and is to be performed immediately. Do not leave depressions overnight.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.
- D. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under for following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner, Engineer and operating utility not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without the permission of all of the parties noted above.

3.5 CLEARING AND GRUBBING

- A. All clearing and grubbing work shall be done in accordance with the requirements of the South Carolina Department of Transportation Standard Specifications for Highway Construction (current edition).
- B. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.
 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
 3. Completely remove stumps and roots greater than 1" in diameter, obstructions, and debris extending to a depth of 24 inches below exposed subgrade.
 4. Use only hand methods for grubbing within tree protection zone.
- C. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated and is to be performed immediately. Do not leave depressions overnight.
 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
 1. Remove subsoil and non-soil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.
- C. Dispose of topsoil as specified for surplus soil material in disposal article below.
- D. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil, in accordance with South Carolina DHEC Storm Water Management BMP Handbook. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 1. Limit height of topsoil stockpiles to 10 feet.
 2. Do not stockpile topsoil within tree protection zones.
 3. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

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- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.
 - 2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

3.8 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil. Remove or burn obstructions, demolished materials, and waste materials including trash and debris.
 - 1. Legally dispose of removed materials off Owner's property.
 - 2. All chipping operations shall be legally conducted so as to not adversely affect the project schedule.
 - 3. Chipping operations shall not be undertaken where noise is likely to disturb adjacent occupants and shall be suspended if complaints are received.
 - 4. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION 02220

SECTION 02240 - DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes construction dewatering.

1.3 PERFORMANCE REQUIREMENTS

- A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.
 - 1. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
 - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 3. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
 - 4. Remove dewatering system when no longer required for construction.

1.4 SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Other Informational Submittals:
 - 1. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer that has specialized in design of dewatering systems and dewatering work.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction. Comply with SCDHEC Regulations.
- C. Authorities having jurisdiction: Conform to requirements of all authorities having jurisdiction.
 - 1. Where conflict exists between the requirements of the Contract Documents and those of authorities have jurisdiction, the higher quality or more restrictive requirement shall apply.

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1.6 PROJECT CONDITIONS

- A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
1. Notify Engineer and Owner no fewer than two days in advance of proposed interruption of utility.
 2. Do not proceed with interruption of utility without Owner's written permission.
- B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data.
1. Make additional test borings and conduct other exploratory operations necessary for dewatering.
 2. The available geotechnical report is referenced elsewhere in the Project Manual.
- C. Survey Work: Where the dewatering is in the vicinity of existing structures, engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
1. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.
1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
 2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- C. Provide temporary grading to facilitate dewatering and control of surface water.

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- D. Monitor dewatering systems continuously.
- E. Promptly repair damages to adjacent facilities caused by dewatering.
- F. Protect and maintain erosion and sedimentation controls, which are specified in Division 31 Section "Site Clearing and Erosion Control," during earthwork operations.

3.2 INSTALLATION

- A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
 - 1. Space well points or wells at intervals required to provide sufficient dewatering.
 - 2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.
- B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.
- C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
 - 1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
- D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
 - 1. Maintain piezometric water level a minimum of 24 inches below surface of excavation.
- E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others and complies with the requirements of authorities having jurisdiction. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.
- F. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.
 - 1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.
- G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

END OF SECTION 02440

SECTION 02300 - EARTH MOVING

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 the following:
 - 1. Preparing subgrades for walks, pavements, lawns and grasses, and exterior plants.
 - 2. Excavating and backfilling for structures.
 - 3. Subbase course for concrete walks and pavements.
 - 4. Subbase and base course for asphalt paving.
 - 5. Subsurface drainage backfill for walls and trenches.
 - 6. Excavating and backfilling for utility trenches.
 - 7. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.
- B. Related Sections:
 - 1. Section 02220 "Site Clearing and Erosion Control" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
 - 2. Section 02240 "Dewatering" for lowering and disposing of ground water during construction.
 - 3. Section 02920 "Turf and Grasses" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.
 - 4. Section 02930 "Plants" for finish grading in planting areas and tree and shrub pit excavation and planting.

1.3 UNIT PRICES

- A. Unit prices for earth moving outside the Base Bid are included in Division 01 Section "Unit Prices."
- B. Dimensions of excavations shall be established and accepted by Engineer prior to initiation of Work. Quantity for payment shall be based on calculation of volume using accepted dimensions. Volumes documented by truck counts are not acceptable.
- C. Volumes shall be based on in-situ measure. Swell factors for expansion of excavated material will not be accepted.
- D. Payment shall not be made without prior acceptance of proposed work by the Engineer, or for quantities in excess of the quantity accepted by the Engineer or geotechnical engineer.
- E. Excavating Unsatisfactory Soils and Hauling Offsite
 - 1. Volume of naturally occurring in-situ unsatisfactory soil removed, measured in original position.
 - 2. Excavated unsatisfactory soil shall be removed from the site and legally disposed.

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- F. Excavating Unsatisfactory Soils and Stockpiling Onsite:
 - 1. Volume of naturally occurring in-situ unsatisfactory soil removed, measured in original position.
 - 2. Excavated unsatisfactory soils shall be stockpiled onsite at a location designated by the Engineer. Stockpile height shall not exceed ten feet without prior authorization from the Engineer.

- G. Backfill of Excavations of Unsatisfactory Soils or Rock with Satisfactory Soils from an Onsite Source
 - 1. Volume of satisfactory soils from an onsite source approved by the Engineer.
 - 2. Replace excavated material as quickly as practical after excavation, but not before review and acceptance of excavation by Engineer.
 - 3. Volume for payment shall be the same as established for Excavating Unsatisfactory Soils or Rock Removal as applicable.

- H. Backfill of Excavations of Unsatisfactory Soils or Rock with Borrow Soil.
 - 1. Volume of borrow soil (imported from offsite).
 - 2. Replace excavated material as quickly as practical after excavation, but not before review and acceptance of excavation by Engineer.
 - 3. Volume for payment shall be the same as established for Excavating Unsatisfactory Soils or Rock Removal as applicable.

1.4 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
- B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
 - 2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
 - 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Filter aggregate: Aggregate backfill material that acts as a filter medium in subdrainage systems.
- I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders

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of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch-wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,090 lbf and stick-crowd force of not less than 18,650 lbf; measured according to SAE J-1179.
2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 48,510-lbf breakout force with a general-purpose bare bucket; measured according to SAE J-732.

- J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- K. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- L. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SUBMITTALS

- A. Product Data: For the following:
1. Geotextile.
- B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
 2. Laboratory compaction curve according to ASTM D 1557 for each on-site and borrow soil material proposed for fill and backfill.
- C. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, which might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.
- D. Regulatory Submittals: Contractor shall make all regulatory submittals as required by the City of Waltherboro, and other authorities having jurisdiction.

1.6 REGULATORY REQUIREMENTS

- A. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of the authorities having jurisdiction.
1. City of Waltherboro.

1.7 QUALITY ASSURANCE

- A. Blasting: No blasting shall be allowed.
- B. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.
- C. Authorities Having Jurisdiction: Conform to requirements of all authorities having jurisdiction.
 - 1. Where conflict exists between the requirements of the Contract Documents and those of authorities having jurisdiction, the higher or more restrictive requirements shall apply.

1.8 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities owned by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated.
 - 1. Notify Engineer not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Engineer's written permission.
 - 3. Contact utility-locator service for area where Project is located before excavating.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, or SM, AASHTO M 145 Soil Classification Groups A-1, A-2-4, A-2-5, and A-3 or a combination of the above groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter, or as approved by geotechnical engineer.
- C. Unsatisfactory Soils: ASTM D 2487 Soil Classification Groups not included above.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction. These soils are not eligible for compensation under any Unit Price provisions for removal of unsatisfactory soil.

2.2 AGGREGATE MATERIALS

- A. Graded Aggregate Base Course (GABC): Naturally or artificially graded crushed stone (macadam) or marine limestone in accordance with Section 305 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- B. Bedding Course: Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements for Coarse Aggregate #57 as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
 - 1. Material shall be free of shale, clay, friable material, debris, waste, frozen materials, vegetation, organic material, or other deleterious matter.

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- C. Drainage Course: Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements for Coarse Aggregate #57 as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
 - 1. Material shall be free of shale, clay, friable material, debris, waste, frozen materials, vegetation, organic material, or other deleterious matter.
- D. Filter Aggregate: Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements for Coarse Aggregate #57 as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
 - 1. Material shall be free of shale, clay, friable material, debris, waste, frozen materials, vegetation, organic material, or other deleterious matter.
- E. Sand: Natural or manufactured sand in accordance with the requirements of Section 701.2.9 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- F. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.3 GEOTEXTILES

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288.
 - 1. Survivability: Class 1; Type A, B or C; SCDOT Standard Spec (latest edition).
 - 2. Grab Tensile Strength: 90 lbf; ASTM D 4632.
 - 3. Trapezoidal Tear Strength: 40 lbf; ASTM D 4533.
 - 4. Puncture Strength: 60 lbf; ASTM D 4833.
 - 5. Apparent Opening Size: No. 70 sieve, maximum; ASTM D 4751.
 - 6. Permittivity: 2.2 per second, minimum; ASTM D 4491.
 - 7. UV Stability: 70 percent after 500 hours' exposure; ASTM D 4355.
 - 8. Water Flow Rate: 150 gal/min/ft²; ASTM D 4491.
- B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Survivability: Class 2; AASHTO M 288.
 - 2. Grab Tensile Strength: 247 lbf; ASTM D 4632.
 - 3. Sewn Seam Strength: 222 lbf; ASTM D 4632.
 - 4. Tear Strength: 90 lbf; ASTM D 4533.
 - 5. Puncture Strength: 90 lbf; ASTM D 4833.
 - 6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
 - 7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
 - 8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.4 FLOWABLE FILL

- A. Flowable Fill: Low-density, self-compacting, flowable concrete material (controlled low-strength material) in accordance with the requirements as defined by Section 210 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.

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2.5 PIPE DETECTION MATERIALS

- A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows, unless required otherwise by utility company:
 - 1. Red: Electric.
 - 2. Yellow: Gas, oil, steam, and dangerous materials.
 - 3. Orange: Telephone and other communications.
 - 4. Blue: Water systems.
 - 5. Green: Sewer systems.
- B. Locator Wire In addition to warning tape where required by operating utility.
 - 1. Material, Gauge and Insulation: as required by operating utility.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 31 Section "Site Clearing and Erosion Control."
- C. Protect and maintain erosion and sedimentation controls, which are specified in Division 31 Section "Site Clearing and Erosion Control," during earthwork operations.

3.2 EXPLOSIVES

- A. Explosives: Do not use explosives.

3.3 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Project subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface runoff water away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 2. Where required, install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

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3.4 EXCAVATION, GENERAL

- A. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Engineer. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents. Changes in the Contract time may be authorized for rock excavation.
1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials. The Contract Sum will be adjusted for replacement of unsatisfactory soils according to unit prices included in the Contract Documents.
 2. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.
 - a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.
 3. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 6 inches beneath bottom of concrete slabs on grade.
 - f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

3.4 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.6 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
1. Beyond building perimeter and where specific gradients, lines, depths, and elevations are

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not indicated, excavate trenches to allow installation of top of pipe below frost line or a minimum depth of 36" below finished grade, whichever is greater.

- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
 - 1. Clearance: 12 inches each side of pipe or conduit or as indicated.
- C. Trench bottoms where bedding course is indicated: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course.
- D. Trench bottoms where no bedding course is indicated: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 - 2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
 - 3. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.7 SUBGRADE INSPECTION

- A. Notify Engineer and geotechnical engineer when excavations have reached required subgrade.
- B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding, as recommended in Geotechnical Report. Do not proof-roll wet or saturated subgrades. Proof-roll shall follow the requirements outlined in Section 211 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
 - 1. Completely proof-roll subgrade in one direction and, where dimensions permit, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 - 2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
 - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.
- D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.8 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings, utility pipe, or other construction as directed by Engineer.

3.9 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees. Stabilize stockpile per requirements of NPDES Permit.

3.10 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 4. Testing and inspecting underground utilities.
 - 5. Removing concrete formwork.
 - 6. Removing trash and debris.
 - 7. Removing temporary shoring and bracing, and sheeting.
 - 8. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.11 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Bedding Course: Where indicated or required by permitting agency, place and compact bedding course on trench bottoms. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
 - 1. Unless otherwise indicated or required by agency having jurisdiction, bedding course shall be required for the following pipe materials:
 - a. Corrugated High Density Polyethylene Pipe (AASHTO M 252M)
 - b. Corrugated Steel Pipe (ASTM A 760)
 - c. Gravity Flow Polyvinyl Chloride Pipe (ASTM D 3034)
 - d. Gravity Flow Ductile Iron Pipe (ASTM A 746)
- C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil as directed by Engineer.
- D. Flowable Fill: Where indicated or required by permitting agency place backfill of flowable fill over the utility pipe or conduit for the full depth of the trench to final subgrade elevation.
- E. Initial Backfill—Bedding Material: Where indicated or required by permitting agency, place and compact initial backfill of bedding course to a height of 2 inches over the utility pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

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- F. Initial Backfill—Satisfactory Soil: Where no other initial backfill is indicated, place and compact initial backfill of satisfactory soil to a height of 6 inches over the utility pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit.
 - 2. Coordinate backfilling with utilities testing.
- G. Backfill voids with satisfactory soil while installing and removing shoring and bracing.
- H. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- I. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.12 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.
 - 3. Under steps and ramps, use satisfactory soil material.
 - 4. Under building slabs, use satisfactory soil material.
 - 5. Under footings and foundations, satisfactory soil material.
 - 6. Make arrangements for required testing as required. Do not place subsequent layers until required testing is complete and acceptable results have been achieved and documented.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.
- D. Do not place soil fill on yielding or unapproved subgrade.

3.13 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry density.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

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- C. Compact soil materials to not less than the following percentages of maximum dry density according to ASTM D 1557:
1. Under structures, building slabs, steps, and pavements, compact each layer of backfill or fill soil material at 95 percent.
 2. Under walkways, compact each layer of backfill or fill soil material at 92 percent.
 3. Under lawn or unpaved areas, compact each layer of backfill or fill soil material at 85 percent.
 4. For utility trenches under lawns or unpaved areas, compact each layer of initial and final backfill soil material at 85 percent. For all other areas compact to the level required for that area.

3.15 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
1. Lawn or Unpaved Areas: Plus or minus 1 inch.
 2. Walks and Pavements: Plus or minus 1/2 inch.

3.16 GRADED AGGREGATE BASE COURSE (GABC)

- A. Place GABC on subgrades free of mud, frost, snow, or ice.
- B. Immediately prior to placing GABC, proof-roll subgrade as directed in the "Subgrade Inspection" paragraph above. Do not proceed with placement of GABC until subgrade is approved.
- C. On prepared and approved subgrade, place GABC under pavements as follows:
1. Place GABC material over subgrade under hot-mix asphalt pavement.
 2. Shape GABC to required crown elevations and cross-slope grades.
 3. Place GABC 8 inches or less in compacted thickness in a single layer.
 4. Place GABC that exceeds 8 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 8 inches thick or less than 4 inches thick.
 5. Compact GABC at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 100 percent of maximum dry density according to ASTM D 698.
 6. Make arrangements for required testing with Geotechnical Testing Firm.
- D. Pavement Shoulders: Place shoulders along edges of GABC to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each base layer to not less than 92 percent of maximum dry density according to ASTM D 1557.

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3.17 DRAINAGE COURSE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
 - 1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 - 2. Place drainage course 6 inches or less in compacted thickness in a single layer.
 - 3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry density according to ATSM D 698.

3.18 FIELD QUALITY CONTROL

- A. Testing Agency: Contractual responsibilities for testing are identified in Division 1 Section "Quality Requirements". Responsible party will engage a qualified independent geotechnical engineering testing firm to perform field quality-control testing.
- B. Allow geotechnical testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Geotechnical testing agency will test compaction of soils in place according to ASTM D 1556, or ASTM D 2922, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Paved and Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 5000 sq. ft or less of paved area or building slab, but in no case fewer than 3 tests.
 - 2. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 300 feet or less of trench length, but no fewer than 2 tests.
- D. When geotechnical testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.20 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Unless directed to stockpile onsite, remove surplus satisfactory and unsatisfactory soil and legally dispose of it off Owner's property. Remove waste material, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 02300

SECTION 02360
TERMITE CONTROL

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 the following for termite control:
 - 1. Soil treatment.

1.3 SUBMITTALS

- A. Product Data: Treatments and application instructions, including EPA-Registered Label.
- B. Product Certificates: Signed by manufacturers of termite control products certifying that treatments furnished comply with requirements.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article 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.
- D. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's record information, including the following as applicable:
 - 1. Date and time of application.
 - 2. Moisture content of soil before application.
 - 3. Brand name and manufacturer of termiticide.
 - 4. Quantity of undiluted termiticide used.
 - 5. Dilutions, methods, volumes, and rates of application used.
 - 6. Areas of application.
 - 7. Water source for application.
- E. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: A PCO who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment in jurisdiction where Project is located and who is experienced and has completed termite control treatment similar to that indicated for this Project and whose work has a record of successful in-service performance.

- B. Regulatory Requirements: Formulate and apply termiticides, and label with a Federal registration number, to comply with EPA regulations and authorities having jurisdiction.
- C. Standards for Application: Current edition of South Carolina Division of Regulatory and Public Service Programs Standard 27-1085.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with EPA-Registered Label requirements and requirements of authorities having jurisdiction.

1.6 COORDINATION

- A. Coordinate soil treatment application with excavating, filling, and grading and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs, before construction.

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.
- B. Special Warranty: Written warranty, signed by applicator and Contractor certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
- C. Warranty Period: Five years from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

- A. Continuing Service: Provide a proposal for continuing service, including monitoring, inspection and retreatment for occurrences of termite activity, from applicator to Owner, in the form of a standard yearly continuing service agreement, starting on the date of Substantial Completion. State services, obligations, conditions and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT

- A. Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in a soluble or emulsible, concentrated formulation that dilutes with water or foaming agent, and formulated to prevent termite infestation. Use only soil treatment solutions that are not harmful to plants. Provide quantity required for application at the label

volume and rate for the maximum termiticide concentration allowed for each specific use, according to the product's EPA-Registered Label.

- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Aventis Environmental Science USA LP; Termidor.
 2. Bayer Corporation; Premise 75.
 3. Dow AgroSciences LLC; Dursban TC or Equity.
 4. FMC Corporation, Agricultural Products Group; Prevail FT.
 5. Syngenta; Demon TC.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of the soil, interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparing substrate. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil and around foundations.
- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended by termiticide manufacturer.
- C. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

3.3 APPLICATION, GENERAL

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

3.4 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a

continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute the treatment evenly.

1. Slabs-on-Grade: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.

2. Foundations: Adjacent soil including soil along entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating slab, and around interior column footers, piers, and chimney bases; and along entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
 3. Masonry: Treat voids.
 4. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.
- B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
- C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.
- D. Post warning signs in areas of application.
- E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

END OF SECTION 02630

SECTION 02510-WATER DISTRIBUTION SYSTEM

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 water-distribution piping and related components outside the building for water service and fire-service mains.
- B. The Section includes general requirements that will apply to all water systems. In addition, the operating utility (the authority having jurisdiction) has numerous specific standards for materials and execution that are too varied to cover in this specification.
 - 1. For this Project, the operating utility is the City of Waterboro Water and Sewer Department.
 - 2. Materials and execution requirements that are not covered in this Section shall comply with the standards of the operating utility.
 - 3. Materials and execution requirements that are covered, but are in conflict with the standards of the operating utility, shall comply with the standards of the operating utility.
- C. Utility-furnished products include water meters that will be installed by the utility upon completion of utility required preparations by Contractor.

1.3 DEFINITIONS

- A. CTS: Cooper tubing size
- B. DIP: Ductile iron pipe
- C. EPDM: Ethylene propylene diene terpolymer rubber
- D. HDPE: High density polyethylene pipe.
- E. LLDPE: Linear, low-density polyethylene plastic.
- F. NPS: Nominal pipe size.
- G. PE: Polyethylene plastic.
- H. PVC: Polyvinyl chloride plastic.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Ductile iron pipe.

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2. Polyvinyl chloride pipe.
 3. Tees, elbows, reducers and similar fittings.
 4. Special fittings for expansion and deflection.
 5. Joint restraint.
 6. Valves and valve boxes.
 7. Tapping sleeve assemblies.
 8. Fire hydrants.
 9. Temporary backflow preventers (during construction).
 10. Service connection piping and fittings
 11. Corrosion-protection piping encasement.
- B. Field quality-control test reports.
- C. Bacteriological test reports.
- D. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.
- E. Record Drawings: Include the following, as required by the City of Walterboro Water and Sewer Department, SCDHEC and other authorities having jurisdiction:
1. Location of water mains from centerline of road or curb. Contractor shall coordinate with Owners surveyor to allow for location of water main prior to backfilling.
 2. Location of fire hydrants, valves, tees, elbows, reducers, and other fittings.
 3. Location and elevation of any other above ground appurtenances.
 4. Designation, size and length of water lines between fittings.
 5. Location and depth below finished grade of service connections.
- F. Regulatory Submittals: Contractor shall make all regulatory submittals as required by the City of Walterboro Water and Sewer Department, SCDHEC and other authorities having jurisdiction.
- 1.5 QUALITY ASSURANCE
- A. Regulatory Requirements:
1. Comply with requirements of the City of Walterboro Water and Sewer Department.
 2. Comply with requirements of SC Department of Health and Environmental Control (SCDHEC).
 3. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
 4. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
 5. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
- B. Pre-installation Conference: Conduct conference at to comply with requirements in Division 01.
1. Review methods and procedures related to water system installation including, but not limited to, the following:
 - a. Review requirements of the operating utility.
 - b. Review site conditions and preparatory work.
 - c. Review requirements for protecting work.

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- d. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - e. Review inspection schedule and procedures required to monitor and document quality assurance.
- C. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- D. Comply with ASTM F 645 for selection, design, and installation of thermoplastic (PVC and HDPE) water piping.
- E. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.
- F. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.
- G. NSF Compliance: Comply with NSF 61 for materials for water-service piping and specialties for domestic water.
- H. Lead Free Requirement: Section 1417 of the Federal Safe Drinking Water Act has mandated that "Any pipe, solder, or flux used after June 19, 1986, in the installation or repair of public water systems and plumbing used for drinking water must be "Lead Free". The act defines "Lead Free" as less than 0.2-percent lead in solder and flux and less than 8.0-percent lead in pipes and fittings.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
- 1. Ensure that valves are dry and internally protected against rust and corrosion.
 - 2. Protect valves against damage to threaded ends and flange faces.
 - 3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
- 1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
 - 2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use hand wheels or stems as lifting or rigging points.
- D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.
- G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.7 PROJECT CONDITIONS

- A. Interruption of Existing Water-Distribution Services: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated;
1. Notify Architect, Owner, and Utility having jurisdiction no fewer than two days in advance of proposed interruption of service.
 2. Do not proceed with interruption of water-distribution service without Architect's written permission.

1.8 COORDINATION

- A. Where required, coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.1 STANDARDS OF OPERATING UTILITY

- A. See paragraph 1.2.B above for information regarding materials standards of the operating utility.

2.2 DUCTILE-IRON PIPE (DIP)

- A. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end unless mechanical joint or flanged ends are indicated on Drawings or required by operating utility.
1. Gaskets: AWWA C111, rubber. Use only non-toxic lubricants approved by the manufacturer and that will not support microbiological growth. Vegetable shortening shall not be used.
 2. Pressure class: Class 350 for NPS 3 to NPS 12; Class 250 for NPS 14 and larger.
 3. Cement mortar lining: AWWA C 104, standard thickness.
 4. Laying length: 18 feet-0 inches to 20 feet-0 inches.
 5. Pipe size: No metric sized pipe shall be permitted.
 6. Testing: All pipe lengths shall be tested to 500 psi working pressure prior to shipping.
 7. Marking: Clearly mark each joint of pipe at convenient intervals, as follows:
 - a. Manufacturer's name.
 - b. Nominal pipe size.
 - c. Letters "DI" or "Ductile".
 - d. Weight.
 - e. Pressure Class.
- B. Flanged Joints: where indicated on Drawings or where required by operating utility and in accordance with standards of operating utility.
- C. Mechanical Joints: where indicated on Drawings or where required by operating utility and in accordance with standards of operating utility.

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2.3 POLYVINYL CHLORIDE PLASTIC PIPE (PVC)

- A. PVC, AWWA Pipe: AWWA C900, Class 150, with bell end with gasket, and with spigot end.
1. Gaskets: ASTM F 477, rubber. Use only non-toxic lubricants approved by the manufacturer and that will not support microbiological growth. Vegetable shortening shall not be used.
 2. Joints: ASTM D 3139.
 3. Laying length: 18 feet-0 inches to 20 feet-0 inches
 4. Pipe size: comply with outside diameter dimensions of DIP.
 5. Standard dimension ratio: SDR 18.
 6. Pipe color: blue.
 7. Comply with UL 1285 for fire-service mains if indicated.
 8. The use of solvent weld joints is prohibited.
 9. Marking: Clearly mark each joint of pipe at convenient intervals, as follows:
 - a. Manufacturer's name.
 - b. Nominal pipe size.
 - c. Pressure class.
 - d. Material designation.
 - e. National Sanitation Foundation (NSF) seal.

2.4 HIGH DENSITY POLYETHYLENE PIPE (HDPE)

- A. HDPE, AWWA Pipe: AWWA C906, DR No. 7, 9, or 11; with PE compound number required to give working pressure rating not less than 160 psig.
1. Joints: Thermal butt fused, saddle fused, or socket fused in accordance with manufacturer's instructions.
 2. Marking: Clearly mark each joint of pipe at convenient intervals, as follows:
 - a. Manufacturer's name.
 - b. Nominal pipe size.
 - c. Pressure class.
 - d. Material designation.
 - e. National Sanitation Foundation (NSF) seal.

2.5 FITTINGS (NPS 3 AND LARGER)

- A. Mechanical-Joint, Ductile-Iron Fittings: For NPS 3 and larger, AWWA C110, ductile-iron standard pattern or AWWA C153, ductile-iron compact pattern.
1. Glands and Gaskets: AWWA C111, ductile-iron glands, rubber gaskets. Use only nontoxic lubricants approved by the manufacturer and that will not support microbiological growth. Vegetable shortening shall not be used.
 2. Nuts and Bolts: 316 Stainless Steel, material shall be marked on nuts and bolts.
 3. Material: Cast iron fittings are not permitted.
 4. Pressure class: Class 250.
 5. Fitting size: Metric sized fittings are not permitted.
 6. Cement mortar lining: AWWA C 104, standard thickness.

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2.6 SPECIAL PIPE FITTINGS FOR DEFLECTION AND EXPANSION

- A. Ductile-Iron Flexible Expansion Joints: Compound fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include 2 gasketed ball-joint sections and 1 or more gasketed sleeve sections, rated for 250-psig minimum working pressure and for offset and expansion indicated.
1. Thrust Restraint: Cast-in-place concrete thrust blocks or equivalent restraint system to be approved by Engineer.

2.7 RESTRAINED JOINTS

- A. Push-on (DIP only) or mechanical joint type joint restraint where indicated on Drawings or where required by operating utility and in accordance with standards of operating utility.
1. Push-on Gaskets: AWWA C 111, for use on DIP only, approved for use on the pipe on which it is installed. Use only non-toxic lubricants approved by the manufacturer and that will not support microbiological growth. Vegetable shortening shall not be used.
 2. Mechanical Joint Glands, Gaskets and Bolts: AWWA C 111, the gland, gasket and bolts shall be part of an integral system by the same manufacturer and approved for use on the pipe on which it is installed. Installation shall require only standard mechanical joint assembly techniques. Bolts shall be 316 Stainless Steel. Use only non-toxic lubricants approved by the manufacturer and that will not support microbiological growth. Vegetable shortening shall not be used.
 3. DIP Pressure Rating: 350 psi.
 4. PVC Pressure Rating: rated at a 2:1 safety factor for the pipe on which it is installed.

2.8 VALVES (NPS 3 AND LARGER)

- A. General:
1. Opening direction: As required by operating utility.
 2. Operating system: 2" square operating nut for below grade installation, wheel for above grade or vault installations.
 3. Exterior Nuts and Bolts: 316 stainless steel
 4. Interior Coating: Complying with AWWA C550.
- B. AWWA, Gate Valves:
1. Nonrising-Stem, Resilient-Seated Gate Valves:
 - a. Description: For NPS 3 to NPS 12, gray- or ductile-iron body and bonnet; with bronze or ductile-iron gate, resilient seats, bronze stem, and stem nut.
 - 1) Standard: AWWA C509.
 - 2) Minimum Pressure Rating: 250 psig.
 - 3) End Connections: AWWA C 111, mechanical joint.
- C. Tapping-Sleeve Assemblies:
1. Description: Sleeve and valve compatible with drilling machine.
 - a. Standard: MSS SP-60.

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- b. Tapping Sleeve: Ductile-iron or stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
- c. Pressure Rating: 250 psig.
- d. Tapping Valve: AWWA C 509, cast or ductile-iron, nonrising-stem, resilient-seated gate valve.
- e. Valve End Connections: Flanged (ANSI B16.1) for end mating tapping-sleeve flange and mechanical joint (AWWA C111) for opposite end.

2.9 VALVE ACCESSORIES (NPS 3 AND LARGER)

A. Valve Boxes:

1. Material: Cast or ductile-iron, suitable for heavy traffic use and conforming to ASTM A-48, Class 20.
 - a. Model: as required by the operating utility.
 - b. Elevation Adjustment: as required by operating utility.
 - c. Inside Shaft Diameter: 5-1/4 inches.
 - d. Coating: Asphaltic, not less than 1 mil thick.
 - e. Cover: Heavy cast iron with the word WATER cast in raised letters.
 - f. Base: Enlarged to enclose and protect valve operating nut without actually being in contact with pipe or valve.

B. Valve Box Protection Rings:

1. Material: Reinforced, precast 3,000 psi concrete.
 - a. Inside diameter: 9-1/4 inches.
 - b. Outside Diameter: 27 inches.
 - c. Thickness: 5 inches at inner diameter with top tapering to 2 inches at outer diameter.
 - d. Reinforcing: Two #3 rebar, one at 21 inch diameter and one at 24 inch diameter.
 - e. Min. Weight: 110 lbs.

2.10 BACKFLOW PREVENTERS (Temporary, during construction)

A. Double-Check, Backflow-Prevention Assemblies:

1. Standards: AWWA C510 and any other requirements of authorities having jurisdiction.
2. Operation: Continuous-pressure applications, unless otherwise indicated.
3. Pressure Loss: 5 psig maximum, through middle 1/3 of flow range.
4. Size: as indicated on Drawings.
5. Body: Cast iron with interior lining complying with AWWA C550.
6. End Connections: Flanged.
7. Configuration: Designed for horizontal, straight through flow.

2.11 CORROSION-PROTECTION PIPING ENCASUREMENT

A. Encasement for Underground Metal Pipe, Fittings and Appurtenances:

1. Standards: ASTM A 674 or AWWA C105.
2. Form: Tube.

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3. Material: LLDPE film of 0.008-inch minimum thickness.
4. Color: Blue.

2.12 SERVICE CONNECTIONS (NPS 2 AND SMALLER)

- A. Polyethylene (PE) Tubing: AWWA C901, material type PE-3408/3608.
 1. Copper tubing size (CTS), rated for min. working pressure of 160 psi.
 2. Marking: Clearly mark each joint of pipe at convenient intervals, as follows:
 - a. Manufacturers name.
 - b. Nominal pipe size.
 - c. Material size.
 - d. Pressure rating.
 - e. National Sanitation Foundation (NSF) seal.
- B. Tapping Saddles and Sleeves: in accordance with standards of operating utility.
- C. Corporation Stops: in accordance with standards of operating utility.
- D. Curb Stops: in accordance with standards of operating utility
- E. Miscellaneous Fittings: in accordance with standards of operating utility.

2.13 PIPE DETECTION MATERIALS

- A. Detectable Warning Tape: specified in Division 31 Section "Earth Moving".
- B. Locator Wire: In addition to warning tape where required by operating utility. Specified in Section "Earth Moving".

PART 3 - EXECUTION

3.1 STANDARDS OF OPERATING UTILITY

- A. See paragraph 1.2.B above for information regarding execution standards of the operating utility.

3.2 EARTHWORK

- A. Refer to Section "Earth Moving" for excavating, trenching, and backfilling.
- B. Refer to Section "Earth Moving" for installation requirements of pipe detection materials.

3.3 PIPING APPLICATIONS

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.
- B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

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- C. Do not use flanges or unions for underground piping.
- D. Flanges, unions, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- E. Restrained joints shall be provided where required by the operating utility and where indicated on Drawings.
- F. Underground Water Main Piping NPS 3 and larger shall be the following, subject to approval by the operating utility and as indicated on the Drawings:
 - 1. Ductile-iron, push-on-joint pipe with ductile-iron, mechanical-joint fittings and gasketed joints.
 - 2. PVC, push-on-joint pipe with ductile-iron, mechanical-joint fittings and gasketed joints.
 - 3. HDPE pipe with ductile-iron, mechanical-joint fittings, and thermal fused joints.
- G. Above Ground and Vault Water Main Piping NPS 3 and larger shall be ductile-iron, mechanical or flanged joint pipe and ductile-iron-pipe appurtenances; and gasketed, restrained joints.

3.4 VALVE APPLICATIONS

- A. General Application: Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use flanged-end valves for installation above ground or in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation stops and curb stops with ends compatible with piping, for NPS 2 and smaller installation.
- B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - 1. Underground Valves for Water Mains: NPS 3 and Larger: AWWA, cast-iron, nonrising-stem, resilient-seated gate valves with valve box.
 - 2. Underground Valves for Fire Protection Lines: NPS 3 and Larger, for Indicator Posts: UL/FMG, cast-iron, nonrising-stem gate valves with indicator post.
 - 3. Use the following for valves in vaults and above ground:
 - a. Gate Valves for Water Mains: NPS 3 and Larger: AWWA, cast iron, OS&Y rising stem, resilient seated.

OS&Y rising stem.

3.5 PIPING INSTALLATION

- A. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.
- B. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.
 - 1. Make connections larger than NPS 2 with tapping machine according to the following:
 - a. Install tapping sleeve and tapping valve according to MSS SP-60.
 - b. Install tapping sleeve on pipe to be tapped. Position flanged outlet for tapping valve.

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- c. Install tapping valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.
 - d. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Extract bit and close valve. Remove tapping machine.
 - e. Slightly open valve briefly to flush out filings. Close valve and connect water-piping.
2. Make connections NPS 2 and smaller with drilling machine according to the following:
- a. Install service-saddle assemblies and corporation stops in size, quantity, and arrangement required by operating utility.
 - b. Install service-saddle assemblies on water-service pipe to be tapped. Position outlets for corporation stops.
 - c. Install corporation stops into service-saddle assemblies.
 - d. Use drilling machine compatible with service-saddle assemblies and corporation stops. Drill hole in main. Extract bit and close corporation stop.
 - e. Remove drilling machine.
 - f. Slightly open stop briefly to flush out filings. Close stop and connect water-service piping.
 - g. Install manifold for multiple taps in water main.
 - h. Install curb valve in water-service piping with head pointing up and with service box.
- C. Install ductile-iron pipe according to AWWA C600, AWWA M41 and the standards of the operating utility.
1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.
- D. Install PVC, AWWA pipe according to ASTM F 645, AWWA M23 and the standards of the operating utility.
- E. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.
- F. Install underground piping with restrained joints at horizontal and vertical changes in direction, at locations indicated on Drawings and where required by the operating utility. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports as accepted by the operating utility.
- 3.6 JOINT CONSTRUCTION
- A. Make pipe joints according to the following:
1. Ductile-Iron Piping, Gasketed Joints for Water Main Piping: AWWA C600, AWWA C111 AWWA M41 and standards of the operating utility.
 2. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139, pipe manufacturer's written instructions and standards of the operating utility.
 3. PE Tubing, Pressure-Sealed Joints: Use brass fittings and fasteners according to fitting manufacturer's written instructions.
 4. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with correct OD, and with system working pressure at least equal to pipe. Install according to fitting manufacturer's written instructions

3.7 ANCHORAGE INSTALLATION

- A. Anchorage, General: Install water system piping with restrained joints at horizontal and vertical changes in direction, at locations indicated on Drawings, and where required by the operating utility. Subject to acceptance by the operating utility, anchorages and restrained-joint types that may be used include the following:
1. Concrete thrust blocks.
 2. Set-screw mechanical retainer glands.
 3. Bolted flanged joints.
 4. Heat-fused joints.
 5. Pipe clamps and tie rods.
- B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
1. Gasketed-Joint, Ductile-Iron, Water- Piping: According to AWWA C600 and the standards of the operating utility.
 2. Gasketed-Joint, PVC Water- Piping: According to AWWA M23 and the standards of the operating utility.
 3. Thermally Fused Joint, HDPE Water Piping with Mechanical Joint Fittings: According to AWWA M55 and the standards of the operating utility.
- C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.8 VALVE INSTALLATION

- A. AWWA Gate Valves: Comply with AWWA C600, AWWA M44 and standards of the operating utility. Install each underground valve with stem pointing up and with valve box.
- B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600, AWWA M44 and standards of the operating utility.
- C. Corporation and Curb Stops: Install according to the manufacturer's written instructions and to the standards of the operating utility with head pointed up and with service box.
- D. Pressure-Reducing Valves: Install in vault or aboveground between shutoff valves.

3.9 BACKFLOW PREVENTER INSTALLATION

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing health department and authorities having jurisdiction.
- B. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.
- C. Do not install bypass piping around backflow preventers.
- D. Support NPS 2-1/2 and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

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3.10 PIPE DETECTION MATERIALS INSTALLATION

- A. Install continuous underground detectable warning tape and locator wire, where required by operating utility, during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping and according to standards of operating utility. Pipe detection materials are specified in Division 31 Section "Earth Moving."

3.11 FIELD QUALITY CONTROL

- A. Hydrostatic Test: Conduct test according to AWWA C 600 or C605 as applicable and the standards of the authorities having jurisdiction.
1. Pre-testing: The Contractor shall conduct his on pre-tests and confirm that the system is capable of passing prior to requesting the Engineer's presence to witness the test.
 - a. Conduct pre-tests only after all installation is complete including joint restraint. Concrete thrust blocks shall have been in place long enough to have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
 - b. Leaks shall be immediately repaired and the test shall be repeated until acceptable results are obtained.
 - c. The Contractor shall notify the Engineer at least 48 hours before the scheduled time of the official test. Passing test performed without the Engineer present will be rejected. The Contractor will be required to retest, with the Engineer present, without additional compensation.
 2. Test Procedures: The line shall be slowly filled with water and all air expelled through air valves or other means. A suitable test pump, water meter and potable water source, furnished by the Contractor, shall be connected to the line by means of a tap (or other suitable means) in the line and the proper test pressure slowly applied to the line. The test pressure shall be maintained for at least two hours.
 - a. Test at not less than 150 psi or one-and-one-half times working pressure, whichever is larger, for two hours. If pressure falls during the test, the pump shall be reactivated and the pressure restored to the starting pressure as often as necessary. At the end of two hours, the pressure shall be restored to the starting pressure a final time and the total quantity of water used (leakage) to maintain the pressure for two hours shall be read.
 - b. Open and close each valve within the system several times during the test period.
 - c. Service connections, if present, shall be subjected to the hydrostatic test concurrently with the main lines.
 3. Allowable Leakage: No allowable leakage is permitted.
- B. Preliminary Inspection: Make arrangements with Engineer to conduct preliminary final inspection.
1. Pre-inspection: The Contractor shall conduct his own pre-inspection and confirm that the system is capable of passing prior to requesting the Engineer's presence to witness the preliminary inspection.
 - a. Repair or remove and replace components where test results or pre-inspections indicate that they do not comply with specified requirements.

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2. Preliminary Inspection: The Contractor shall notify the Engineer at least 48 hours before the scheduled time of the preliminary inspection.
 - a. Preliminary inspection shall include but shall not necessarily be limited to the following:
 - 1) A visual inspection of fire hydrants: Requirements include: verification that hydrant is plumb and at correct elevation, verification that caps are in place and operational, verification that hydrant is operational and that no apparent leakage exists, verification that gate valve is in place and operational, verification that hydrant finish is adequate, verification that hydrant location is correct.
 - 2) A visual inspection of valves: Requirements include: verification that valves are operational, verification that valve boxes are centered, plumb, at correct elevation, and properly backfilled, verification that valve indicates that water line is at adequate depth, verification that valve location is correct, verification that valve protection rings are properly installed, and verification that any valve appurtenances are properly installed and functioning.
 - 3) A visual inspection of connections to existing water system: Requirements include: verification of adequacy of connection work, verification that leakage does not exist, verification that connection valve is off, verification that safeguards are in place to prevent contamination of existing system by backflow from the new system.
 - 4) A visual inspection of water meters, backflow preventers and other appurtenances to confirm proper installation.
 - b. Repair or remove and replace components where test results or preliminary final inspections indicate that they do not comply with specified requirements.
 - c. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- C. Final Inspection: Upon successful completion of the preliminary inspection and after any required documentation has been received and approved by the authorities having jurisdiction, the Contractor, Engineer, representatives of the authorities having jurisdiction shall conduct a final inspection of the system.
 - a. The Contractor shall notify the Engineer at least 48 hours before the desired time of the pre-inspection. The Engineer shall endeavor to schedule attendance by representatives of the authorities having jurisdiction at the desired time; however, the Engineer provides no guarantee of availability at that time. If unavailable, the Engineer will schedule the representative at the soonest reasonable time. Final inspections will not be held without the attendance of both the Engineer and a representative of the authorities having jurisdiction.
 - b. Final inspection shall include but shall not necessarily be limited to the items listed for the pre-inspection.
 - c. Repair or remove and replace components where test results or final inspections indicate that they do not comply with specified requirements.
 - d. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- D. Reports of Inspection Activities.
 1. Where required, the Engineer will provide final required documentation to authorities having jurisdiction for the purpose of obtaining a Permit to Operate. Promptly provide any documents required from Contractor. Once Permit to Operate is received, Engineer will notify Contractor. Make final connections, when necessary, and place system in

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operation. Do NOT place system in operation before notification by Engineer that Permit to Operate has been received.

3.12 DISINFECTION AND BACTERIOLOGICAL TESTING

A. Clean and disinfect water-distribution piping as follows:

1. Purge and disinfect according to AWWA C 651 and standards of authorities having jurisdiction.
 - a. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
 - 1) Provide adequate openings to ensure that required flushing velocities are met.
 - 2) Where applicable, provide protective measures as required to ensure that flushing waters do not damage property or cause erosion or flooding.
 - b. Fill lines to be disinfected with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for at least 24 hours.
 - c. At end of retention time, perform concentration testing of solution at the extreme end of the lines to be disinfected. Solution shall contain not less than 25 ppm of chlorine. If residual chlorine is less than 25 ppm, repeat procedure.
 - d. Once an acceptable residual chlorine count is obtained, flush system with clean, potable water until no chlorine remains in water coming from the system.

B. Bacteriological Testing:

1. Perform bacteriological testing according to AWWA C 651 and the standards of the authorities having jurisdiction.
 - a. Using methods acceptable to the Engineer and authorities having jurisdiction, take two successive samples, at each dead-end line and at points deemed representative of the water in the newly constructed mains, at a period of at least 24 hours apart.
 - b. Perform tests, at an independent laboratory certified by the authorities having jurisdiction, for coliform growth, non-coliform growth and residual chlorine.
 - c. Should the test values exceed the maximum acceptable values permitted by the authorities having jurisdiction, repeat disinfection, flushing and testing until acceptable values are obtained (with the exception of residual chlorine, in which case the samples are considered invalid and system must be only be flushed and retested).
 - d. Prepare reports of purging, disinfecting, and testing activities, including water sample chain of custody and copies of passing bacteriological tests, and provide to Engineer.
 - e. After passing samples are obtained, make arrangements for follow-up samples to be taken by the authorities having jurisdiction.
 - f. As before, should the test values of the follow-up samples exceed maximum acceptable values, repeat disinfection, flushing and testing until acceptable values are obtained.

END OF SECTION 02510

SECTION 02620 – SUBDRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Drainage conduits.
 - 2. Geotextile filter fabrics.

1.3 DEFINITIONS

- A. PE: Polyethylene plastic.
- B. Subdrainage: Drainage system that collects and removes subsurface or seepage water.

1.4 SUBMITTALS

- A. Product Data:
 - 1. Drainage conduits, including rated capacities.
 - 2. Geotextile filter fabrics.
- B. Regulatory Submittals: Contractor shall make all regulatory submittals as required by the City of Waltherboro, SCDHEC and other authorities having jurisdiction.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of the authorities having jurisdiction.
 - 1. Comply with requirements of the City of Waltherboro.
 - 2. Comply with requirements of SC Department of Health and Environmental Control (SCDHEC).
 - 3. Where conflict exists between the requirements of the Contract Documents and those of authorities having jurisdiction, the higher quality or more restrictive requirement shall apply.

PART 2 - PRODUCTS

2.1 PERFORATED-WALL PIPES AND FITTINGS

- A. Perforated PE Pipe and Fittings:
 - 1. NPS 6 and Smaller: ASTM F 405 or AASHTO M 252, Type CP; corrugated, for coupled joints.
 - 2. Couplings: Manufacturer's standard, band type.
- B. Perforated PVC Sewer Pipe and Fittings: ASTM D 2729, bell-and-spigot ends, for loose joints.

2.2 PIPE TO DRAINAGE STRUCTURES CONNECTORS

- A. Resilient Pipe Connectors: ASTM C 923, cast into manhole wall at time of manufacture or fitted into walls in the field, for each pipe connection.
 - 1. Fittings shall be specifically designed for integral casting or field installation as applicable.

2.3 AGGREGATE MATERIALS

- A. Filter Aggregate: Satisfactory Aggregate materials are specified in Division 31 Section "Earth Moving".

2.4 SOIL MATERIALS

- A. Backfill: Satisfactory Soil materials are specified in Section "Earth Moving."

2.5 GEOTEXTILE FILTER FABRICS

- A. Subsurface Drainage Geotextile material are specified in Section "Earth Moving".

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and areas for suitable conditions where subdrainage systems are to be installed.
- B. Locate and mark existing utilities, underground structures, and aboveground obstructions before beginning installation and avoid disruption and damage of services.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Section "Earth Moving."

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3.3 PERFORATED PIPE SUBDRAINAGE INSTALLATION

- A. Provide trench width to allow installation of drainage conduit. Grade bottom of trench excavations to required slope, and compact to firm, solid bed for drainage system.
- B. Line trench with geotextile. Roll of geotextile shall be extended longitudinally along the trench in order to minimize joints. Roll width shall be sufficient to cover bottom, sides, and top of trench, with at least a 6 inch overlap, without joints. Where a joint is required for a new roll of geotextile, overlap 6 inches.
- C. Place supporting layer of drainage course over compacted subgrade and geotextile filter fabric, to compacted depth of not less than 4 inches.
- D. Install drainage conduits as indicated in Part 3 "Piping Installation" Article for landscaping subdrainage with horizontal distance of at least 6 inches between conduit and trench walls. Wrap drainage conduits without integral geotextile filter fabric with flat-style geotextile filter fabric before installation. Connect fabric sections with adhesive or tape.
- E. Add drainage course to top of drainage conduits.
- F. After satisfactory testing, cover drainage conduit to within 12 inches of finish grade.
- G. Install drainage course and wrap top of drainage course with flat-style geotextile filter fabric.
- H. Place layer of flat-style geotextile filter fabric over top of drainage course, overlapping edges at least 4 inches.
- I. Fill to Grade: Place satisfactory soil fill material over drainage course. Place material in loose-depth layers not exceeding 6 inches. Thoroughly compact each layer. Fill to finish grade.

3.4 PIPING INSTALLATION

- A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.
 - 1. Perforated Pipe Subdrainage: Install pipe pitched down in direction of flow, at a minimum slope of 0.5 percent and with a minimum cover of 36 inches, unless otherwise indicated.
 - 2. Lay perforated pipe with perforations down.
 - 3. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.
- B. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.
- C. Install thermoplastic piping according to ASTM D 2321.

3.5 PIPE JOINT CONSTRUCTION

- A. Join perforated PE pipe and fittings for soil-tight joints according to AASHTO's "Standard Specification for Highway Bridges," Division II, Section 26.4.2.4, "Joint Properties"; or according to ASTM D 2321.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings and specialties.
- B. Connect low elevations of subdrainage system to solid-wall-piping storm drainage system at concrete drainage structures as follows:
 - 1. Where resilient connector is not installed at time of drainage structure manufacture,
 - a. Core drill opening into structure large enough to allow installation of resilient manhole connector.
 - b. Install resilient manhole connector in accordance with manufacturer's written instructions.

3.7 IDENTIFICATION

- A. Arrange for installation of green warning tapes directly over piping. Comply with requirements for underground warning tapes specified in specified in Section "Earth Moving."
 - 1. Install detectable warning tape over nonferrous piping and over edges of underground structures.

3.8 FIELD QUALITY CONTROL

- A. Inspection: Before placing drainage course around and above pipe, inspect pipe to confirm that: it is not crushed or damaged; that joints are sound and properly made; that interior of pipe is unobstructed and free flowing; that pipe is properly aligned and at indicated elevation and grade; and that connections to drainage structures are properly made, sound and water-tight. As drainage course and backfill is installed, monitor operations to ensure that pipe is not damaged or displaced by placement or compaction operations.
- B. Drain piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.9 CLEANING

- A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

END OF SECTION 02620

SECTION 02740 – BITUMINOUS CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Hot-mix asphalt paving.
 - 2. Asphalt surface treatments.
 - 3. Pavement-marking paint.

1.3 DEFINITION

- A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
 - 1. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
- B. Material Certificates: For each paving material, from manufacturer.
- C. Material Test Reports: For each paving material.
- D. Regulatory Submittals: Contractor shall make all regulatory submittals as required by SCDOT and other authorities having jurisdiction.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.
- B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of the authorities having jurisdiction.
 - 1. Comply with requirements of South Carolina Department of Transportation Standard Specifications for Highway Construction (current edition).

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.
- B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is frozen, wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
 - 1. During the months of December, January and February except with the written permission of the Engineer.
 - 2. Lift thickness of 1.0" or less: Min surface temp: 55 deg F and rising at time of placement.
 - 3. Lift thickness of 1.1" to 2.0": Min surface temp: 45 deg F and rising at time of placement.
 - 4. Lift thickness of 2.1" to 3.0": Min surface temp: 40 deg F and rising at time of placement.
 - 5. Lift thickness of 3.1" to 4.5": Min surface temp: 35 deg F and rising at time of placement.
- B. Pavement-Marking: Proceed with pavement marking only on clean, dry surfaces; at a minimum ambient or surface temperature of at least 55 deg F, and not exceeding 95 deg F; and at a maximum relative of 85%. Do not apply pavement markings if rain is imminent or expected before time required for adequate drying.

PART 2 - PRODUCTS

2.1 ASPHALT PAVING MIXES

- A. Prime/Tack Coat: Asphalt binder or emulsified asphalt in accordance with Section 401 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- B. Asphalt Surface Course: Hot Mix Asphalt Surface Course in accordance with Sections 401 and 403 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- C. Undersealing Asphalt: ASTM D 3141, pumping consistency.
- D. Emulsified-Asphalt Slurry: ASTM D 3910, Type 2.
- E. Water: Potable (for mixing with emulsified asphalts).

2.2 PAVEMENT MARKINGS

- A. Pavement-Marking Paint: Reflectorized, heavy metals free, fast drying, waterborne paint for pavement markings in accordance with Section 609 and 625 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
 - 1. Color: As indicated.

- B. Glass Beads: AASHTO M 247, Type 1.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades. Proof-roll shall follow the requirements outlined in Section 211 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 - 2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
 - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by geotechnical engineer engaged by Owner and a representative from Horry County.
- C. Proceed with paving only after unsatisfactory conditions have been corrected and approved by geotechnical engineer and a representative from Horry County.
- D. Verify that utilities, traffic loop detectors, and other items requiring a cut and installation beneath the asphalt surface have been completed and that asphalt surface has been repaired flush with adjacent asphalt prior to beginning installation of imprinted asphalt.

3.2 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
- B. Prime Coat: Apply uniformly over surface of compacted graded-aggregate base course at the rates indicated below. Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure.
 - 1. Apply to macadam base course at a rate of 0.25 to 0.30 gal./sq. yd.
 - 2. Apply to marine limestone base course at a rate of 0.10 to 0.15 gal./sq. yd.
 - 3. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
 - 4. Protect primed substrate from damage until ready to receive paving.
- C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.3 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
1. Place hot-mix asphalt aggregate base course to the total thicknesses indicated in lifts not to exceed 6 inches in thickness.
 2. Place hot-mix asphalt binder course to the total thicknesses indicated in lifts not to exceed 4 inches in thickness.
 3. Place hot-mix asphalt surface course to the total thicknesses indicated in lifts not to exceed 3 inches in thickness.
 4. Spread mix at temperature of not less than 250 deg F nor more than 325 deg F.
 5. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
 6. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Place paving in a minimum number of equal width consecutive strips, up to a maximum width of 12 feet for each strip.
1. Adjust width and number of strips as necessary to provide the minimum number while maintaining requirement for longitudinal joint spacing of successive courses as indicated below. Make adjustments in lower courses such that the top course will be applied using the minimum possible number of strips.
 2. The width of each strip of the top course shall equal the width of the travel lane unless otherwise indicated.
 3. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of each asphalt course before beginning a succeeding course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.4 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
1. Clean contact surfaces and apply tack coat to joints.
 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
 3. Offset transverse joints, in successive courses, a minimum of 24 inches.
 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
 5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
 6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.5 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185 deg F.
 - 2. Roll with a 8 to 12 ton tandem steer-wheel roller conforming to the requirements of Section 401 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 - 1. Average Density: between 98% and 102% of the target density established in accordance with SCDOT Specification SC-T-65.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 - 1. Binder Course: Plus or minus 1/4 inch.
 - 2. Surface Course: Plus 1/4 inch, no minus.
- B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 - 1. Binder Course: 1/4 inch.
 - 2. Surface Course: 1/8 inch.
 - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.7 PAVEMENT MARKING

- A. Do not apply pavement-markings until layout, colors, and placement have been verified with Engineer.
- B. Allow paving to age for 30 days before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Surface shall be dry and free of glaze, oil, dirt, grease or other foreign contaminants.
- E. Apply paint with mechanical equipment for the application of waterborne asphalt paint meeting the requirements of Section 625 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
 - 1. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
 - 2. Broadcast glass beads uniformly into wet pavement markings at a rate of 6 lb/gal.
- F. At SCDOT rights-of-way at Entrance area, apply thermoplastic pavement markings with mechanical equipment for the application of thermoplastic pavement markings meeting the requirements of Section 627 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
 - 1. Apply at manufacturer's recommended rates to provide a finished thickness of 90 mils.
 - 2. Glass beads shall be mechanically applied to the surface of the thermoplastic material immediately after it is applied to the pavement surface and while it is still molten. Uniformly apply at a rate of 12 lb per 100 sq ft.
- G. Apply to produce pavement markings of the dimensions indicated; which are straight or of uniform curvature; of consistent width; and with crisp, uniform, edges.
 - 1. The finished line markings shall be free from waviness and the lateral deviations shall not exceed 2 inches in 15 feet.
 - 2. No markings shall be less than the specified width.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Contractual responsibilities for testing are identified in Division 1 Section "Quality Requirements". Responsible party will engage a qualified independent testing agency to perform tests and inspections.
- B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined by core samples in accordance with SCDOT Specification SC-T-100.
 - 1. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than 3 samples taken.
 - 2. Replace and compact hot-mix asphalt where core tests were taken.
- C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement in accordance with SCDOT Specifications SC-T-65 and SC-T-100.

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to SCDOT Specification SC-T-65, and compacted according to job-mix specifications.
 2. In-place density of compacted pavement will be determined by nuclear gauge in accordance with SCDOT Specifications SC-T-65, SC-T-68 and SC-T-100, as applicable.
 - a. One test will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than 3 tests taken.
- E. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.9 PROTECTION

- A. Protect paving installation from deposition of sediments from adjoining grounds and vehicular traffic.
1. Install and maintain erosion control measures as necessary, at boundaries of paving installations, to prevent migration of sediment onto the pavement surface.
 2. Where practicable, erect and maintain barricades to prevent construction traffic on the paving surface.
 3. Do not allow tracking of mud or debris onto the pavement surface by any vehicle.
 4. If deposition of sediment on the paving surface is noted, remove and clean pavement surface immediately. Do not delay cleaning efforts as subsequent rainfall events may worsen potential damage.

3.10 DISPOSAL

- A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
1. Do not allow milled materials to accumulate on-site.

END OF SECTION 02740

SECTION 02890 – TRAFFIC SIGNAGE

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 the following:
 - 1. Traffic signs.

1.3 REGULATORY REQUIREMENTS

- A. Regulatory Performance: Provide traffic signs in accordance with requirements of current editions of the following government agency publications:
 - 1. "Manual on Uniform Traffic Control Devices" (MUTCD) published by the Federal Highway Administration (FHWA), U.S. Department of Transportation.
 - 2. "Standard Highway Signs" published by the Federal Highway Administration (FHWA), U.S. Department of Transportation.
 - 3. "Standard Specifications for Highway Construction" published by South Carolina Department of Transportation (SCDOT).

1.4 SUBMITTALS

- A. Product Data: For each type of sign indicated, showing compliance with regulatory requirements.
- B. Sign Schedule: Use same designations indicated on Drawings.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.
- C. Authorities Having Jurisdiction: Conform to requirements of all authorities having jurisdiction.
 - 1. Where conflicts exist between the requirements of the Contract Documents and those of authorities having jurisdiction, the higher quality or more restrictive requirement shall apply.

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1.6 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when weather conditions permit installation of signs to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 6061-T6 5052-H38, or 5154-H38.
- B. Steel:
 - 1. Galvanized Steel Sheet: ASTM A 653/A 653M, Grade 50, class 1; G90 coating, either commercial or forming steel.
 - 2. Steel Bars and Shapes, Carbon Rolled from "T" Rails: ASTM A 499, Grade 60 and conforming to chemical requirements of ASTM A 1.
 - 3. Bolts for Steel Framing: ASTM A 307 or ASTM A 325 as necessary for design loads and connection details.
 - 4. For steel exposed to view on completion, provide materials having flat, smooth surfaces without blemishes. Do not use materials whose surfaces exhibit pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Chromate Conversion Coating: ASTM B 449, Class 2, 10 – 33 mg/sq.ft., with a median of 25 mg/sq.ft.
- D. Reflective Sheeting: ASTM D 4956, "Standard Specification for Retro-reflective Sheeting for Traffic Control" (latest edition).
 - 1. Obtain sheeting from manufacturers prequalified in accordance with SCDOT Qualified Product Policy 20 and who appear in the current edition of SCDOT Qualified Products List 20.
 - 2. A minimum of Type III reflective sheeting (bead or micro-prismatic) is to be used on all highway signs except the following:
 - a. All orange background rigid signs are to be Type VIII or IX micro-prismatic florescent orange sheeting, including slow/stop paddles.

2.2 TRAFFIC SIGNS

- A. Sign Panels: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner.
- B. Sign Panel Materials: In accordance with SCDOT "Standard Specifications for Highway Construction", Section 608.
 - 1. Aluminum Sheet: 0.080 inch thick for signs up to 48 inches wide; 0.100 inch thick for signs 48 inches or wider.

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- a. Panel Finish: Reflective sheeting.
 - b. Shape, Dimensions and Color: In accordance with FHWA "Standard Highway Signs".
- C. Posts: Fabricate posts to lengths required for mounting method indicated.
1. Direct-Burial Method: Provide posts 36 inches longer than height of sign to permit direct embedment in concrete foundations.
- D. U-Section Steel Posts: In accordance with SCDOT "Standard Specifications for Highway Construction", Section 608.
1. Post Weight: Provide posts of one of the following weights as appropriate for applications:
 - a. 2 lbs/lin.ft.
 - b. 3 lbs/lin.ft.
 2. Post Fabrication: Punch standard 3/8-inch diameter holes in post prior to applying galvanized finish. Place holes as follows:
 - a. 2-lb. Posts: Minimum 58 holes, one inch o.c., beginning one inch from top of post.
 - b. 3-lb Posts: Holes one inch o.c., starting one inch from top and extending to within 6 feet from the bottom, and 2 inches o.c. for the remainder of post length.
 3. Finish: Hot-dip galvanize post assemblies after fabrication to comply with ASTM A 123/A 123M.
- E. Telescopic Square Steel Tubing: In accordance with SCDOT "Standard Specifications for Highway Construction", Section 608. Provide tubing capable of telescoping when consecutive size tubes are used one inside the other, with free movement and without excess side movement, as approved by FHWA.
1. Post Gage: Provide posts of one of the following gages as appropriate for applications:
 - a. 12 gage (0.105 inch) thick.
 - b. 14 gage (0.083 inch) thick.
 2. Post Fabrication: Punch standard 7/16-inch diameter holes in post prior to applying galvanized finish. Place holes one inch o.c. along centerline of each of the 4 sides, beginning one inch from tube end, with vertical spacing accuracy of 1/8-inch in 20 feet of tube length.
 3. Finish: Hot-dip galvanize post assemblies after fabrication to comply with ASTM A 123/A 123M.

2.3 ACCESSORIES

- A. Anchors: Provide hot-dip galvanized anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

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- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Excavation: Excavate for sign to elevations and dimensions indicated. Reconstruct subgrade that is not firm, undisturbed, or compacted soil, or that is damaged by freezing temperatures, frost, rain, accumulated water, or construction activities by excavating a further 12 inches, backfilling with satisfactory soil, and compacting to original subgrade elevation.

- 1. Excavate hole depths approximately 39 inches below finished grade.

- B. Locate signs where indicated, using mounting methods of types described and complying with manufacturer's written instructions.

- 1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install at heights and lateral offsets from the roadway that conform to guidelines established in Part 2 of the MUTCD published by the FHWA.

3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 02890

SECTION 02920 - TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Seeding.
- 2. Hydroseeding.
- 3. Sodding.
- 4. Erosion-control material(s).

B. Related Sections:

- 1. Section "Site Clearing and Erosion Control" for topsoil stripping and stockpiling.
- 2. Section "Earth Moving" for excavation, filling and backfilling, and rough grading.

1.3 DEFINITIONS

- A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

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- H. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.
- J. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass and other unspecified growth.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.
- B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
- C. Certification of Sod: From sod vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
- D. Qualification Data: For qualified landscape Installer.
- E. Product Certificates: For soil amendments and fertilizers, from manufacturer.
- F. Material Test Reports: For existing in-place surface soil and imported or manufactured topsoil.
- G. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required initial maintenance periods.

1.5 QUALITY ASSURANCE

- A. All landscaping and irrigation shall be performed by the same contractor and shall be a firm specializing in this work and must have a minimum of 5 years' experience.
- B. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.
 - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress
 - 2. Pesticide Applicator: State licensed, commercial.

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- C. Sod Producer: Company specializing in sod production and harvesting with a minimum of 5 years' experience and certified by the State of South Carolina.
- D. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- E. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of the soil.
 - 1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
 - 2. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
 - 3. Report suitability of tested soil for turf growth.
 - a. Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
 - b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.
- B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying. Deliver sod on pallets. Do not deliver more sod than can be laid within 24 hours. Do not harvest or transport sod when moisture content may adversely affect sod survival.
- C. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - 3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.7 WARRANTY

- A. It is the responsibility of the Contractor to make known any site conditions which may be harmful or growth inhibiting to the plant materials specified, prior to the installation of said materials.
- B. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control. Warranty shall cover any plant loss due to weather damage to plants installed out of normal planting season.
 - 2. Warranty Periods from Date of Substantial Completion:
 - a. Seed, Hydroseed, and Sod: 12 months.

1.8 PROJECT CONDITIONS

- A. Temporary Grassing: As indicated on Seeding Schedule on Drawing Number C305.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.9 MAINTENANCE SERVICE

- A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:
 - 1. Seeded Turf: from time of installation until time of Final Acceptance or 60 days from date of Substantial Completion, whichever is greater.
 - a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.
 - 2. Sodded Turf: from time of installation until time of Final Acceptance or 60 days from date of Substantial Completion, whichever is greater.
- B. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS

2.1 HYDROSEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.
- B. Seed Species: Seed of grass species as follows, with not less than 85 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:
 - 1. Full Sun: Pennington Smart Seed Bermuda Grass Blend for Full Sun Lawns with MYCO advantage coating, mixture: 48% Mohawk Bermuda coated/un-hulled & 5% Sultan Bermuda coated/un-hulled; install at rate of 2 lbs per 1000 SF.

2.2 TURFGRASS SOD

- A. Turfgrass Species: Certified approved nursery grown grade; cultivated grass sod; minimum age 18 months; type indicated on Drawings with fibrous root system, free of stones, burned or bare spots, disease, nematodes, soil borne insects and containing no more than 5 weeds per 1000 square feet.
 - 1. Sod: Bermuda grass.

2.3 INORGANIC SOIL AMENDMENTS

- A. Provide inorganic soil amendments in quantities and proportions recommended by soil analysis report.
- B. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 - 1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.
 - 2. Provide lime in form of ground dolomitic limestone.
- C. Aluminum Sulfate: Commercial grade, unadulterated.
- D. Perlite: Horticultural perlite, soil amendment grade.
- E. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

2.4 ORGANIC SOIL AMENDMENTS

- A. Provide organic soil amendments in quantities and proportions recommended by soil analysis report.
- B. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.
 - 1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. of loose sawdust or ground bark.

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- C. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.
- D. Water: Potable

2.5 FERTILIZERS

- A. Provide fertilizers in quantities and proportions recommended by soil analysis report.
- B. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 20 percent phosphoric acid.
- C. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
- D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.6 PLANTING SOILS

- A. Planting Soil: ASTM D 5268 topsoil, with pH range of 5.5 to 7, a minimum of 4 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.

2.7 MULCHES

- A. Fiber Mulch: Biodegradable, dye-wood, cellulose-fiber mulch; non-toxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a PH range of 4.5 to 6.5.
- B. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; non-toxic and free of plant-growth or germination inhibitors.

2.8 PESTICIDES

- A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 - 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.
- D. Beginning of installation means acceptance of existing condition.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
 - 2. Protect grade stakes set by others until directed to remove them.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

- A. Limit turf subgrade preparation to areas to be planted in the immediate future.
- B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply fertilizer directly to subgrade before loosening.
 - 2. Spread planting soil to as required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
 - a. Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.
 - b. Reduce elevation of planting soil to allow for soil thickness of sod.
- C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:
 - 1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.

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2. Loosen surface soil to a depth of at least 6 inches [. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.
 - a. Apply fertilizer directly to surface soil before loosening.
 3. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
 4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
- E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- F. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.
- 3.4 PREPARATION FOR EROSION-CONTROL MATERIALS
- A. Prepare area as specified in "Turf Area Preparation" Article.
 - B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.
 - C. Fill cells of erosion-control mat with planting soil and compact before planting.
 - D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.
 - E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- 3.5 HYDROSEEDING
- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
 1. Mix slurry with fiber-mulch per manufacturer's recommended tackifier.
 2. Apply slurry uniformly to all areas to be seeded. Apply slurry at a rate to obtain the specified seed-sowing rate.
- 3.6 SODDING
- A. Moisten prepared surface immediately prior to laying sod.
 - B. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

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- C. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
1. Lay sod across angle of slopes exceeding 1:3.
 2. Anchor sod on slopes exceeding 1:6 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.
- D. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 4 inches below sod.

3.7 TURF MAINTENANCE

- A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and mulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
 2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
 3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
- B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.
1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
 2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.
- C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:
1. Mow bermudagrass to a height of 1/2 to 1 inch.
- D. Turf Postfertilization: Apply fertilizer after initial mowing and when grass is dry.
1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

3.8 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Engineer:

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1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities. Scattered bare spots exceeding 4 inches by 4 inches shall not total more than two square feet (2 SF) in any 100 square foot area.
 2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities. Scattered bare spots exceeding 4 inches by 4 inches shall not total more than two square feet (2 SF) in any 100 square foot area.
- B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.9 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.10 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.
- C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 02920

SECTION 03200
CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete.

1.2 RELATED SECTIONS

- A. Section 01400 - Quality Requirements: Testing Laboratory Services.
- B. Section 03300 - Cast-in-Place Concrete.
- C. Section 04810- Unit Masonry Systems: Reinforcement for Masonry.

1.3 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 318 - Building Code Requirements For Reinforced Concrete.
- C. ACI SP-66 - American Concrete Institute - Detailing Manual.
- D. ASTM International:
 - 1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - 2. ASTM A184/A184M - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
 - 3. ASTM A496 - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
 - 4. ASTM A497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
 - 5. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 6. ASTM A704/A704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
 - 7. ASTM A706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
 - 8. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
 - 9. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.
- E. ANSI/AWS D1.4 - Structural Welding Code for Reinforcing Steel.
- F. AWS D12.1 - Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.
- G. CRSI - Concrete Reinforcing Steel Institute - Manual of Standard Practice.
- H. CRSI - Recommended Practice For Placing Reinforcing Bars.

- I. CRSI - Recommended Practice For Placing Bar Supports, Specifications and Nomenclature.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and welded wire fabric, bending and cutting schedules, and supporting and spacing devices.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Certificates: Submit AWS Qualification Certificate for welders employed on the Work.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with CRSI and Manual of Practice; ACI 301; ACI 318.
- B. Submit certified copies of mill test report of reinforcement materials analysis.
- C. Prepare shop drawings in accordance with ACI SP-66.
- D. Maintain one (1) copy of each document on site

1.6 QUALIFICATIONS

- A. Design reinforcement under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of South Carolina.

1.7 COORDINATION

- A. Section 01300 - Administrative Requirements - Coordination and Project Conditions.
- B. Coordinate work with all related trades to include but not limited to masonry and structural steel.
- C. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, 60 ksi yield strength; deformed billet steel bars, unfinished.

- B. Welded Steel Wire Fabric: ASTM A185 Plain Type in flat sheets or coiled rolls; unfinished.

WWF 6x6 10/10 or as indicated on the documents (whichever is more stringent).

2.2 ACCESSORY MATERIALS

- A. Tie Wire: Minimum 16 gage annealed type.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on the bottom to prevent puncture of the vapor retarder.

2.3 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice/ ACI 318.
- B. Weld reinforcement in accordance with ANSI/AWS D1.4.
- C. Reinforcement: Clean surfaces, weld and re-protect welded joint in accordance with CRSI.
- D. Locate reinforcing splices not indicated on drawings, at point of minimum stress. Review location of splices with Architect/Engineer prior to installation.
- E. Form spiral column reinforcement from minimum 3/8 inch diameter continuous deformed bar or wire.
- F. Weld reinforcement in accordance with AWS D1.4.
- G. Reinforcement: Clean surfaces, weld and re-protect welded joint in accordance with CRSI.

PART 3 EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.
 - 1. Do not weld crossing reinforcement bars for assembly except as permitted by Architect/Engineer.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.

3.2 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements and 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

- B. Perform field inspection and testing in accordance with ACI 318.
- C. Provide free access to Work and cooperate with appointed firm.
- D. Reinforcement Inspection:
 - 1. Placement Acceptance: Specified and ACI 318 material requirements and specified placement tolerances.
 - 2. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.

END OF SECTION 03200

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cast-in-place concrete floor slabs on grade and footings.
- B. Control, and construction joint devices associated with concrete work, including joint sealants.
- C. Equipment pads
- D. Sidewalks

1.2 RELATED SECTIONS

- A. Section 01400 - Quality Requirements: Testing Laboratory Services.
- B. Division 2 – All related sections for sitework and earthwork
- C. Section 03200 - Concrete Reinforcement.
- D. Section 07900 - Joint Sealers
- E. Section 09311 - Ceramic Tile Floor Finish.
- F. Section 09686 – Sheet Carpet.
- G. Section 09650 - Resilient Flooring.
- H. Division 15 - Mechanical: Mechanical items for casting into concrete.
- I. Division 16 - Electrical: Electrical items for casting into concrete.

1.3 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 117 - Specifications for Tolerances for Concrete Construction Materials.
 - 2. ACI 301 - Specifications for Structural Concrete.
 - 3. ACI 305 - Hot Weather Concreting.
 - 4. ACI 306.1 - Standard Specification for Cold Weather Concreting.
 - 5. ACI 308.1 - Standard Specification for Curing Concrete.
 - 6. ACI 318 - Building Code Requirements for Structural Concrete.
- B. ASTM International:
 - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 2. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - 3. ASTM C33 - Standard Specification for Concrete Aggregates.
 - 4. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

5. ASTM C42/C42M - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
6. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
7. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
8. ASTM C150 - Standard Specification for Portland Cement.
9. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
10. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
11. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
12. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
13. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
14. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
15. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
16. ASTM C685/C685M - Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing.
17. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
18. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
19. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
20. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
21. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
22. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
23. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
24. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
25. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.4 PERFORMANCE REQUIREMENTS

- A. Vapor Retarder Permeance: Maximum 1 perm when tested in accordance with ASTM E96, Procedure A.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide data on joint devices, attachment accessories and admixtures. Provide data on curing and finishing compounds, product characteristics, compatibility and limitations.

- C. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent work. Indicate criteria for preparation and application.

1.6 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301/ACI 318, ACI 117 unless more stringent provisions are provided.
- B. Acquire cement and aggregate from same source for all work.
- C. Conform to ACI 305 when concreting during hot weather.
- D. Conform to ACI 306.1 when concreting during cold weather.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements: Environmental conditions affecting products on site.
- B. Maintain concrete temperature after installation at minimum 50 degrees F for minimum 7 days.

1.8 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I - Normal or Type IA - Air Entraining.
- B. Normal Weight Aggregates: ASTM C33.
- C. Coarse Aggregate Maximum Size: In accordance with ACI 318.
- C. Water: ACI 318, ASTM C94: Potable clean and not detrimental to concrete.

2.2 ADMIXTURES

- A. Air Entrainment: Conform to requirement of ASTM C260.
- B. Fly Ash and Calcinated Pozzolan: Shall not be used and will be rejected.
- C. Silica Fume: ASTM C1240.

2.3 ACCESSORIES

- A. Vapor Barrier: ASTM E1745 Class A, type recommended for below grade application, furnish joint tape recommended by manufacturer.
1. Manufacturers:
 - a. Raven Industries: Vapor Block VB15
 - 1) Color: Blue
 - 2) Thickness (nominal): 15 mil
 - 3) Water vapor permeance 0.03 perms.
 - 4) Tensile Strength: 88 lb/in.
 - 5) Puncture Resistance: > 4000g
 - 6) Use manufacturer recommended tape at all joints.
 - b. Substitutions: Section 01600 - Product Requirements.
- B. Non-Shrink Grout: ASTM C1107 Grade C premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,500 psi in 48 hours and 7,000 psi in 28 days.

2.4 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Filler Type A: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/2 inch thick; tongue and groove profile.
- B. Construction Joint Devices: Integral galvanized steel; full thickness of slab, less 1/2 inch, formed to tongue and groove profile, with removable top strip exposing sealant trough, knockout holes spaced at 6 inches, ribbed steel spikes with tongue to fit top screed edge.
- C. Sealant: Cold applied two part liquid neoprene.

2.5 CONCRETE MIX

- A. Mix concrete in accordance with ACI 304. Deliver concrete in accordance with ASTM C94.
- B. Select proportions for normal weight concrete in accordance with ACI 301 Method 2.
- C. Provide concrete to the following criteria:
- | <u>Unit</u> | <u>Measurement</u> |
|-------------------------------|---|
| Compressive Strength (28 day) | 3000 (Footings, Slab on grade, Steps on Grade)
4500 Piers (unless noted otherwise) |
| Fly Ash or Pozzolan Content | NOT PERMITTED |
| Slump | Plus or minus 1 inch
(50 mm) 4 inches |
- D. Use accelerating admixtures in cold weather only when approved by Architect/Engineer. Use of admixtures will not relax cold weather placement requirements.
- E. Use calcium chloride only when approved by Architect/Engineer.
- F. Use set retarding admixtures during hot weather only when approved by Architect/Engineer.

- G. Add air entraining agent to normal weight concrete mix for work exposed to exterior.
- H. Water shall not be added at the site unless approved by the Engineer.
- I. Average Compressive Strength Reduction: Not permitted.
- J. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C94/C94M.
- K. Site Mixed Concrete: Mix concrete in accordance with ACI 318.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01300.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.
- D. Verify compatibility of sealers and substrate finish with finish surface material bonding, in accordance with Manufacturer's recommendations.

3.2 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.
- B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- C. Remove debris and ice from formwork, reinforcement, and concrete substrates.
- D. Remove water from areas receiving concrete before concrete is placed.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301 and ACI 318.
- B. Notify Architect/Engineer minimum 24 hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
- D. Install vapor barrier under interior slabs on grade in accordance with ASTM E1643. Lap joints minimum 6 inches and seal watertight by taping edges and

ends (use taped lap method). End laps should be staggered to avoid build up of layers, Lap vapor retarder over footings and seal to foundation walls.

- E. Repair vapor barrier damaged during placement of concrete reinforcing. Repair with vapor barrier material; lap over damaged areas minimum 6 inches and seal watertight. Seal around all pipe penetrations.
- F. Unless noted otherwise place slab joints such that control joints are spaced approximately 24 to 36 times the thickness. Limit slab area to 450 sf. The length to width area of jointed section of slab shall not exceed 1 – 1/2.
- G. Apply sealants in joint devices in accordance with Section 07900.
- H. Deposit concrete at final position. Prevent segregation of mix.
- I. Place concrete in continuous operation for each panel or section determined by predetermined joints.
- J. Consolidate concrete.
- K. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- L. Place concrete continuously between predetermined expansion, control, and construction joints.
- M. Do not interrupt successive placement; do not permit cold joints to occur.
- N. Place floor slabs in saw cut pattern indicated.
- O. Saw cut joints within 12 hours after placing. Use 3/16 inch thick blade, cut into 1/3 depth of slab thickness.
- P. Screed floors and slabs on grade level, maintaining surface flatness of F_r of 20 maximum 1/4 inch in 10 ft.

3.4 CONCRETE FINISHING

- A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 318.
- B. Steel trowel surfaces which will receive carpeting, resilient flooring or seamless flooring.
- C. Wood float surfaces which will receive ceramic tile with full bed setting system.
- D. Light Broom finish the exterior concrete walks to provide a non-slip surface, in accordance with ADA regulations.
- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1/8 inch per foot nominal or as indicated on drawings.
- F. Finish and measure the concrete surface so that the gap at any point between the concrete surface and unleveled, freestanding, 10 foot long straightedge resting on two high spots and placed anywhere else on the surface does not exceed 1/4 inch.

3.5 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. Protect concrete footings from freezing for a minimum of five (5) days.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Cure floor surfaces in accordance with ACI 308.1 and apply curing compound in accordance with manufacturer's instructions.
- D. Ponding: Maintain 100 percent coverage of water over floor slab areas continuously for 7 days.
- E. Spraying: Spray water over floor slab areas and maintain wet for 7 days.
- F. Polyethylene Film: Spread polyethylene film over floor slab areas, lapping edges and sides and sealing with pressure sensitive tape; maintain in place for 7 days.
- G. Apply sealer in accordance with manufacturer's instructions on floor surfaces scheduled to receive carpeting and ceramic tile.
- H. Compound curing will not be permitted for surfaces to receive glue adhered floor coverings to include carpet and resilient flooring, or coatings (penetrants) such as paint, epoxy liquid hardener or fluid applied waterproofing.

3.6 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements and 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform field inspection and testing in accordance with ACI 318.
- C. Submit proposed mix design to Architect/Engineer for review prior to commencement of Work.
- D. Tests of cement and aggregates may be performed at no cost to the Owner to ensure conformance with specified requirements.
- E. Three concrete test cylinders will be taken for every concrete pour.
- F. One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.
- G. One slump test will be taken for each set of test cylinders taken.
- H. Concrete Inspections:
 - 1. Continuous Placement Inspection: Inspect for proper installation procedures.
 - 2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.

- I. Strength Test Samples:
 - 1. Sampling Procedures: ASTM C172.
 - 2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, standard cured.
 - 3. Sample concrete and make one set of three cylinders for every 50 cu yds or less of each class of concrete placed each day and for every 5,000 sf of surface area for slabs and walls.
 - 4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
 - 5. Make one additional cylinder during cold weather concreting, and field cure under same conditions as concrete represents.
 - 6. One slump test will be taken for each set of test cylinders taken.

- J. Field Testing:
 - 1. Slump Test Method: ASTM C143/C143M.
 - 2. Air Content Test Method: ASTM C173/C173M and ASTM C231.
 - 3. Temperature Test Method: ASTM C1064/C1064M.
 - 4. Measure slump and temperature for each compressive strength concrete sample.
 - 5. Measure air content in air entrained concrete for each compressive strength concrete sample.

- K. Cylinder Compressive Strength Testing:
 - 1. Test Method: ASTM C39.
 - 2. Test Acceptance: In accordance with ACI 318.
 - 3. Test one cylinder at 7 days.
 - 4. Test two cylinders at 28 days.
 - 5. Dispose remaining cylinders when testing is not required.

- L. Core Compressive Strength Testing:
 - 1. Sampling and Testing Procedures: ASTM C42/C42M.
 - 2. Test Acceptance: In accordance with ACI 318.
 - 3. Drill three cores for each failed strength test from concrete represented by failed strength test.

- M. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.7 PATCHING

- A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.
- C. Patch imperfections as directed and in accordance with ACI 301 and ACI 318.

3.8 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the

Architect/Engineer. **Any visible hairline crack will be considered defective.**

- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

3.9 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions of Section 01500.
- B. Do not permit traffic over unprotected floor surface.

3.10 TOLERANCES

- A. Maximum Variation of surface flatness for exposed concrete floors: 1/4 inch in 10 feet.
- B. Maximum Variation of surface flatness under carpet: 1/8 inch in 10 feet.

END OF SECTION 03300

SECTION 04810
UNIT MASONRY SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete masonry units, facebrick units.
- B. Reinforcement, anchorage, and accessories.
- C. Mortar and grout for masonry.
- D. Pea gravel at base of cavity wall.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

- A. Section 07620 - Sheet Metal, Flashing and Trim: Placement of reglets for flashings.

1.3 RELATED SECTIONS

- A. Section 01400 - Quality Requirements: Testing Laboratory Services.
- B. Section 03200 - Concrete Reinforcement: Reinforcing bars.
- C. Section 07900 - Joint Sealers: Rod and sealant at control and expansion joints.

1.4 REFERENCES

- A. ANSI/ASTM A82 - Cold-Drawn Steel Wire for Concrete Reinforcement.
- B. ANSI/ASTM C55 - Concrete Building Brick.
- C. ANSI/ASTM C216 - Facing Brick (Solid Masonry Units Made From Clay or Shale).
- D. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- E. ASTM A525 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process.
- F. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- G. ASTM C90 - Hollow Load Bearing Concrete Masonry Units.
- H. ASTM C129 - Non-Load Bearing Concrete Masonry Units.
- I. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.
- J. UL - Underwriters' Laboratories.
- K. ASTM B370 - Copper Sheet and Strip for Building Construction

- L. NCMA - National Concrete Masonry Association--NCMA Tech Notes
- M. ASTM C5 - Quickline for Structural Purposes.
- N. ASTM C91 - Masonry Cement.
- O. ASTM C94 - Ready-Mixed Concrete.
- P. ASTM C144 - Aggregate for Masonry Mortar.
- Q. ASTM C150 - Portland Cement.
- R. ASTM C207 - Hydrated Lime for Masonry Purposes.
- S. ASTM C270 - Mortar for Unit Masonry.
- T. ASTM C387 - Packaged, Dry, Combined Materials for Mortar and Concrete.
- U. ASTM C404 - Aggregates for Masonry Grout.
- V. ASTM C476 - Grout for Masonry.
- W. ASTM C595 - Blended Hydraulic Cement.
- X. ASTM C780 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
- Y. ASTM C1019 - Method of Sampling and Testing Grout.
- Z. ASTM A510 - Wire Rods and Coarse Round Wire, Carbon Steel

1.5 SUBMITTALS

- A. Submit product data for each different masonry unit, accessory and other manufactured products indicated under provisions of Section 01330.
- B. Submit samples under provisions of Section 01330. Samples to be used in field mock-up.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 530 Building Code Requirements for Masonry Structures and ACI 530.1 Specification for Masonry Structures.
- B. Fire Rated Wall Construction: Rating as indicated on Drawings.
 - 1. Tested Rating: Determined in accordance with ASTM E119.
- C. Surface Burning Characteristics:
 - 1. Foam Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- D. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation insert.
- E. Perform Work in accordance with State of South Carolina standards.
- F. Maintain one copy of each document on site

1.7 MOCK-UP

- A. Provide mock-up of composite masonry wall under, provisions of Section 01400.
- B. Erect facebrick, to 4' - 0" wide x full height panel size (6' - 8"), to include specified mortar and accessories.
- C. When accepted mock-up will demonstrate minimum standard for the work. Mock-up may remain part of the work.
- D. The mock-up will aid in determining the color selections and compatibility with other material textures and colors.

1.8 PRE-INSTALLATION CONFERENCE

- A. Convene one (1) week prior to commencing work of this Section, under provisions of Section 01300 – Administrative Requirements.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 01600.
- B. Store and protect products under provisions of Section 01600.
- C. Accept concrete masonry units on site. Inspect for damage.
- D. Store and handle masonry units off the ground, under cover, and in a dry location. If unit becomes wet, do not place units until they are in an air dried condition.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 50 degrees F prior to, during, and 48 hours after completion of masonry work.
- B. Cold-weather requirements: IMIAC--Recommended practices and specifications for cold-weather masonry construction.

1.11 SEQUENCING AND SCHEDULING

- A. Coordinate work under provisions of Division 1.
- B. Coordinate all masonry work with all other disciplines.

PART 2 PRODUCTS

2.1 FACE BRICK

- A. Face Brick: Allowance \$400/1000 brick for material only; brick to match existing. Refer to Section 01200: Price and Payment Procedures for allowances.
- B. Brick Mason Units: Modular
- C. A standard mortar shall be selected by architect with standard concave tooled joint.

2.2 CONCRETE MASONRY UNITS

- A. Hollow and Solid Load Bearing Block Units: ASTM C90, Grade N, Type II – Non-Moisture Controlled; light weight, with a minimum average net area compressive strength of 2000 psi, D-3 classification @ fire rated assemblies.
 - 1. Sizes: 8 x 8 x 16 or as indicated on documents.
- B. General: Comply with requirements indicated below applicable to each form of concrete masonry unit required.
 - 1. Provide special shapes where indicated and as follows:
 - a. For lintels, jambs, sash, control joints, headers, bonding, and other special conditions.
 - b. Square-edged units for outside corners.
 - 2. Size: Provide concrete masonry units complying with requirements indicated below for size that are manufactured to specified face dimensions within tolerances specified in the applicable references ASTM specification for concrete masonry units.
 - a. Concrete Masonry Units: Manufactured to specified dimensions of 3/8 inch less than nominal widths by nominal lengths indicated on drawings.

2.3 MORTAR MIXES

- A. Mortar for Reinforced Masonry: ASTM C270, Type M or S using the Property Method:
 - 1. For masonry below grade and in contact with earth, and where indicated, use type indicated below:
 - a. Type: M or S
 - 2. For exterior, above-grade load bearing and non-load bearing walls and parapet walls; and for other applications where another type is not indicated, use type indicated below:
 - a. Type: M or S
- B. Pointing Mortar: ASTM C270, Type N using the Property Method.
- C. Stain Resistant Pointing Mortar: One part Portland cement, 1/8 part hydrated lime, and two parts graded (80 mesh) aggregate, proportioned by volume. Add aluminum tristearate, calcium stearate, or ammonium stearate equal to 2 percent (2%) of Portland cement by weight.
- D. Grout for Unit Masonry: Comply with ASTM C476 and referenced unit masonry standard:
 - 1. 3000 psi strength at twenty-eight (28) days: Eight (8) inch slump

2.4 MORTAR MIXING

- A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C94 / C 94M.
- B. Add mortar color and admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.
- C. Do not use anti-freeze compounds to lower the freezing point of mortar.
- D. If water is lost by evaporation, re-temper only within two hours of mixing.

- E. Use mortar within two hours after mixing at temperatures of 80 degrees F (26 degrees C), or two-and-one-half hours at temperature under 50 degrees (10 degrees C).

2.5 REINFORCING AND ANCHORAGE

- A. Provide adjustable wall ties by Durowall DA-213 S System; hot dipped galvanized with screws of same coating, D/A 807 – 1 ½" long screws with neoprene washer.
- B. Provide anchors at 16" o.c. vertically and horizontally, as well as at each opening, jamb, and control joint.

2.6 JOINT REINFORCEMENT

- A. General: Provide joint reinforcement complying with requirements of referenced unit masonry standard and this article, formed from the following:
1. Galvanized Carbon Steel Wire: ASTM A82, coating class as follows:
 - a. Where installed in interior walls unless specified otherwise: ASTM A641, Class 1
 - b. Where installed in exterior walls and interior walls at toilets, showers: ASTM A153, Class B-2.
- B. Description: Welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet, with prefabricated corner and tee units, and complying with requirements indicated below:
1. Wire Diameter for Side Rods: 0.1483 inch (9 gage).
 2. Wire Diameter for Cross Rods: 0.1483 inch (9 gage).
 3. For single-wythe masonry, provide type as follows with single pair of side rods:
 - a. Pencil rod – hot dipped galvanized at 16" o.c.
- C. Manufacturers: Subject to compliance with requirements, provide joint reinforcement by one of the following:
1. AA Wire Products
 2. Dur-O-Wal, Inc.
 3. Heckman Building Products, Inc.
 4. Hohmann & Barnard, Inc.
 5. Masonry Reinforcing Corp. of America
 6. National Wire Products Industries
 7. Southern Construction Products, Inc.

2.7 ADJUSTABLE MASONRY VENEER ANCHORS

- A. General: Provide two-piece assemblies allowing vertical or horizontal differential movement between wall and framework parallel to plane of wall, but resisting tension and compression forces perpendicular to it; for attachment over sheathing to metal studs or for embedment in masonry back-up; and with the following structural performance characteristics:
1. Structural Performance Characteristics: Capable of withstanding a 100 lb/ft load in either tension or compression without deforming over, or developing play in excess of, 0.05 inch.
- B. Masonry Veneer Anchors for Metal Stud Back-Up: consisting of 3/16" rectangular wire section for embedment in masonry back-up with eye ends

sections protruding from masonry beyond masonry cavity insulation (if any) and 3/16" rectangular wire section with turned-down ends to fit into eyes in back-up section and allowing approximately 1-1/4" vertical adjustment; hot-dip galvanized.

- C. Neoprene Gaskets: For use at screw-attached masonry veneer anchor. Manufacturer's standard closed cell neoprene gaskets manufactured to fit behind anchor plate and to prevent moisture from penetrating through screw holes to steel studs behind sheathing.

2.8 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints, manufactured by No. AA1000 AA Wire Products.
- B. Joint Filler: Closed cell rubber; oversized 50 percent to joint width; self-expanding; 2 inches wide by maximum lengths.
- C. Weeps: Provide the following:
 - 1. Wicking Material: material as indicated below, required to produce 2 inches exposure on exterior and up into cavity between wythes:
 - a. Cotton sash cord.
- D. Cleaning Solutions: Non-acidic, not harmful to masonry work or adjacent materials.
- E. Building Paper: #15 asphalt saturated felt.

2.9 FLASHING

For all thru-wall flashing and sill pan flashing:

- A. York Flashings: Cop-R-Tex Duplex 5 oz copper bonded on both sides to heavy creped kraft paper reinforced with heavy fibers. Use Cop-R-Mastic at all splices.
- B. Substitutions under provisions of Section 01600.
- C. All masonry surfaces receiving thru-wall flashing shall be free from loose materials, and reasonably smooth. There shall be no slopes that will form pockets or prevent free drainage of water to the exterior surfaces of the wall.

The metal drip edge the forms the exposed edge of all the through wall flashing shall be 26 gauge stainless steel as defined on the contract documents (reference the wall sections) Manufactured by Hohmann & Bernard, Inc. (Sandell FTSA-LB Drip Plate 3" wide Type 304 stainless steel 26 gauge standard)

- 1. Foundation Sill Flashing: The flashing for foundation sills shall be laid in a slurry of fresh mortar and topped with a fresh full bed of mortar. Flashing shall be left flush with the exterior face of the masonry and turned up on the inside not less than 2" or be carried upward across the cavity a minimum of 6". Flashing will then be secured in the back wall in a reglet or mortar joint. Where sill and column meet, flashing shall be brought a minimum of 10" up the column and be secured with Cop-R-Tite Mastic.
- 2. Cavity Wall Flashing: Flashing shall be laid in a slurry of fresh mortar and topped with a fresh full slurry of mortar. Flashing shall be left flush

with the exterior face of the masonry wall and carried through the wall, upward across the cavity a minimum of 6" and secured in the back wall mortar joint or reglet.

3. Head and Sill Flashing: The flashing shall start with the outside of the wall or lintel angle, then carried through or up the wall as indicated. Flashing shall extend 6" beyond each side of the opening and be turned up at the sides forming a pan. All corners shall be folded, not cut.
4. Weep Holes: All flashing installed through masonry shall be provided with proper drainage to the outside. Weep holes shall be provided in the head joint, the first course immediately above the flashing. Weep holes shall be kept free of mortar droppings.
5. Joining of Material: Joints shall be made by lapping a minimum of 4" coating the contacting surfaces with Cop-R-Tite Mastic.
- and
1.
6. Mortar Deflection: A mortar deflection device should be installed at all flashing locations to ensure proper weepage.
7. Inspection: In each area where membrane flashing has been installed, a minimum of three locations in the wall joint above the flashing shall be left clean of mortar for water to be forced into the opening to determine if flashing has been installed properly and weep holes provided in accordance with these specifications. All flashing that has been left exposed to the exterior should be trimmed flush with the exterior masonry at this time and in coordination with stainless steel metal drip edge.
8. All Cop-R-Tex Duplex 5 oz ,flashing shall extend past the brick veneer edge by ¼" and be cut and hemmed to form a clean straight, plumb condition. The Stainless Steel metal drip flashing shall be placed below the through wall flashing to form an exposed edge condition. This condition will be reviewed at the mock-up panel.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work. Do not proceed until unsatisfactory conditions have been corrected.
- B. Verify items provided by other Sections of work are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.
- D. Beginning of installation means installer accepts existing conditions.
- E. Verify the actual locations of piping prior to installation.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied to other Sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.
- C. Cut masonry units with water driven blade saws to provide clean, sharp, unchipped edges. Wash units immediately after cutting to remove saw slurry. Use full size units without cutting where possible.
- D. Comply with referenced unit masonry standard and other requirements indicated applicable to each type of installation included in Project.
- E. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units, using units of nominal thickness indicated.
- F. Leave openings for equipment to be installed before completion of masonry. After installation of equipment, complete masonry to match construction immediately adjacent to the opening.
- G. Install mortar in accordance with ASTM C780. Install grout in accordance with ASTM C475.

3.3 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Lay concrete masonry units in running bond. Course one unit and one mortar joint to equal 8 inches. Form concave mortar joints. Lay brick units in running bond course three brick units and three mortar joints equal to 8 inches from concave mortar joints.
- D. For starting course to be placed on footings where cells are not grouted spread out full mortar bed including areas under cells.
- E. Tool exposed joints slightly concave using a joint larger than the joint thickness unless noted otherwise.

3.4 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
- D. Remove excess mortar as Work progresses.
- E. Interlock intersections and external corners.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where

adjustment must be made, remove mortar and replace.

- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Build cavity walls and other masonry construction to the full thickness shown.
- I. During erection of cavity wall, cover tops of walls and sills with waterproof sheeting at the end of each days work. Cover partially completed masonry when construction is not in progress, extend cover, and work in place furring that work day or a minimum of 24" below non work a minimum of 24 inches down both sides and secure cover in place. All in place masonry work during the installed work day shall be covered a minimum of 24" below new work.
- J. Do not apply uniform load (roof or floor) for a minimum of 12 hours and concentrated loads for at least 3 days after erecting masonry wall or columns.

3.5 WEEPS AND VENTS

- A. Install weep vent holes in veneer at 24 inches on center horizontally above through-wall flashing above shelf angles and at bottom of walls.
- B. Install weeps in the head joints in exterior wythes of the first course of masonry immediately above embedded flashings and as follows:
 - 1. Install weeps with product specified in Part 2 of this Section.
 - 2. Space weeps 24 inches o.c. unless otherwise indicated.
 - 3. Install weeps to extend 6" up into cavity and to allow 2" extension beyond exterior face of veneer.
 - 4. In all exterior cavities/air spaces place pea gravel to a height equal to height of first course but not less than 2 inches immediately above flashing embedded in the wall, as masonry construction progresses, to splatter any mortar droppings and to maintain drainage.

3.6 CAVITY WALL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep holes.
- B. Build inner wythe ahead of outer wythe to receive cavity insulation air/vapor barrier adhesive.

3.7 HORIZONTAL JOINT REINFORCEMENT

- A. General: Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere; lap reinforcing a minimum of 6 inches.
 - 1. Space horizontal joint reinforcement 16" o.c. vertically, unless otherwise indicated.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

- D. Place masonry reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

3.8 LINTELS

- A. Install loose steel lintels over door openings. (Not to be used over the overhead door openings)
- B. Provide masonry lintels where shown and wherever openings of more than 2'-0" for block size units are shown without structural steel or other supporting lintels. Provide precast or formed-in-place masonry lintels. Continuity of vertical jamb reinforcing must be provided at precast lintels. Temporarily support formed-in-place lintels.
- C. Use single piece reinforcing bars only.
- D. Support and secure reinforcing bars from displacement. Maintain position within ½ inch of dimensioned position.
- E. Place and consolidate concrete fill without displacing reinforcing.
- F. Allow masonry lintels to attain specified strength before removing temporary supports.
- G. Maintain minimum 8 inch bearing on each side of opening.

3.9 GROUTED COMPONENTS

- A. Reinforce wall components as indicated on drawings.
- B. Lap splices minimum 48 bar diameters.
- C. Support and secure reinforcing bars from displacement. Maintain position within ½ inch of dimensioned position.
- D. Place and consolidate grout fill without displacing reinforcing.
- E. At bearing locations, fill masonry cores with grout for minimum 12 inches either side of opening.

3.10 SINGLE WYTHE MASONRY VENEER ATTACHED TO METAL STUD BACK-UP

- A. Erect interior wythe first with specified joint reinforcement and ties.
 - 1. Secure exterior wythe to metal stud back-up with masonry veneer anchors spaced not more than 16" o.c. vertically and 16" o.c. horizontally. Stagger in alternate vertical courses between horizontal joint reinforcing.
- B. Place at maximum 3" o.c. each way around perimeter of opening within 12" o.c. of openings and center joints.
- C. Do not "strike-off" mortar and allow it to drop into cavity.

3.11 FLASHINGS

- A. General: Install embedded through-wall flashing and weeps in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.
- B. Prepare masonry surfaces so that they are smooth and free from projections that could puncture flashing. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with adhesive/sealant/tape as recommended by flashing manufacturer before covering with mortar.

3.12 TOLERANCES (as specified in AGI 530.1 or as indicated whichever is stricter)

- A. Maximum Variation From Unit to Adjacent Unit: 1/32 inch.
- B. Maximum Variation From Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.
- C. Maximum Variation From Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Maximum Variation From Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet; 1/2 inch in 30 feet.
- E. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.
- F. Maximum Variation From Cross Sectional Thickness of Walls: 1/4 inch.

3.13 CLEANING

- A. Clean work under provisions of Section 01700.
- B. Remove excess mortar and mortar smears.
- C. Replace defective mortar. Match adjacent work.
- D. Clean soiled surfaces with cleaning solution.
- E. Use non-metallic tools in cleaning operations.

3.14 PROTECTION OF FINISHED WORK

- A. Protect finished installation under provisions of Section 01500.
- B. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.
- C. Prevent grout, mortar and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on the ground and over the wall surface.
 - 2. Protect sills, ledges and projections from mortar droppings.

END OF SECTION 04810

SECTION 05120
STRUCTURAL STEEL

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Structural shapes.
 - 2. Channels and angles.
 - 3. Hollow structural sections.
 - 4. Structural pipe.
 - 5. Structural plates and bars.
 - 6. Floor plates.
 - 7. Fasteners, connectors, and anchors.
 - 8. Grout under structural base plates, etc.

- B. Related Sections:
 - 1. Section 01400 - Quality Requirements: Testing and Inspection Services.

1.2 REFERENCES

- A. American Institute of Steel Construction:
 - 1. AISC Code of Standard Practice for Steel Buildings and Bridges.
 - 2. AISC Load and Resistance Factor Design (LRFD) Specification for Structural Steel Buildings.
 - 3. AISC Load and Resistance Factor Design Specification for Single-Angle Members.
 - 4. AISC Seismic Provisions for Structural Steel Buildings.
 - 5. AISC Specification for Allowable Stress Design of Single-Angle Members.
 - 6. AISC Specification for the Design of Steel Hollow Structural Sections.
 - 7. AISC Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design.

- B. American Society of Civil Engineers:
 - 1. ASCE 19 - Standard Applications of Steel Cables for Buildings.

- C. ASTM International:
 - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 - 2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 3. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
 - 4. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 5. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 6. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
 - 7. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

8. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 9. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
 10. ASTM A449 - Standard Specification for Quenched and Tempered Steel Bolts and Studs.
 11. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
 12. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 13. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
 14. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding.
 15. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
 16. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
 17. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
 18. ASTM A588/A588M - Standard Specification for High-Strength Low-Alloy Structural Steel with 50 ksi Minimum Yield Point to 4-in. (100-mm) Thick.
 19. ASTM A618 - Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing.
 20. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
 21. ASTM A847 - Standard Specification for Cold-Formed Welded and Seamless High Strength, Low Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance.
 22. ASTM A852/A852M - Standard Specification for Quenched and Tempered Low-Alloy Structural Steel Plate with 70 ksi Minimum Yield Strength to 4 in. (100 mm) Thick.
 23. ASTM A913/A913M - Standard Specification for High-Strength Low-Alloy Steel Shapes of Structural Quality, Produced by Quenching and Self-Tempering Process (QST).
 24. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.
 25. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
 26. ASTM E94 - Standard Guide for Radiographic Examination.
 27. ASTM E164 - Standard Practice for Ultrasonic Contact Examination of Weldments.
 28. ASTM E165 - Standard Test Method for Liquid Penetrant Examination.
 29. ASTM E709 - Standard Guide for Magnetic Particle Examination.
 30. ASTM F436 - Standard Specification for Hardened Steel Washers.
 31. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.
 32. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
 33. ASTM F1852 - Standard Specification for Twist Off Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- D. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
 2. AWS D1.1 - Structural Welding Code - Steel.

- E. Research Council on Structural Connections:
 - 1. RCSC - Specification for Structural Joints Using ASTM A325 or A490 Bolts.
- F. SSPC: The Society for Protective Coatings:
 - 1. SSPC - Steel Structures Painting Manual.
 - 2. SSPC Paint 15 - Steel Joist Shop Paint.
 - 3. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
 - 4. SSPC SP 3 - Power Tool Cleaning.
 - 5. SSPC SP 6 - Commercial Blast Cleaning.
 - 6. SSPC SP 10 - Near-White Blast Cleaning.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments and fasteners. Coordinate locations that are required to receive sprayed on fireproofing and verify compatibility of adherence to steel.
 - 2. Connections.
 - 3. Cambers.
 - 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
 - 5. Verify that field measurements are as shown on shop drawings.
- C. Mill Test Reports: Submit indicating structural strength, destructive and non-destructive test analysis.
- D. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
 - 1. AISC Code of Standard Practice for Steel Buildings and Bridges.
 - 2. AISC Code of Standard Practice for Steel Buildings and Bridges. Section 10.
 - 3. AISC Seismic Provisions for Structural Steel Buildings.
 - 4. AISC Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design.
- B. Perform Work in accordance with State of South Carolina standards.
- C. Maintain one copy of each document on site.

1.5 QUALIFICATIONS

- A. Fabricator: Company specializing in performing Work of this section with minimum 10 years documented experience with the following current AISC Certification:
 - 1. Standard Steel Building Structures (STD).
 - 2. Conventional Steel Building Structures (SBD).
 - 3. Complex Steel Building Structures (CBD).

- B. Erector: Company specializing in performing Work of this section with minimum 10 years documented experience with the following current AISC Certification:
 - 1. Certified Steel Erector (CSE).
 - 2. Advanced Certified Steel Erector (ACSE).

- C. Shop Painter: Company specializing in performing Work of this section with minimum 10 years documented experience with the following current AISC Certification:
 - 1. Sophisticated Paint Endorsement - Enclosed (P1).
 - 2. Sophisticated Paint Endorsement - Covered (P2).
 - 3. Sophisticated Paint Endorsement - Outside (P3).

- D. Welders and Welding Procedures: AWS D1.1 qualified within previous 12 months.

1.6 COORDINATION

- A. Section 01300 - Administrative Requirements: Requirements for coordination.

- B. Coordinate work with the following:
 - 1. Section 05312 for framed openings other than structural steel.
 - 2. Section 05500 for miscellaneous steel supports other than structural steel.

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL

- A. Structural S-Shapes: ASTM A529/A529M; Grade 50 and ASTM A572/A572M; Grade 50.

- B. Channels and Angles: ASTM A36/A36M.

- C. Round Hollow Structural Sections: ASTM A500, Grade B.

- D. Square and Rectangular Hollow Structural Sections: ASTM A500, Grade B.

- E. Structural Pipe: ASTM A53/A53M, Grade B.

- F. Structural Plates and Bars: ASTM A36/A36M.

2.2 FASTENERS, CONNECTORS, AND ANCHORS

- A. High Strength Bolts: ASTM A325; Type 1.
 - 1. Finish: Unfinished.

- B. Nuts: ASTM A563 heavy hex type.
 - 1. Finish: Unfinished.

- C. Washers: ASTM F436; Type 1, circular.
 - 1. Finish: Unfinished.

- D. Shear Connectors: ASTM A108; headed, unfinished and in accordance with AWS D1.1; Type B.

- E. Anchor Rods: ASTM A36/A36M.
 - 1. Shape: Hooked.
 - 2. Plate Washers: ASTM A36/A36M.
- F. Threaded Rods: ASTM A36/A36M.
 - 1. Finish: Mechanically galvanized.

2.3 WELDING MATERIALS

- A. Welding Materials: AWS D1.1; type required for materials being welded.

2.4 ACCESSORIES

- A. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing minimum compressive strength of 7,000 psi at 28 days.
- B. Shop and Touch-Up Primer: SSPC Paint 15, Type 1, red oxide.
- C. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic.

2.5 FABRICATION

- A. Space shear stud connectors equally along beam span, unless indicated otherwise on Drawings.
- B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- C. Fabricate connections for bolt, nut, and washer connectors.
- D. Develop required camber for members.

2.6 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP 3.
- B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.
- C. Galvanizing for Structural Steel Members: ASTM A123/A123M; minimum 1.2 oz/sq ft coating thickness; galvanize after fabrication.
- D. Galvanizing for Fasteners, Connectors, and Anchors:
 - 1. Hot-Dipped Galvanizing: ASTM A153/A153M.
 - 2. Mechanical Galvanizing: ASTM B695; Class 50 minimum.

2.7 SOURCE QUALITY CONTROL AND TESTS

- A. Section 01400 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Shop test bolted and welded connections as specified for field quality control tests.

- C. When fabricator is approved by authority having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
 - 1. Specified shop tests are not required for Work performed by approved fabricator.
- D. Welding: Inspect welds in accordance with AWS D1.1, by independent testing laboratory in accordance with Section 01400.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify bearing surfaces are at correct elevation.
- C. Verify anchors rods are set in correct locations and arrangements with correct exposure for steel attachment.

3.2 PREPARATION

- A. Furnish templates for installation of anchor rods and embedments in concrete and masonry work.

3.3 ERECTION

- A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.
- B. Field weld components and shear connectors indicated on Drawings and shop drawings.
- C. Field connect members with threaded fasteners; torque to required resistance tighten to snug tight for bearing type connections.
- D. Do not field cut or alter structural members without approval of Architect/Engineer.

3.4 GROUT INSTALLATION

- A. Grout under base plates in accordance with Section 03600 - Grout.

3.5 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

- C. Maximum Offset From Alignment: 1/4 inch.

END OF SECTION

SECTION 05400
COLD-FORMED STRUCTURAL FRAMING

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. Furnish and install all cold-formed structural framing studs, tracks, joists, trusses, bracing, angles, plates, and related accessories indicated in the Construction Documents.
- B. Related Sections:
1. Section 04810 -Unit Masonry Assemblies: Head and sill flashings.
 2. Section 06100 – Rough Carpentry
 3. Section 06114 - Wood Blocking and Curbing: Rough wood blocking.
 4. Section 09260 - Gypsum Board Systems: Light weight, non-load bearing metal stud framing, insulation, sound attenuation and wall sheathing.

1.2 REFERENCES

- A. American Iron and Steel Institute:
1. AISI General - Standard for Cold-Formed Steel Framing - General Provisions.
 2. AISI Header - Standard for Cold-Formed Steel Framing - Header Design.
 3. AISI NASPEC - North American Specification for Design of Cold-Formed Steel Structural Members.
 4. AISI - Residential Steel Framing Manual.
- B. ASTM International:
1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 2. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 3. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.
 4. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 5. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 6. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.
 7. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.
- C. American Welding Society:
1. AWS D1.1 - Structural Welding Code - Steel.
 2. AWS D1.3 - Structural Welding Code - Sheet Steel.
- D. National Association of Architectural Metal Manufacturers:
1. NAAMM ML/SFA 540 - Lightweight Steel Framing Systems Manual.
- E. SSPC: The Society for Protective Coatings:

1. SSPC Paint 15 - Steel Joist Shop Paint.
2. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

F. Steel Stud Manufacturers Association: SSMA - Product Technical Information

1.3 SYSTEM DESCRIPTION

A. Size components to withstand design loads as shown on Structural Drawings.

B. Maximum Allowable Deflection: 1: 240 of span.

C. Wall System:

1. Design to AISI NASPEC, AISC General, and AISC Header.
2. Design to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
3. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

1.4 PERFORMANCE REQUIREMENTS

A. Select stud thickness to resist minimum 5 psf uniform load and maximum 1/240 deflection.

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.

B. The Framing Contractor shall be responsible for submitting part or all of the following items, as required by the Construction Documents:

1. Manufacturer's technical literature covering products.
2. Manufacturer's certification of product compliance with codes and standards.
3. Structural framing calculations as required.
4. Connection details as required.
5. Shop drawings as required.
6. Certification of calculations, connections, and/or drawings by a registered professional engineer as required.

1.6 QUALITY ASSURANCE

A. The structural framing and its installation shall meet the following standards:

1. American Iron and Steel Institute (AISI) "Specification For The Design of Cold-Formed Structural Members", latest edition.
2. American Society of Testing and Materials (ASTM) Standard C-955; Standard Specification for Load Bearing (Traverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Board and Metal Plaster Bases.
3. ASTM Standard C-1007; Standard Specification for Installation of Load Bearing (Traverse and Axial) Steel Studs and Related Accessories.

B. **Single Source Responsibility for the Metal Stud Framing Section 05400, Gypsum Board installation Section 09260 and Acoustical Ceiling Tile Section 09510.**

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
 - 1. Current member of Steel Stud Manufacturers Association.
- B. Installer: Company specializing in performing Work of this section with minimum 5 years documented experience approved by manufacturer. The documented experience must include will be required to include a list of references and past projects of similar size and scope.
- C. Form, fabricate, provide, and connect components in accordance with NAAMM ML/SFA 540 - Lightweight Steel Framing Systems Manual.

1.8 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate placement of components within stud framing system.
- C. Upon delivery, the structural framing materials shall be protected from the elements by storing them in a sheltered area or using protective covering.

1.9 DELIVERY STORAGE AND HANDLING

- A. Upon delivery, the structural framing materials shall be protected from the elements by storing them in a sheltered area or using protective covers.

1.10 SINGLE SOURCE CONTRACTOR

- A. **For Sections 05400, 09260 and 09510, the project will require a single source contractor. The single source contractor shall be responsible for all products and services and may use various suppliers and subcontractors for this work under their supervision**

PART 2 PRODUCTS

1.1 COLD-FORMED METAL FRAMING

- A. Manufacturers:
 - 1. Clark Steel Framing Systems.
 - 2. Harrison Manufacturing Co.
 - 3. Marino\Ware
 - 4. Unimast Incorporated.
 - 5. Dale / Incor
 - 6. Substitutions: Section 01600 - Product Requirements.
- B. Cold-Formed Metal Framing: ASTM C955.

1.2 FRAMING COMPONENTS

- A. Steel Sheet: ASTM A1003/A1003M; Structural Grade, Type H, painted metallic coated: equivalent to G-60 galvanized finish.
 - 1. Grade: ST33H.
 - 2. Coating: G-60 galvanized finish - See Structural General Notes.

1.3 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined by performance requirements specified.

1.4 FASTENERS

- A. Self-drilling, Self-tapping Screws, Bolts, Nuts, and Washers: Steel, hot dip galvanized.
- B. Anchorage Devices: Power actuated, drilled expansion bolts, screws with sleeves,.
- C. Welding: In conformance with AWS D1.1 and AWS D1.3.

1.5 FABRICATION

- A. Fabricate assemblies of formed sections of sizes and profiles required.
- B. Fit, reinforce, and brace framing members to suit design requirements.
- C. Fit and assemble in largest practical sections for delivery to site, ready for installation.

PART 3 EXECUTION

3.1 INSPECTION

- A. Inspect supporting substrates and structure for compliance of conditions for installation and performance of the cold-formed structural framing system.

3.2 PREPARATION

- A. Prepare attachment surfaces so that they are plumb, level, and in proper alignment for accepting the cold-formed structural framing system.

3.3 WALL FRAMING

- A. Cold-formed structural framing members may be shop or field fabricated into wall assemblies, prior to erection, or stick built in the field.
- B. The wall framing members shall be sized, spaced, and erected in accordance with the Contract Documents or approved shop drawings.

- C. The framing members shall have ends squarely cut by shearing or sawing, be installed plumb, square, true to line and securely fastened per the Contract Documents or approved connection details.
- D. Fabrication, handling, and erection of wall framing members and assemblies shall be done in a manner to prevent any damage or distortion of the framing.
- E. Cold-formed tracks, when set to adjacent structures, shall have web contact with a uniform and level bearing surface and be securely anchored with fasteners, sized and spaced per the Contract Documents or approved connection details.
- F. Bracing of wall framing resisting wind (Traverse) loading only, (Non-axial loaded), can be accomplished by the attachment of wall sheathing to both sides of the studs. However, during construction, when only the exterior of the studs is sheathed, a minimum 2" wide steel strap, run horizontally on the interior flanges, attached to each stud and spaced at a maximum of 4'-0" throughout the height of the wall is recommended to brace the wall during construction.
- G. Bracing of axial loaded wall framing shall be accomplished by either cold rolled channel, run horizontally through the stud punchouts and attached at each stud, or by minimum 2" wide steel straps run horizontally, on both sides of the studs, and attached at each stud. Vertical spacing of the bracing is limited to a maximum of 4'-0" throughout the height of the wall.
- H. Structural "C" members are not permitted to have splices or cutouts in the flanges.
- I. Framing of wall openings shall include jack studs, headers, cripples, sill plates, and jamb studs as per the Contract Documents or approved shop drawings.
- J. For wall framing assemblies that will form voids which will not be accessible to the insulation contractor, the framing contractor shall be responsible for filling these voids with suitable insulation prior to assembly.
- K. Slip connections, allowing for vertical movement of the structure without imposing vertical load on the wall framing, shall be per the Contract Documents or approved shop drawings.
- L. Temporary bracing of wall framing shall be provided as required and removed only after the framing has been secured with permanent support.
- M. Structural framing shear walls shall be built per the Contract Documents or approved shop drawings.

3.4 ERECTION OF STUDS

- A. Align floor and ceiling tracks; locate to wall partition layout. Secure in place with fasteners at each stud. Coordinate installation of acoustic sealant with floor and ceiling tracks.
- B. Place studs at 16 inches oc (unless noted otherwise in contract documents); not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener.
- C. Construct corners using minimum three studs. Double stud wall openings, door jambs, and window jambs.

- D. Erect load bearing studs one piece full length. Splicing of studs is not permitted.
- E. Erect load bearing studs, brace, and reinforce to develop full strength, to achieve design requirements.
- F. Fully seat axial loaded studs in receiving tracks maximum 1/16 inch gap between stud and track web.
- G. Coordinate placement of insulation in multiple stud spaces after erection.
- H. Install intermediate studs above and below openings to align with wall stud spacing.
- I. Install studs with deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- J. Attach cross studs and furring channels to studs for attachment of fixtures anchored to walls.
- K. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- L. Touch-up field welds and damaged primed surfaces with primer to match shop coating.
- J. Complete framing ready to receive finish surface material.

3.5 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Indicated Position: 1/4 inch.
- C. Maximum Variation of Members from Plane: 1/4 inch.

END OF SECTION 05400

SECTION 05520

HANDRAILS AND RAILINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes aluminum pipe and tube railings, balusters, and fittings; and handrails for exterior handrails.

1.2 REFERENCES

- A. Aluminum Association:
1. AA ADM 1 - Aluminum Design Manual.
 2. AA ASM 35 - Aluminum Sheet Metal Work in Building Construction.
- B. American Architectural Manufacturers Association:
1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 3. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- C. ASTM International:
1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 3. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 4. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
 5. ASTM A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
 6. ASTM B177 - Standard Guide for Chromium Electroplating on Steel for Engineering Use.
 7. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire.
 8. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 9. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube.
 10. ASTM B483/B483M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Tubes for General Purpose Applications.
 11. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.

- D. National Ornamental & Miscellaneous Metals Association:
 - 1. NOMMA Guideline 1 - Joint Finishes.
- E. SSPC: The Society for Protective Coatings:
 - 1. SSPC - Steel Structures Painting Manual.
 - 2. SSPC Paint 15 - Steel Joist Shop Paint.
 - 3. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

1.3 DESIGN REQUIREMENTS

- A. Design handrail, guardrail, and attachments to resist forces as required by applicable code. Apply loads non-simultaneously to produce maximum stresses.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
- C. Samples: Submit two, 24 x 24 inch long samples of handrail. Submit two samples, of elbow, Tee, wall bracket, escutcheon and end stop.

1.5 QUALITY ASSURANCE

- A. Perform Work for structural aluminum in accordance with AA ADM 1 and AA ASM 35.
- B. Finish joints in accordance with NOMMA Guideline 1.
- C. Perform Work in accordance with State of South Carolina standards.
- D. Maintain one copy of each document on site.

1.6 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 HANDRAILS AND RAILINGS

- A. Furnish materials in accordance with State of South Carolina standards.

2.2 ALUMINUM RAILING SYSTEM COMPONENTS

- A. Rails: As defined on drawings, extruded tubing conforming to B211.
- B. Posts: As defined on drawings, extruded tubing conforming to ASTM B211.
- C. Fittings: Elbows, T-shapes, wall brackets, escutcheons; cast aluminum.

- D. Mounting: Adjustable brackets and flanges, with aluminum inserts for casting in concrete with aluminum brackets for embedding into masonry. Prepare backing plate for mounting in wall construction.
- E. Splice Connectors: Welding collars; cast aluminum.
- F. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.
- G. Finish coatings to conform to AAMA 611.
- H. Exterior Aluminum Surfaces: Exterior Two step anodized to color, to 0.0007 inch thickness.
- I. Interior Aluminum Surfaces: AAMA A41 anodized, prepared with mechanical M pre-treatment, anodized to color.
- J. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.3 ALUMINUM RAILING SYSTEM COMPONENTS – **Front Ramp**

- A. Tubing: ASTM A513, Type 5, minimum 50 ksi yield strength.
- B. Top Rails and Bottom Rails: 1-1/2 inch square aluminum tubing hollow structural sections pipe; welded joints.
- C. Posts: 2 inch square aluminum tubing hollow structural sections pipe; welded joints.
- D. Cap: 2 inch rounded cap
- E. Pickets: ½ inch square tube picket
- F. Inside Rail: 1-1/2 inch diameter (finish) with bracket of same material
- G. Splice Connectors: Steel welding collars.
- H. Galvanizing: ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication.
 - 1. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic zinc rich.
- I. Shop Prefinishing: Epoxy coated to color as selected.

2.4 ALUMINUM RAILING SYSTEM COMPONENTS – **Exterior Stage Side Ramps**

- A. Tubing: ASTM A513, Type 5, minimum 50 ksi yield strength.
- B. Top Rails and Bottom Rails and Posts: 1-1/2 inch square aluminum tubing hollow structural sections pipe; welded joints.
- C. Splice Connectors: Steel welding collars.

- D. Galvanizing: ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication.
 - 1. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic zinc rich.
- E. Shop Prefinishing: Epoxy coated to color as selected.

2.5 FABRICATION

- A. Fit and shop assemble components in largest practical sizes for delivery to site.
- B. Fabricate components with joints tightly fitted and secured. Furnish spigots and sleeves to accommodate site assembly and installation.
- C. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- E. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations not encouraging water intrusion.
- F. Interior Components: Continuously seal joined pieces by continuous welds.
- G. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify field conditions are acceptable and are ready to receive work.
- C. Verify concealed blocking and reinforcement is installed and correctly located to receive wall mounted handrails.

3.2 PREPARATION

- A. Clean and strip aluminum where site welding is required.
- B. Supply items required to be cast into concrete and/or embedded in masonry with setting templates, to appropriate sections.

3.3 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects.

- B. Anchor railings to structure with anchors, plates angles.
- C. Field weld anchors as indicated on shop drawings. Touch-up welds with primer. Grind welds smooth.
- D. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- E. Assemble with spigots and sleeves to accommodate tight joints and secure installation.

3.4 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- C. Maximum Offset From Alignment: 1/4 inch.
- D. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 06100
ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Grounds, nailers, blocking, furring, sheathing.
- B. Miscellaneous framing and sheathing – framing above top plate of metal stud walls
- C. Telephone and electrical panel boards.
- D. Concealed wood blocking for support of toilet and bath accessories, wall cabinets, and wood trim.
- E. Window/door opening flashing wall seam – membrane
- F. Pressure treated wood for decks/rails at rear of building

1.2 REFERENCES

- A. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.
- B. APA: American Plywood Association.
- C. AWPA (American Wood Preservers Association) C1 - All Timber Products Preservative Treatment by Pressure Process.
- D. NFPA: National Forest Products Association.
- E. SPIB: Southern Pine Inspection Bureau.
- F. WWPA: Western Wood Products Association.
- G. ANSI A117.1: Providing Accessibility and Usability for Physically Handicapped People.
- H. American Disability Act.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide technical data on wood preservative materials, and application instructions.
- C. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
 - 1. Lumber Grading Agency: Certified by DOC PS 20.

1. Wood Structural Panel Grading Agency: Certified by EWA - The Engineered Wood Association.
 2. Lumber: DOC PS 20.
 3. Wood Structural Panels: DOC PS 1 or DOC PS 2.
- B. Surface Burning Characteristics:
1. Fire Retardant Treated Materials: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- C. Apply label from agency approved by authority having jurisdiction to identify each preservative treated material.
- D. Perform Work in accordance with State of South Carolina standards.
- E. Maintain one copy of each document on site.
- 1.4 DELIVERY, STORAGE, AND HANDLING
- A. Deliver, store, protect, and handle products to site under provisions of Section 01600.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

- A. Lumber Grading Rules: NFPA, SPIB, and WWPA as applicable.
- B. Non-Structural Light Misc. Framing and Blocking: Southern Yellow Pine species, No. 2 grade, 19 percent maximum moisture content.
- C. Grounds and Blocking and Decking: Preservative; Wolman CCA Type C: Arch Wood Protection above ground, Southern Yellow Pine species, No. 2 grade, NIST PS 20, 19 percent maximum moisture content. At deck post that are below grade – ground or fresh water contact.

2.2 SHEATHING MATERIALS

- A. Plywood Roof Sheathing: APA Rated Sheathing, Span Rating 42/20; Exposure Durability 1; unsanded.
- B. Plywood Wall Sheathing: APA Rated Sheathing, Span Rating 32/16; Exposure Durability 1; unsanded.
- C. Plywood Floor Sheathing: APA Rated Sheathing, Span Rating 36/16; Exposure Durability 1, sanded.
- D. Telephone and Electrical Panel Boards: Plywood.

2.3 SHEATHING LOCATIONS

- A. Sloped Roof Sheathing: 5/8 inch thick, 48 x 96 inch sized sheets, square edges.
- B. Flat Roof Sheathing: 3/4 inch thick, 48 x 96 inch sized sheets, tongue and groove edges.
- C. Wall Sheathing: 1/2 inch thick, 48 x 96 inch sized sheets, square edges.
- D. Floor Sheathing/Mezzanine Area: 3/4 inch thick, 48 x 96 inch sized sheets, tongue and groove edges.

2.4 ACCESSORIES

- A. Nails, Fasteners and Anchors:
 - 1. Nails and Fasteners; hot dipped galvanized or stainless steel see Structural Drawings. Must be compatible with wolmanized lumber (preservative treated).
 - 2. Anchors: Unless otherwise noted the following applies; Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.
- B. Joists Hangers and Connectors: Hot-dipped galvanized steel, size to suit framing conditions (U.N.O.).
- C. Glue: APA AFG-01, waterproof of water solvent base, air cure type, cartridge dispensed.
- D. Building Paper: ASTM D226, Type I and Type II asphalt saturated felt, plain untreated cellulose building paper. 15# on walls, the roof will receive a weatherproofing membrane.
- E. Straps and Connectors - By Simpson Strong Tie, galvanized with approved fasteners. Provide as noted on drawings and as required to meet uplift requirements.
- F. **Window and Door Opening Flashing: Perma-A-Barrier Wall Seam Tape by W.R. Grace and Co.. A 30 mil, cold applied self adhering membrane composed of a 2-1/2" mil high density, cross laminated polyethylene film coated on one side with a 27-1/2' mil layer of rubberized asphalt adhesive. To be applied at all window/door openings and at all exterior plywood seams.**

PART 3 EXECUTION

- 3.1 FRAMING - COORDINATE NAILING PATTERN WITH STRUCTURAL NOTES AND COMPLY WITH THE MOST STRINGENT (for all framing above the top plate of the metal stud walls)
 - A. Set structural members level and plumb, in correct position.
 - B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until alignment until completion of erection and installation of permanent bracing.
 - C. Place horizontal members flat, crown side up.

- D. Construct framing members full length without splices
- E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists. Frame rigidly into joists.
- F. Bridge framing in excess of 8 feet span and/or at mid-span. Fit solid blocking and bridging at ends of members.
- G. Contractor is to confirm any cutting or drilling of joists, rafters, or studs with Architect prior to any installation of Electrical, Mechanical, or Plumbing work.
- H. Contractor shall provide a continuous path of uplift resistance from the roof to the foundation.
- I. Provide solid bridging at all wall and floor framing, at all plywood joints, glue and nail to sheathing.
- J. Draftstop/Firestop all holes in top plates of framed wall.
- K. Coordinate installation of wood blocking for support of all bathroom accessories with Architect prior to installation of Gypsum board.
- L. Building Felt - Provide 15 lb. felt for walls. Place building felt horizontally over wall sheathing weather lap edges a minimum of 2" and lap ends a minimum of 6". Fasten to wall with corrosive resistant nails. Provide an additional lap of felt to extend 12" from each corner at both the inside and outside. Provide a positive resistance to water flow with lapping.
- M. **At all window and door openings install Perm-A-Barrier wall seam tape as indicated on the opening details in accordance with the manufactures recommendation. The tape when install on the exterior casing flange of the window opening shall be set back from the exterior edge of the flange to assure proper sealant compatibility between the window casing and the wood trim. Submit data that illustrates that there compatibility with the sealant and the window casing. (see Section 07900).**
 - 1. **At all exterior plywood joints, provide Perm-A-Barrier wall seam tape to comply with Current Edition of IECC.**
- N. Install all straps, connectors and fasteners as required by manufacturer.

3.2 SHEATHING

- A. Roof Sheathing: Install with the long dimensions or strength axis of the panel across supports, and with panel continuous over two or more spans. Allow 1/8" spacing at panel ends and edges. Fasten in accordance with Structural Drawings.
- B. Wall sheathing: Install with long dimensions or strength axis across supports. Allow 1/8" spacing at panel ends and edges. Fasten in accordance with the Structural Drawings - wall sheathing shall bridge discontinuities in all wall framing; i.e. plywood seam shall not align with seam of joint. Install Perm-A-Barrier wall seam membrane at all exterior plywood seams.
- C. Plywood subfloor: Install with long dimensions of strength axis across supports.

Allow 1/8" spacing at panel ends and edges. Glue and nail and fasten in accordance with Structural Drawings. Stagger panel end joints. Panel end joints shall occur over framing.

- D. Place building paper horizontal over wall sheathing, weather lap edges and ends.
- E. Install telephone and electrical panel boards with plywood sheathing material where required. Over sized the panel by 12 inches on all sides.
- F. At interior walls to receive wood paneling/siding, install 4" x 8"1/2" thick AC plywood to the metal studs at the height of wood paneling/siding as indicated on construction drawings.

3.3 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Surface Flatness of Floor; 1/4 inch in 10 feet maximum, and 1/2 inch maximum in 30 feet.

END OF SECTION 06100

SECTION 06200
FINISH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Finish carpentry items other than shop prefabricated casework.
- B. Attachment accessories

1.2 RELATED SECTIONS

- A. Section 06112 - Framing and Sheathing.
- B. Section 08212 - Wood Doors.
- C. Section 08800 - Glazing: Glass and Glazing of Doors.
- D. Section 09900 - Painting: Painting and Finishing of Finish Carpentry Items.

1.3 REFERENCES

- A. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials
- B. AWI – American Woodworking Institute

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Submit samples of each product for review of conformance and quality.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with AWI (Architectural Woodwork Institute) Architectural Woodwork Quality Standards Illustrated, Premium Grade.
- B. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- C. Apply label from agency approved by authority having jurisdiction to identify each preservative treated and fire retardant treated material.
- A. Perform Work in accordance with State of South Carolina standards.
- B. Maintain one copy of each document on site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01600.
- B. Protect work from moisture damage.

PART 2 PRODUCTS

2.1 INTERIOR STANDING AND RUNNING TRIM

- A. AWI Quality Grade: Custom grade, Lumber grade II opaque, plain saw finger joint not permitted.
- B. Solid Wood:
 - 1. Poplar "D" and better paint grade to be painted.
 - 2. Fastened with stainless steel type 316 angular chisel point nails
 - 3. Moisture content not to exceed 10% and relative indoor humidity of 45-70%
- C. Smoothness: 20 KCPI and 30 grit.
- D. Flushness variation not to exceed .015".
- E. Sizes and locations as indicated on the drawings 12'0" lengths.
- F. Provide a moisture content not to exceed 10% and a relative indoor humidity of 45-70%.

2.2 MISCELLANEOUS SHELVING AND BUILT-IN WORK

- A. Softwood Limber: PS 20; Graded in accordance with AWI Custom; Douglas Fir, Western Red Cedar, Western Pine, and Yellow Cypress species, plain swan, maximum moisture content of 6-8 percent; with mixed grain, of quality suitable for transparent finish.
- B. Softwood Plywood: PS 1 Grade AB; Graded in accordance with AWI, veneer core; Douglas Fir face species, plain cut.
- C. Fasteners: Sizetype to suit application. Hot dipped galvanized steel for exterior exposed, interior concealed, high humidity, and treated wood locations; stainless steel where exposed at interior locations.
- D. Contact Adhesives: Water base type.
- E. Lumber for Shimming and Blocking: Softwood lumber of SYP species.
- F. Wood Filler: Solvent or oil base, tinted to match surface finish color.
- G. Hardware: Manufactured by Stanley Hardware Division of the Stanley Works as follows:
 - 1. Closet Rods and Escutcheons: V7502, adjustable steel tubing integral escutcheons; polished chrome finish.
 - 2. Handrail Brackets: DP57-1050, zinc die cast; satin chrome finish.
 - 3. Adjustable Shelving Tracks: Brushed chrome with shelf supports.

2.3 FABRICATION

- A. Fabricate to AWI Custom Standards.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.
- C. Interior trim must be stacked and stored on site in accordance with AWI guidelines for wood to acclimate to local conditions and achieve a maximum moisture content of 12% prior to back priming.

3.2 INSTALLATION

- A. Install Work in accordance with AWI Quality Standards.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. Install trim with nails at 8 inch on center.
- E. Apply sealant as required (see Section 07900).

3.3 PREPARATION FOR SITE FINISHING

- A. Site Finishing: Refer to Section 09900.
- B. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.
- C. Interior Back Primer: Alkyd primer sealer.

3.4 ERECTION TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION 06200

SECTION 06410
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shop Built cabinet units.
- B. Countertops.
- C. Cabinet hardware.

1.2 RELATED SECTIONS

- A. Section 06112 - Framing and Sheathing: Grounds and support framing.
- B. Section 06200 - Finish Carpentry: Related trim not specified in this section.
- C. Section 09900 - Painting: Finishing cabinet exterior and interior.
- D. Section 15440 - Plumbing Fixtures and Trim.

1.3 REFERENCES

- A. ANSI/BHMA A156.9 - Cabinet Hardware.
- B. AWI - Quality Standards.
- C. FS MM-L-736 - Lumber Hardwood.
- D. PS 1 - Construction and Industrial Plywood.
- E. PS 20 - American Softwood Lumber Standard.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location, and schedule of finishes.
- C. Samples: Submit two, 12 x 12 inch size samples illustrating cabinet finish.
- D. Samples: Submit two, 12 x 12 inch size samples illustrating counter top finish.
- E. Samples: Submit two samples of drawer pulls, hinges and, shelf brackets, locks, and standards illustrating hardware finish.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with State of South Carolina standards.

- B. Maintain one (1) copy of each document on site.
- C. Perform work in accordance with AWI Custom quality.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum five years experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle products to site under provisions of Section 01600.
- B. Protect units from moisture damage.

1.8 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

1.9 COORDINATION

- A. Coordinate work under provisions of Section 01039.
- B. Coordinate the work with Division 15, Plumbing Rough-In, Division 16, Electrical Rough-In. Coordinate location of grommets with data outlets.
- C. Conform to all ADA Regulations for counter height and clearances.

1.10 SYSTEM DESCRIPTION

- A. All countertops and exposed surfaces of cabinets to be plastic laminate. Inside of drawers and inside base cabinets, sealed wood.
- B. Coordinate prior to fabrication for exact size and clearances.
- C. All cabinets to be flush overlay.
- D. Coordinate all blocking and provide clearance for a pull-out keyboard (N.I.C.) to be installed in the future at areas.

PART 2 PRODUCTS

2.0 ACCEPTABLE MANUFACTURERS

- A. Shop Built Cabinets

2.2 SHEET MATERIALS

- A. Hardwood Plywood: Ps 1; graded in accordance with AWI, type of glue recommended for application; face veneer and cuts as follows:

<u>ITEM</u>	<u>FACE SPECIES</u>	<u>CUT</u>
Drawer & Cabinet Face	Birch	Rift Sawn
Gables and Backs	Birch	Plain Sawn
Shelving	Birch	Plain Sawn
Drawer Bottoms	Spruce, Fir	Plain Sawn
Backs	Spruce, Fir	Plain Sawn

- B. Wood Particle Board: PS 1; AWI standard, composed of wood chips, medium

density, made with high waterproof resin binders; of grade to suit application;
sanded faces, located as follows:

ITEM

Tops, Backsplash

2.3 MANUFACTURERS - PLASTIC LAMINATE

- A. Wilson Art
- B. Formica
- C. Nevamar

2.4 LAMINATE MATERIALS

- A. Plastic Laminate: NEMA LD3, GP-50 General Purpose type; color pattern to be selected, and matte surface texture as selected.
- B. Laminate Backing Sheet: LD3 BK20 backing grade, undecorated plastic laminate.

2.5 ACCESSORIES

- A. Fasteners: Size and type to suit application.
- B. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application.
- C. Concealed Joint Fasteners: Threaded steel.
- D. Grommets: Provide the number equal to data and electrical outlets within corresponding casework.

2.6 HARDWARE

- A. Drawer and Door Pulls: Hafele or equal brushed chrome, Bow Handles, Wire design; attached with machine screws at 4 inch centers.
- B. Drawer Slides: Blum BS 230E or equal sliding epoxy coated steel glides with nylon tired rollers.
- C. Hinges: Blum Module 170 or equal, concealed design, all metal construction 170 degree opening, full adjustable for door alignment: provide tow hinges per door.

2.7 FABRICATION

- A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
- B. Fit shelves, doors, and exposed edges with 3/8 inch matching veneer edging. Use one piece for full length only.

- C. Door and Drawer Fronts: 3/4 inch thick; flush overlay style with trim as indicated on drawings.
- D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- E. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, fixtures and fittings. Verify locations of cutout from on-site dimensions. Prime paint and seal contact surfaces of cut edges.
- F. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Locate counter butt joints minimum two feet from sink cutouts. Provide eased edge corners, sharp corners will not be accepted.
- G. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

2.8 FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler which matches surrounding surfaces and of types recommended for applied finishes.
- D. Seal and stain exposed to view surfaces.
- E. Seal, stain and varnish internal exposed to view surfaces. Brush apply only.
- F. Seal surfaces in contact with cementitious material.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.

3.2 INSTALLATION

- A. Set and secure casework in place; rigid, plumb and level.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- E. Secure cabinet and counter bases to floor using appropriate angles and anchorages.
- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.3 ADJUSTING

- A. Adjust work under provisions of Section 01700.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.4 CLEANING

- A. Clean work under provision of Section 01700.
- B. Clean casework, counters, shelves, hardware, fittings and fixtures.

END OF DOCUMENT 06410

SECTION 07213
BATT AND BLANKET INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Batt insulation and vapor barrier ceiling/roof construction.
- B. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.2 RELATED SECTIONS

- A. Section 06100 – Rough Carpentry – Wood Framing
- B. Section 07270 - Firestopping.
- C. Section 09260 - Gypsum Board Systems: Acoustic insulation.

1.3 REFERENCES

- A. FS HH-I-521 - Insulation Blankets, Thermal, (Mineral Fiber for Ambient Temperatures).
- B. FS HH-I-558 - Insulation, Blocks, Boards, Blankets, Felts, Sleeving (Pipe and Tube Covering), and Pipe Fitting Covering, Thermal (Mineral Fiber, Industrial Type).

1.4 PERFORMANCE REQUIREMENTS

- A. Materials of this Section shall provide continuity of thermal barrier at building enclosure elements.
- B. Materials of this Section shall provide continuity of vapor and air barrier at building enclosure elements.
- C. Comply with South Carolina Energy Code, IEC 2009

1.7 QUALITY ASSURANCE

- A. Insulation Installed in Concealed Locations Surface Burning Characteristics:
 - 1. Batt Insulation: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- B. Insulation Installed in Exposed Locations Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
 - 1. Attic Floor Insulation: Minimum 0.12 watt per sq cm critical radiant flux when tested in accordance with ASTM E970.
- C. Carolina standards.
- D. Maintain one copy (1) copy of each document on site.

1.8 COORDINATION

- A. Coordinate Work under provisions of Section 01039.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Owens Corning Fiberglass Corp. FS-25
- B. Manville FSK-25
- C. CertainTeed FSK-25
- D. Batt Insulation: FS HH-I-521 Type II - with non-reflective membrane one side mineral fiber; friction fit, conforming to the following:

Batt Size	Ceiling (above auditorium only): R-38 – Unfaced
	New Floor Area: R-19 – Faced
	Existing Floor Area: R19 Faced
Facing	Faced on one side with asphalt treated mesh reinforced Kraft paper
- E. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide.
- F. Wire Mesh: Galvanized steel hexagonal wire mesh or heavy gauge plastic mesh for attachment to bottom of trusses.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01039.
- B. Verify that substrate, adjacent materials, and insulation are dry and ready to receive insulation.

3.2 INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Install in exterior walls, roof and ceiling spaces without gaps or voids.
- C. Trim insulation neatly to fit spaces.
- D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation. Leave no gaps or voids.
- E. Install with factory applied membrane facing warm side of building spaces. Lap ends and side flanges of membrane between framing members.
- F. Staple or nail in place at maximum 6 inches. Tape in place. At bottom chord of trusses, retain in place with wire mesh secured to framing members.

- G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

3.3 SCHEDULES

- A. Attic Insulation: R38 Batt, faced
- B. At Auditorium/Stage Area Only: Lay over top of existing insulation
- C. New Floor Area: R-19 – Faced
- D. At existing floor area of stage/auditorium/gallery/entire first floor work area: R19 – Faced

END OF SECTION 07213

SECTION 07460
FIBER CEMENT SIDING

PART 1 GENERAL

1.1 SCOPE

- A. Furnish and install Hardiplank fiber-cement siding, Hardtrim fascia and moulding and accessories where shown on drawings or as specified herein.
- B. Coordinate this section with interfacing and adjoining work for proper sequence of installation.
- C. Work in other sections affecting this work.
 - 1. Section 05400 - Metal Stud Framing
 - 2. Section 06100 - Rough Carpentry: Wood Framing and Bracing, Sheathing
 - 3. Section 07213 - Batt and Blanket Insulation: Insulation
 - 4. Section 07620 - Sheet Metal Flashing & Trim: Typical Flashing Conditions
 - 5. Section 09900 - Paints and Coatings

1.2 SUBMITTALS

- A. Submit three 6 inch x 6 inch pieces of Hardiplank / Harditrim claddings in texture and widths shown and specified herein. Submittal to include a sample of the batton strip.
- B. Submit three copies of specifications, installation data and other pertinent manufacturer's literature.
- C. Submit with Submittal Action Form provided in Section 01300

1.3 PRODUCT HANDLING

- A. Stack Hardiplank / Harditrim claddings on edge or lay flat on a smooth, level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.

1.4 JOB CONDITIONS

- A. Install weather-resistive barriers and claddings to dry surfaces.
- B. Repair any punctures or tears in the weather-resistive barrier prior to the installation of the siding.
- C. Protect siding from other trades.

1.5 WARRANTY

- A. Provide a limited product warranty against manufacturing defects in Hardiplank lap for 50 years, HardiTrim for 10 years.

1.6 MOCK UP

- A. **Provide mock-up of an area minimum 8 feet wide by full height to include all trim boards, flashing, window trim for review and approval as per provisions of Section 01400. Mock-up shall indicate the installation and finish quality to include nailing patterns.**

- B. When accepted mock-up will demonstrate minimum standard for the work. Mock-up may remain part of the work.
- C. The mock-up will aid in determining the color selections and compatibility with other material textures and colors.

PART 2 PRODUCTS

2.1 HARDIPLANK / HARDITRIM FASCIA AND MOULDING

by James Hardie: Basis of Design; Any and all substitutions must receive prior approval in accordance with Section 01600: Product Requirements. If approval is not stated in an addendum, a substitution will not be acceptable. All products shall be primed and meet HZ10 criteria.

- A. Non-asbestos fiber-cement siding to comply with ASTM Standard Specification C1186 Grade II, Type A.
- B. Siding – Horizontal siding type “colonial smooth” 8”w 6-3/4” exposure with a recess top edge – 5/16” thick and 12’-0” length
- C. Siding to meet the following building code compliance National Evaluation Report No. NER 405 (BOCA, ICBO, SBCCI); Non-asbestos fiber-cement siding to be non-combustible when tested in accordance with ASTM test method E136.
- D. Trim Type: HardiTrim XLD 1” Smooth Planks 5/4” nominal by the width as required and as indicated on the drawings. Provide the full length boards. All boards to be solid boards, not to have holes at back.
- E. Soffit panel/board: Hardisoffit Vented 1/4” x 16” x 144” smooth finish to be used only on horizontal surface not on sloped rakes.
- F. Ceiling Board: Hardi-Panel for use as indicated for ceiling at the Porch unless noted otherwise.
Panel Type: Hardipanel Smooth 5/16” x 4’ x 10’.

2.2 FASTENERS

- A. Wood framing: 0.093” shank x 0.222” head x 2” corrosion resistant (Stainless Steel) siding nails for trim and as per manufacturers recommendations whichever is more stringent. For batten use 2 inch minimum 16 ga. Stainless steel finish nail.
- B. Metal Stud Framing – Screws: Ribbed bugle head (No. 8- 18 x 1-5/8” long x 0.323” HD) Must penetrate minimum three threads into metal framing. Nails: ET & F Pin (0.10” shank x 0.25 HD and 1-1/2” long). Nails must penetrate minimum 1/4” into metal framing.
- C. Do not place fasteners closer than 3/4 inches from the edges
- D. Submit fastener for approval for metal framing prior to installation.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Correct conditions detrimental to timely and proper completion of work.

3.2 INSTALLATION

- A. Install flashing around all wall openings.
- B. Block framing between studs where horizontal joints of Hardi Panel occur.
- C. Fasten through trim into structural framing or code complying sheathing. Fasteners must penetrate minimum $\frac{3}{4}$ inch or full thickness of sheathing.
- D. Place fasteners no closer than $\frac{3}{4}$ inch and no further than 2 inch from side edge of trim board and no closer than 1 inch from end. Fasten maximum 16 inch on center.
- E. Allow minimum 1-1/2" inch vertical clearance between roofing and bottom edge of siding.
- F. Align vertical joints of the planks over wood framing members. Leave a small gap between the boards in accordance with the manufacturers recommendation and apply sealant prior to installing the batten strip.
- G. Maintain clearance between siding and adjacent finished grade. Minimum of 6" inches.
- H. Fasteners should be driven snug with the exterior surface of the siding (no airspace). Do not overdrive fastener into the siding or batten. Do not drive fastener in to surface at an angle. The use of Aluminum fasteners, staples and clipped head nails is not allowed.
- I. Maintain clearance between trim and adjacent finished grade.
- J. Trim inside corner with single board.
- K. Install single board of outside corner board then align second corner board to outside edge of first corner board. Do not fasten Harditrim board to Harditrim board.
- L. Allow 1/8 inch gab between trim and siding.
- M. Seal gap with high quality, paint-able caulk. See Section 07900 - Joint Sealants.
- N. Shim frieze board as required to align with corner trim.
- O. Install Harditrim fascia over structural wood subfascia.

3.3 INSTALLATON – HARDIPLANK SIDING

- A. Starting: Install a minimum ¼ inch thick lath starter strip at the bottom course of the wall. Apply planks horizontally with minimum ¼ inch wide laps at the top. The bottom edge of the first plank overlaps the starter strip.
- B. Allow minimum 1 inch vertical clearance between roofing and bottom edge of siding.
- C. Align vertical joints of the planks over framing members.
- D. Maintain clearance between siding and adjacent finished grade.
- E. Locate splices at least one stud cavity away from window and door openings.
- F. Use off-stud metal joiner when vertical joints occur between framing members. Position metal joiner so that the bottom lip is resting on the solid course of planks. Fasten plank to the framing. Position and fasten abutting plank into place insuring that the lower edges of the two planks align. Locate metal joiner centrally behind the joint. Locate off-stud splices a minimum of two stud cavities from wall corners and stagger all subsequent course splices at minimum 24 inch intervals when located in the same wall cavity.
- G. Wind Resistance: A wind resistance is required and Hardiplank lab siding should be installed to framing members and secured with fasteners described in Table No. 2 in National Evaluation Service Report No. NER-405.
- H. All field cut edges shall receive prime and paint.

3.4 FINISHING

- A. Finish primed siding with two coats high quality, alkali-resistant, 100% acrylic exterior grade topcoat within 90 days of installation. Follow paint manufacturer's written product recommendation and written application instructions. Use Elastomeric Sealant: ASTM C920 Grade NS or higher in accordance with ASTM C1193
- B. See Section 09900 – Paints and Coatings. Paint must be applied with a brush, no spray application will be allowed.

END OF SECTION 07460

SECTION 07613
MANUFACTURED SHEET METAL ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preformed, prefinished metal roofing and flashing for sloped roofing.
- B. Miscellaneous trim, flashing, closures, drip flashing, and accessories.
- C. Sealant
- D. Fastening devices, ridge vents.
- E. Weatherproofing Membrane.

1.2 RELATED SECTIONS

- A. Section 02225 - Selective Minor Renovation and Demotion
- B. Section 04810 - Unit Masonry Systems
- C. Section 06100 – Rough Carpentry
- D. Section 06200 – Finish Carpentry
- E. Section 07620 - Sheet Metal Flashing & Trim
- F. Section 07900 - Joint Sealers

1.3 REFERENCES

- A. American Iron & Steel Institute (AISI) Specification for the Design of Coldformed Steel Structural Member
- B. ASTM A-525 Steel Sheet, Zinc-Coated (Galvanized)
- C. ASTM E-283-84 Air Infiltration
- D. ASTM E-331-86 Water Infiltration
- E. Spec Data Sheet - Gal Valume Sheet Metal By Bethlehem Corp.
- F. SMACNA – Sheet Metal and Air Conditioning Contractors National Association, Inc.: Architectural Sheet Metal Manual
- G. NCRA – The National Roofing Contractors Association: Roofing and Waterproofing Manual (including Construction Details), and Handbook of Accepted Roofing Knowledge
- H. Manufacturer's Construction Details Handbook
- I. ASIC Steel Construction Manual
- J. AISI Cold Formed Steel Design Manual

1.4 ASSEMBLY DESCRIPTION

- A. The roofing assembly includes preformed sheet metal panels, related accessories, valleys, hips, ridges, eaves, ridge vent, crickets, miscellaneous flashing and attaching devices.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Submit a sample of each type of roof panel, complete with factory finish.
- C. Submit detailed drawings showing layout of panels, anchoring details, joint details, trim, flashing, and accessories. Show details of weatherproofing and terminations.
- D. Submit results indicating compliance with minimum requirements of the following performance tests:
 - 1. Air Infiltration ASTM E 283-84
 - 2. Water Infiltration ASTM E331-86
- E. Submit calculations with registered SC engineer seal, verifying roof panel and attachment method resists wind pressures imposed on it pursuant to applicable building codes. The design is to include clip spacing design. The work will not commence without approval of submitted data.
- F. Submit manufacturer's warranty covering the substrate (metal) against rupture, perforation, and structural failure due to normal atmospheric corrosion for twenty (20) years.
- G. Submit manufacturer's thirty (30) year warranty on paint finish against cracking, peeling, blistering, chalk, and color change.
- H. Submit test reports complying with finish specifications per section 2.02 C5 through C8.

1.6 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in Architectural Sheet Metal Products with ten (10) years minimum experience.
- B. No product substitutions shall be permitted without meeting specifications.
- C. Substitutions shall be submitted 10 days prior to Bid Date and acceptance put forth in an addendum as per Section 01600 - Material & Equipment.
- E. Before Fabrication: The contractor shall take field measurements of the structure and substrates indicated and specified to ensure that panel lengths and brakeformed flashings are dimensioned accurately to facilitate easy installation. Fabrication shall not begin until all field conditions have been verified. Allow for sufficient trimming of panel units at caves, valleys, and gables prior to fabrication.
- F. Perform Work in accordance with State of South Carolina standards.
- G. Maintain one (1) copy of each document on site.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Upon receipt of panels and other materials, installer shall examine the shipment for damage and completeness.
- B. Panels should be stored in clean, dry place. One end should be elevated to allow moisture to run off.
- C. Panels with strippable film must not be stored in the open, exposed to the sun.
- D. Stack all materials to prevent damage and to allow for adequate ventilation.
- E. Store materials above ground, on skids. Protect material with waterproof covering and allow sufficient ventilation to prevent condensation build-up or moisture entrapment in the materials.

1.8 WARRANTY

- A. Paint finish shall have a twenty (20) year guarantee against cracking, peeling and fade (not to exceed 5 N.B.S. units).
- B. Galvalume material shall have a twenty (20) year guarantee against failure due to corrosion, rupture, or perforation.
- C. Applicator shall furnish guarantee covering watertightness of the roofing system for the period of two (2) years from the date of substantial completion where the installer shall assure weathertightness and watertightness on the roof, without any cost to the building owner.
- D. Provide a twenty (20) year manufacturers watertightness warranty. The twenty (20) year weather tightness warranty must be issued to the Owner by the metal manufacturer, there will be no third party warranty permitted.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Englert, Inc. - Series 2500 – 2” mechanically seamed roof system
- B. Merchant & Evans
- C. Morin - SWL
- D. Or approved substitution in accordance with Section 01600: Product Requirements.

2.2 SHEET MATERIALS

- A. Panel System should be:
 - 1. Englert Series 2500, 1-3/4” x 14” Architectural Mechanically Sealed Standing Seam System with pencil ribs. The panels shall have baked on finish as specified.
 - 2. Manufacturers Standard Color:
Final color selection to be determined by Architect.
- B. Substrate: .032 Aluminum Alloy 3105-H14 approved equal.
- C. Performance:

1. Panel shall meet the requirements of Underwriter's Laboratories, Inc. for Class 105 wind uplift resistance and 580 classification for 105lb./sq. ft. uplift test.
2. Air Infiltration/Water Penetration: No evidence of uncontrolled leakage on Snap-Lock Seam at 100 mph with simulated water spray of 8.8" of rainfall per hour.
3. Panel shall display a flame spread classification of a (Class 1) when tested in accordance with ASTM E-84-87.
4. Permacolor 2000 Finish (30 year Warranty: Englert's Permacolor coatings comprises of a .8 to .9 mil full strength 70% Kynar 500 fluorocarbon (Polyvinylidene Fluoride PVF2) coating over a urethane primer of .2 to .3 mil on the finish side, with primer and a wash coat on the reverse, on steel with just a wash coat on aluminum. Face film thickness 1.0 mil \pm .2 mil.
5. Film Thickness: Topside finish primer shall be .2 - .3 mil. Kynar 500 top coat shall be .8 - .9 mil. Reverse side finish shall be .2 - .3 mil primer with a wash coat. Total dry film thickness for the coating system shall be 1.00 mil nominal. All measurements per NCCA Technical Bulletin II-4 or ASTM D1005-84.
6. Specular Gloss: As determined per ASTM D523-85 at a glossmeter angle of 60 degrees. 35% \pm 5 specular reflectance.
7. Humidity Resistance: No blistering, cracking, peeling, loss of gloss or softening of the finish after 3000 hours aluminum 1000 hours coated steel, of exposure at 100% humidity at 95 degrees F, per Federal Test Method Standard 141, Method 6201 or ASTM D2247-87.
8. Salt Spray Resistance: Samples diagonally scored and subjected to 5% - at 95 degrees F, neutral salt spray per ASTM B117-85, then taped with Scotch #610 cellophane tape: 3000 hours aluminum/1000 hours coated steel, no blistering and no loss of adhesion greater than 1/8 from score line. (Samples taped one hour after removal from test cabinet).
9. Chemical Resistance: No effect after 24 hour exposure of a 10% solution of hydrochloric acid, and 18-hour exposure to 20% sulfuric acid, per ASTM D1308-85, including exposure to 10% muriatic acid and nitric acid fumes.
10. Chalking Resistance: No chalking greater than #8 rating, per ASTM D659-86 test procedure after a 3000-hour weatherometer test.
11. Color Change: Finish coat color change shall not exceed 5 NBS units per ASTM D822-86, ASTM G23-88 and ASTM D2244-85 (South Florida 10-years) test procedure after 3000-hour weatherometer test.
12. Abrasion Resistance: Shall pass 60 liters.mil., minimum of falling sand per ASTM D968-81. Method A.

- D. Strippable film shall be applied to the top side of the painted coil to protect finish during fabrication, shipping and field handling. This strippable film must be removed before installation.

2.3 ACCESSORY MATERIALS

- A. Fasteners: Stainless steel with washers where required.
- B. Sealant: As specified in Section 07900 - Joint Sealers.
- C. Vinyl weatherseal insert.
- D. Ridge Vent – Hollow vented core by Cor-A-Vent, Inc. Model V300/cs or approved substitution.

2.4 FABRICATION

- A. Panel Construction: Panels shall be uniformly dimensioned, roll formed to exact lengths to avoid trimming. The panel system shall be anchored as recommended by the Manufacturer. All fasteners shall be concealed. Panels shall be continuous from ridge to eaves with not end laps. There shall be no face penetration of panels.
- B. Flashing and Trim: All exposed standard or special flashing/trim and such other brake formed in the same gauge, color, and finish to match roofing panels, furnished with protective strippable film to be removed upon installation.
- C. Accessories such as clips, closures, fasteners, etc., shall be as recommended by the Manufacturer.
- D. All exposed adjacent flashing shall be of the same material and finish as the roof panels.
- E. Hem all exposed edges of flashing on underside, 1/2 inch.

2.5 STANDING SEAM PANEL

- A. 2" high vertical legs shall be spaced at 16" o.c. and shall have no exposed fasteners.
- B. Panels shall be site formed with Portable Roll Former in continuous lengths from ridge to eave or factory formed to 40' max and a contain a continuous sealant bead in the female rib.
- C. Continuous Rib panel shall be 2" in height. Rib shall be connected wood substrate with panel clips and the clips attached with two (2) #12 – 14 x 1 1/4" wood screw fasteners. Clips are to be spaced in accordance with submitted and approved engineer report.
- D. Vinyl Weatherseal to be factory installed over Continuous Snap Lock Standing Seam.
- E. Certification shall be submitted, based on independent testing laboratory, indicating no measurable water penetration or air leakage through the system when tested in accordance with ASTM E-331-86 and E-283-84.

2.6 WEATHERPROOFING MEMBRANE

- A. York Deck Shield 366, 40 mil thick, self adhesive, composite underlayment – ASTM D412, ASTM E 96B, ASTM D 146, ASTM C794, ASTM D903, to be installed over entire roof on the plywood sheathing in accordance with manufacturers recommendations.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify substrate is uniform, even and symmetrical by running a string test. Inspect to assure that all purlins or substructure/framing members are flat and

insulation is embedded symmetrically so when the metal panels are applied, they will not appear wavy or distorted.

- B. Provide a written report of discrepancies or variations in the substrate to the Architect.
- C. Do not begin installation until unsatisfactory conditions are corrected.
- D. Substrate:
 - 1. Examine plywood to ensure proper attachment to framing.
 - 2. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, level to +/- 1/4" in 20', and properly sloped to eaves.
 - 3. Verify deck is dry and free of snow or ice. Joints in wood deck to be solidly supported and nailed.
- E. Underlayment:
 - 1. Verify York Deck Shield 366 – Weatherproofing Membrane underlayment has been installed over solid sheathing and fastened in place.
 - 2. Remove all dirt, dust, loose nails and debris. Place metal drip edge over York Deck Shield 366.
 - 3. Cut the membrane into manageable lengths, typically 10' – 12'. Align the membrane parallel to the roof edge, extending over the roof edge by 1/4". On steep slope applications it may be necessary to spot nail the top edge of the membrane temporarily during the installation process. Fold the membrane away from the edge onto itself. Remove the release sheet, starting with the middle of the membrane to the edge. Place the membrane with the exposed rubberized asphalt onto the deck, pressing firmly into place. Repeat process as needed. A metal drip edge should be installed over the underlayment. Underlayment should always be applied to a point on the roof deck above the highest anticipated ice dam. With a roof pitch above 4" in 12" underlayment should extend 24 inches above the juncture of the roof deck and the exterior wall. Additional coverage may be required on roof decks with a pitch below 4" and 12". End laps should overlap a minimum of 6 inches.
 - 4. Apply in fair weather at ambient temperatures above 40° F.
 - 5. May be left exposed for 30 days.

3.2 INSTALLATION:

- A. The metal panel system shall be installed plumb, level, and straight over a layer weatherproofing membrane.
- B. The standing seam shall be equidistant and shall align for corners, hips, valleys, mullions, and columns in accordance with architectural design parameters as shown on the drawings.
- C. Installation shall be made in accordance with manufacturer' recommended procedures and layout drawings. Manufacturers of construction Detail Handbook, SMACNA Architectural Sheet Metal Manual, NRCA Roofing and Waterproofing Manual and Handbook of Roofing Knowledge shall be used as guides and details whenever applicable. Because of various levels of each

manufacturers and SMACNA , the Architect will accept only the most restrictive guide and it is at the discretion of the Architect.

- D. No face penetrations or perforation shall be made in metal panels by fasteners without architect's specific approval. All panels shall be continuous from ridge to eaves with no horizontal end laps.
- E. End lap all flashing and trim at least 3". All gutters must be mitered, soldered and caulked with a lining of Ice and Watershield applied at the laps to make it watertight. All but joints must be caulked. Soldered areas shall be counter flashed or painted to match. All valleys shall be treated with a layer of Ice and Watershield spread out at least 24" each side from the center of the valley, on both sides, before applying valley flashing. End lap at least 6" at joints.
- F. Exercise proper care during installation to avoid damage or scratching of the panels. Avoid walking over the metal roof after installation is completed.
- G. Comply with manufacturers standard instructions and conform to standards set forth in the Architectural Sheet Metal Manual published by SMACNA, in order to achieve a watertight installation.
- H. Install panels in such a manner that horizontal lines are true and level and vertical lines are plumb.
- I. Install starter and edge trim before installing roof panels.
- J. Remove protective strippable film prior to installation of roof panels.
- K. Attach panels using manufacturer's standard clips and fasteners, spaced in accordance with approved shop drawings.
- L. Install sealants for preformed roofing panels as approved on shop drawings.
- M. Do not allow panels or trim to come into contact with dissimilar materials.
- N. Do not allow traffic on completed roof. If required, provide cushioned walk boards.
- O. Protect installed roof panels and trim from damage caused by adjacent construction until completion of installation.
- P. Remove and replace any panels or components which are damaged beyond successful repair.
- Q. All ridge and flashing shall be attached with long life fasteners at 6" oc. The Z closure requires a minimum of 4 fasteners per panel on 1" inch butyl tape that is separating the Z closure and the panel pan.

3.3 CLEANING

- A. Clean any grease, finger marks, or stains from the panels per manufacturer's recommendations.
- B. Remove all scrap and construction debris from the site.

3.4 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements and 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspection will involve surveillance of Work by third party inspector during installation to ascertain compliance with specified requirements.
- C. Owner will provide third party roofing inspections during the work. See Section 01200 Price and Payment Procedures: Allowances. Such inspections may be daily or periodic. Inspector to be Shepard & Associates, LLC.
- D. Contractor Responsibilities: Unless otherwise indicated, provide quality control inspections with Contractor's own work force. Repair or replace non-conforming work.
- E. Associated Services: Co-operate with Owner's Inspectors and Agencies performing inspections, and similar quality control services, and provide reasonable auxiliary services as requested by such parties. Provide the following minimum assistance:
 - 1. Access to the work
 - 2. Incidental labor and materials to facilitate the inspections and testing as may be deemed appropriate.

3.5 SCHEDULE

- A. At the one story existing and new addition: behind the stage
- B. At two external roof covers for Doors 108B/107B
- C. At well covers detailed on D5/A1.6.

END OF SECTION 07613

SECTION 07720
ALUMINUM LADDER

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum Ladder: to include ladder, handrail and mounting fasteners for the ladder in Mechanical Room 201 to extend to the attic above auditorium.

1.2 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Product Data: Provide data on products, physical dimensions, accessories, and anchorage.
- C. Operating and Maintenance Instructions: Include relevant instructions.
- D. Submit manufacturer's installation instructions.
- E. Include maintenance information on regular cleaning, stain removal, and touch-up.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Examine ladder when it arrives on site. Notify the carrier and manufacturer of any damage.
 - B. Store ladder until installation under roof, if possible; or, if stored outside, under tarp or suitable cover.
- a

1.4 WARRANTY

- A. The unit carries a limited warranty of one year against defective material and workmanship, covering parts only, no labor or freight. Defective parts, if deemed so by the manufacturer, will be replaced no charge, freight excluded, upon inspection at manufacturer's plant with warrants same.

PART 2 PRODUCTS

2.1 ALUMINUM LADDER

- A. Manufacturer;
 - a. Precision Ladders
- B. Substitutions: As per Section 01600 - Material & Equipment.

2.2 MATERIALS

- A. Ladder
 - 1. Stringers (Siderails) shall be aluminum channel 5" x 2" x 3/16" (6005-T5).
 - 2. Treads shall be extruded aluminum (6005-T5) aluminum channel 5-3/16" x 2'-6".
 - 3. Mounting bracket.
 - a. Floor 2" x 3" x 1/4" aluminum angle.
 - b. Top 4 3/4" x 2" aluminum 5" angle.
- B. Handrail

1. 1-1/4" schedule 40 aluminum pipe (6061 T-6).
2. External aluminum fittings.
- C. Safety
 1. Deeply serrated aluminum channel treads (standard) both welded and bolted to stringer.
- D. Manufactured Units
 1. The ladder is a model SL, primed for field painting, tread checkered plate.
- E. Fabrication
 1. Ladder is completely fabricated ready for installation before shipment to the site.
 2. Handrail components are completely fabricated ready for field assembly to the ladder before shipment to the site.
- F. Finishes
 1. Mill finish on aluminum components.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Verify that surfaces and internal wall blocking are ready to receive work and opening dimensions are as instructed by the manufacturer.

3.2 INSTALLATION

- A. Install per the manufacturer's installation instructions.

END OF SECTION 07720

SECTION 07840
FIRESTOPPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fireproof firestopping and fire safing materials and accessories.

1.2 RELATED SECTIONS

- A. Section 01300 – Administration Requirements
- B. Section 09260 - Gypsum Board Systems: Gypsum wallboard fireproofing.
- C. Division 15: Mechanical: Mechanical work requiring firestopping.
- D. Division 16: Electrical: Electrical General Requirements: Electrical work requiring firestopping.

1.3 REFERENCES

- A. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM E119 - Method for Fire Tests of Building Construction and Materials.
- C. ASTM E814 - Test Method of Fire Tests of Through Penetration Firestops.
- D. Standard Building Code.

1.4 PERFORMANCE REQUIREMENTS

- A. Fireproofing Materials: ASTM E119 and ASTM E814 to achieve a fire rating as noted on Drawings unless specified otherwise. Provide materials and insulation identical with assemblies which have been tested and defined in publications by recognized rating authorities for fire resistance rating authorities for fire resistance rating indicated.
 - 1. Comply with the applicable design numbers of the "Fire Resistance Directory" by UL.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide data on product characteristics, performance and limitation criteria.
- C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

- A. Through Penetration Firestopping of Fire Rated Assemblies: ASTM E814 with 0.10 inch water gage minimum positive pressure differential to achieve fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
 - 1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
 - 2. Floor and Roof Penetrations: Fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
 - a. Floor Penetrations Within Wall Cavities: T-Rating is not required.
- B. Through Penetration Firestopping of Non-Fire Rated Floor and Roof Assemblies: Materials to resist free passage of flame and products of combustion.
 - 1. Noncombustible Penetrating Items: Noncombustible materials for penetrating items connecting maximum of three stories.
 - 1. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.
- C. Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: E1966 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.
- B. Fire Resistant Joints Between Floor Slabs and Exterior Walls: ASTM E119 with 0.10 inch water gage minimum positive pressure differential to achieve fire resistant rating as indicated on Drawings for floor assembly.
- C. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- D. Perform Work in accordance with State of South Carolina standards.
- E. Maintain one (1) copy of each document on site.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years experience.
- B. Applicator: Company specializing in performing the work of this Section with minimum three years experience approved by manufacturer.

1.8 REGULATORY REQUIREMENTS

- A. Conform to applicable South Carolina Building Code for fire resistance ratings and surface burning characteristics.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when temperature of substrate material and ambient air is below 60 degrees F.
- B. Maintain this minimum temperature before, during, and for 3 days after installation of materials.

- C. Provide ventilation in areas to receive solvent cured materials.

1.10 SEQUENCING

- A. Sequence Work under the provisions of Section 01039.
- B. Sequence Work to permit firestopping materials to be installed after adjacent and surrounding work is complete.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Dow Corning Corporation.
- B. Substitutions: Under provisions of Section 01600, and A701 and Article 9 of Instruction to Bidders.

2.2 MATERIALS

- A. Compatibility: Before selection and purchase of each specified firestopping, investigate its compatibility with joint surfaces. Joint fillers, and other materials in joint system.
- B. Each Firestop System installation shall bear the same fire ratings as the partition penetrated.
- C. The following items D, E and F are principal items only. Contractor is to comply with U.L. requirements for any and all penetrations through rated construction.
- D. At un-insulated steel pipe, conduit or ducts provide one of the following:
 - 1. Fire Barrier CP25 N/S Caulk; 3M.
 - 2. Metal Caulk 835: Rector Seal.
 - 3. Firestop foam and Firestop sealant; Dow Corning corp.
- E. At insulation and un-insulated plastic pipe and insulated steel pipe, conduit or ducts, provide one the following:
 - 1. Fire barrier FS-195 with CP Caulk or MP Moldable Putty; 3M.
 - 2. Metal Caulk 950/880: Rector Seal.
 - 3. Fire stop wrap strip 2002; Dow Corning.
- F. Where fire rated partitions abut underside of steel decks, beams, or concrete decks and/or slabs, provide one of the following:
 - 1. Fire Stop Sealant; Dow Corning.
 - 2. Fire-SIL; Tremco.
 - 3. CS240 Firestop Sealant: Hilti Construction Chemicals.

2.3 ACCESSORIES

- A. Provide metal and/or wire mesh sleeves, retaining collars, backing materials including mineral wool and other components required for Firestop system used.
- B. Retainers: Compatible clips to support mineral fiber matting.
- C. Dam material: mineral fiberboard, removable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01039.
- B. Verify that openings are ready to receive the work of this Section.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may effect bond of firestopping material, immediately before installation.
- B. Remove incompatible materials which affect bond.
- C. Install backing materials to arrest liquid material leakage.

3.3 APPLICATION

- A. Apply primer and materials in accordance with manufacturer's instructions.
- B. Apply firestopping material and intumescent wrap in sufficient thickness to achieve rating to uniform density and texture.
- C. Install material at walls or partition openings which contain penetrating sleeves, piping, ductwork, conduit and other items requiring firestopping.
- D. Remove dam material after firestopping material has cured.
- E. Where fire rated partitions abut underside of steel, firmly pack mineral wool (min 4 PLF density) into space between top of partition and underside of steel allowing 1/2" depth on each face of partition for fire resistive firestop. Provide materials and installation in conformance with assembly that has been tested and defined in publications by testing agency, if available.
- F. Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surface including rough textures. Use masking tape or other precautionary devices to prevent staining on adjoining surfaces, by either primer/sealer or the sealant.

3.4 CLEANING

- A. Clean Work under provisions of Section 01500.
- B. Clean adjacent surfaces of firestopping materials and remove excess and spillage of compounds promptly as work progresses. Clean adjoining surfaces without damage to adjoining surfaces to eliminate evidence of spillage.

3.5 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01500.

- B. Protect adjacent surfaces from damage by material installation.

END OF SECTION 07840

SECTION 07900
JOINT SEALERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preparing sealant substrate surfaces.
- B. Sealant and backing.

1.2 RELATED SECTIONS

- A. Section 03300 - Cast-In-Place Concrete: Sealants used in conjunction with cast in place concrete.
- B. Section 04810 - Unit Masonry Systems: Sealants required in conjunction with masonry.
- C. Section 06200 - Finish Carpentry: Sealants used in conjunction with siding and trim.
- D. Section 07840 - Firestopping: Sealants used in conjunction with firestopping.
- E. Section 07620 - Sheet Metal Flashing and Trim: Sealants used in conjunction with metal flashings.
- F. Section 08112 - Standard Steel Frames: Sealants used in conjunction with door frames.

1.3 REFERENCES

- A. ANSI/ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
- B. ANSI/ASTM D1565 - Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Open-Cell Foam).
- C. ASTM C790 - Use of Latex Sealing Compounds.
- D. ASTM C804 - Use of Solvent-Release Type Sealants.
- E. ASTM C834 - Latex Sealing Compounds.
- F. FS TT-C-00598 - Caulking Compound, Oil and Resin Base Type.
- G. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, solvent Release Type.
- H. FS TT-S-00227 - Sealing Compound: Elastomeric Type, Multi-Component.
- I. FS TT-S-00230 - Sealing Compound: Elastomeric Type, Single Component.

- J. FS TT-S-001543 - Sealing Compound, Silicone Rubber Base.
- K. SWI (Sealing and Waterproofers Institute) - Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability. Color to match mortar color.
- C. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention under provisions of 01330.
- D. Submit manufacturer's certificate under provisions of Section 01400 that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years experience.
- B. Applicator: Company specializing in applying the work of this Section with minimum three years experience.
- C. Conform to Sealant and Waterproofers Institute requirements for materials and installation.
- D. Before selection and purchase of each specified sealant investigate its compatibility with joint surfaces, joint fillers, and other material in joint system. Provide any materials which are known to be fully compatible with ASTM installation conditions.
- E. Maintain one copy of each referenced document covering installation requirements on site.

1.6 FIELD SAMPLES

- A. Provide samples under provisions of Section 01330.
- B. Construct field sample panel, 1-1/2 feet long, illustrating sealant type, color, and tooled surface.
- C. Locate where directed.
- D. Accepted sample may not remain as part of the Work.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not install solvent curing sealants in enclosed building spaces.

- B. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.
- C. Section 01600 - Product Requirements.
- D. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate work under provisions of Section 01100.
- B. Coordinate the work of this Section with all Sections referencing this Section.

1.9 WARRANTY

- A. Provide three year warranty under provisions of Section 01700.
- B. Warranty: Include coverage of installed sealants and accessories which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 SEALANTS

- A. Acrylic Latex (Type A): ASTM C920, Grade NS, Class 12-1/2, Use NT; single component, solvent curing, non-staining, non-bleeding, non-sagging; color as selected.
- B. Butyl Sealant (Type B): ASTM C920, single component, solvent release, non-skinning, non-sagging, black color.
- C. Polyurethane Sealant (Type C): ASTM C920, Type S, Grade NS, Class 25, Use T; multi-component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, self-leveling type; white color.
- D. Polyurethane Sealant (Type D): ASTM C920, Type M, Grade P, Class 25, Use T; multi-component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, self-leveling type; white color.
- E. Acetoxy Silicone Sealant (Type E): ASTM C920, Grade NS, Class 25, Use G; single component, solvent curing, non-sagging, non-staining, fungus resistant, non-bleeding; color.
- F. Polyurethane Sealant (Type F): Single component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, non-sagging, self-leveling type; color as selected; Chem-Caulk 500 manufactured by Bostik.

Elongation Capability	25 percent
Service Temperature Range	-40 to 180 degrees F
Shore A Hardness Range	20 to 35

- G. At FRP Panels: Provide sealant compatible with manufacturer's recommendations.
- H. Security: Sealant high strength, pick resistant by Sika Corp.

2.2 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: ANSI/ASTM D1056; round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate surfaces and joint openings are ready to receive work.
- C. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

- A. Remove loose materials and foreign matter impairing adhesion of sealant.
- B. Clean and prime joints.
- C. Perform preparation in accordance with ASTM C804 for solvent release sealants.
- D. Protect elements surrounding Work of this section from damage or disfiguration.

3.3 INSTALLATION

- A. Perform installation in accordance with ASTM C804 for solvent release sealants.
- B. Measure joint dimensions and size materials to achieve required width/depth ratios.
- C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.
- D. Install bond breaker where joint backing is not used.
- E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- H. Tool joints concave.

3.4 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Clean adjacent soiled surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Protect sealants until cured.

3.6 SCHEDULE

<u>Location</u>	<u>Type</u>
Window perimeter, exterior, interior	F
Door Frame/Walls, exterior	C
Door Frame/Walls, interior	A
Under Thresholds	B
Ceramic Tile	E
Concrete Joints	D
Other exterior joints	C
Other interior joints	A
Fiber Cement Siding & Trim	E or C

END OF SECTION 07900

SECTION 08111
STANDARD STEEL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-rated and fire rated steel doors and frames - KD "Knockdown" frames.
- B. Fire rated fixed window openings in hallways.

1.2 RELATED SECTIONS

- A. Section 08212 – Wood Doors.
- B. Section 08712 - Door Hardware
- C. Section 08800 – Glazing: Glazing of Doors.
- D. Section 09900 – Painting: Field Painting of Door

1.3 REFERENCES

- A. ANSI A117.1 and ADA - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- B. ANSI/SDI-100 - Standard Steel Doors and Frames.
- C. ASTM A525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- D. ASTM E152 - Methods of Fire Tests of Door Assemblies.
- E. Door Hardware Institute (DHI) - The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
- F. NFPA 80 - Fire Doors and Windows.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate door elevations, internal reinforcement, closure method, and cut-outs for louvers, and finish.
- B. Product Data: Indicate door configurations, location of cut-outs for hardware reinforcement.
- C. Manufacturer's Installation Instructions: Indicate special installation instructions.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ANSI A250.8.
- B. Fire Rated Door Construction: Conform to NFPA 252.

- C. Fire Rated Door Construction: Conform to one of the following:
 - 1. NFPA 252; with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.
 - 2. UL 10C.
 - 3. 20-Minute Fire Rated Corridor Doors: Fire tested without hose stream test.
 - D. Fire Rated Door Construction: Conform to UBC Standard 7-2.
 - E. Fire Rated Stair Doors: Rate of rise of 450 degrees F across door thickness.
 - F. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings.
 - G. Smoke and Draft Control Doors: Tested in accordance with UL 1784.
 - 1. Air Leakage: Maximum 3.0 cfm/sf of door opening with 0.10 inch water gage pressure differential.
 - H. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.
 - 1. Indicate temperature rise rating for stair doors.
 - 2. Attach smoke label to smoke and draft control doors.
 - I. Surface Burning Characteristics:
 - 1. Foam Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84, NFPA 25.
 - J. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation board.
 - K. Perform Work in accordance with State of South Carolina standards.
 - L. Maintain one (1) copy of each document on site.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Protect doors with resilient packaging sealed with heat shrunk plastic.
- 1.9 FIELD MEASUREMENTS
- A. Verify that field measurements are as indicated on shop drawings.
- 1.10 COORDINATION
- A. Coordinate the work with door opening construction, door frame and door hardware installation.
- 1.11 REGULATORY REQUIREMENTS
- A. Conform to applicable code for fire rated frames and doors.
- 1.12 SINGLE SOURCE CONTRACTOR
- A. For Sections 08111 and 08212, the project will require a single source supplier. The single source supplier shall be responsible for all products and services and

may use various suppliers for this work under their supervision.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS: DOOR AND FRAMES

- A. Amweld Building Products
- B. Curries Manufacturing, Inc.
- C. Steelcraft Manufacturing Company.
- D. Ceco Corporation.
- E. Republic Builders Products.

2.02 DOORS AND PANELS

- A. Exterior Doors: SDI-100(1985), Grade II, Model 1- Galvaneal 1-3\4" Level B.

2.03 DOOR CONSTRUCTION AND FRAME CONSTRUCTION

- A. Face: Steel sheet in accordance with ANSI/SDI-100.
- B. Core: Impregnated cardboard honeycomb.
- C. Interior and Exterior; 16 gauge thick material core thickness. To suit grade and model of door. Frames types as "knock down" frames to accomodate wall thickness. All frames to have rubber silencers with minimum three (3) anchors per jamb, six (6) per frame, welded and ground smooth, with 2 bottom spreaders all with 18 gauge floor anchors, unless otherwise noted.
- D. Full glass door with frame that is flush with door facing.

2.04 ACCESSORIES

- A. Primer: Zinc chromate type.
- B. Bituminous: Fibered asphalt emulsion.
- C. Rubber silencers: Resilient rubber.
- D. Removable Glazing Stops: Rolled steel channel shape, mitered corners.; prepared for countersink screws.

2.05 FABRICATION

- A. Fabricate doors with hardware reinforcement welded in place.
- B. Attach fire rated label to each door unit.
- C. Close top and bottom edge of exterior doors with flush end closure. Seal joints watertight.

- D. Standard reinforcement for hardware as per SDI-100 (1985).
- E. Astragal for double doors: Steel T shaped, specifically for double doors, as indicated.

2.06 FINISH

- A. Steel Sheet: A60 Galvannealed at exterior applications.
- B. Primer: Baked.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify substrate conditions.
- B. Verify that opening sizes and tolerances are acceptable.

3.02 INSTALLATION

- A. Install doors in accordance with ANSI/SDI-100 and DHI.
- B. Coordinate installation of glass and glazing.
- C. Install door, plumb and level.
- D. Coordinate installation of doors with installation of frames specified in Section 08112 and hardware specified in Section 08712.
- E. Touch-up factory finished doors.
- F. Install a minimum of three (3) anchors per jamb (6 per frame).

3.03 ERECTION TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.04 ADJUSTING

- A. Adjust door for smooth and balanced door movement.

END OF SECTION 08111

SECTION 08212
WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flush wood doors; flush configuration; fire rated and non-rated, "Pre-Finished".

1.2 RELATED SECTIONS

- A. Section 08115 - Standard Steel Frames: Steel door frames.
- B. Section 08710 - Door Hardware.
- C. Section 08800 - Glazing: Glazing for doors.

1.3 REFERENCES

- A. ASTM E152 - Methods of Fire Tests of Door Assemblies.
- B. ASTM E413 - Classification for Determination of Sound Transmission Class.
- C. AWI - Quality Standards of the Architectural Woodwork Institute.
- D. NFPA 80 - Fire Doors and Windows.
- E. NFPA 252 - Standard Method of Fire Tests for Door Assemblies.
- F. UL 10B - Fire Tests of Door Assemblies.
- G. Warnock-Hersey - Certification Listings for fire doors.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special blocking for hardware.
- C. Product Data: Indicate door core materials and construction; veneer species, type and characteristics; factory machining criteria, factory finishing criteria.
- D. Manufacturer's Installation Instructions: Indicate special installation instructions.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Quality Standard Section 1300, Custom Grade.
- B. Perform Work in accordance with State of South Carolina standards.

- C. Maintain one (1) copy of each document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS

- A. Fire Door Construction: Conform to UL 10B, ASTM E152, UL 10B.
- B. Installed Doors: Conform to NFPA 80 for fire rated class indicated on schedules.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 01600.
- B. Package, deliver and store doors in accordance with AWI Section 1300 and ANSI/AWMA Requirements.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges if stored more than one week. Break seal on-site to permit ventilation.

1.9 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings, instructed by manufacturer.

1.10 COORDINATION

- A. Coordinate work under provisions of Section 01300.
- B. Coordinate the work with door opening construction, door frame and door hardware installation.

1.11 WARRANTY

- A. Provide warranty under provisions of Section 01700 to the following term:
 - 1. Interior Doors: Manufacturer one (1) year.
- B. Provide for replacing to include cost of rehanging and refinishing at no cost to the owner. Wood doors exhibiting defects in materials or workmanship, including warp and delamination within minimum period of one (1) year from date of substantial completion of the work.

1.12 SINGLE SOURCE CONTRACTOR

- A. For Sections 08111 and 08212, the project will require a single source supplier. The single source supplier shall be responsible for all products and services and may use various suppliers for this work under their supervision.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Mohawk Flush Doors.
- B. Marshfield Doors
- C. Algoma Hardwoods, Inc.
- D. Substitutions under provisions of Section 01600 and A701 and Article 9 of Instructions to Bidders.

2.2 DOOR AND TRANSOM PANEL TYPES

- A. Flush Interior Doors: 1-3/4 inches thick; solid core construction LD 2, fire rated as indicated.

2.3 DOOR CONSTRUCTION

- A. Core (Solid, Non-Rated): AWI Section 1300, Particle Core LD 2 5 ply.
- B. Core (Solid, Fire Rated): AWI Section 1300, Type FD 1-1/2 5 ply.

2.4 FLUSH DOOR FACING

- A. Veneer Facing (Flush Interior Doors): AWI Rotary White Birch Species Prefinished Custom Grade Book Match with CE (compatible hardwood) edge. Finish transparent stain.

2.5 ADHESIVE

- A. Facing Adhesive Type II - Water resistant.

2.6 ACCESSORIES

- A. Glass stops: Wood, of same species wood as door facing at non-rated doors. Rolled steel type designed to conform to UL requirements at fire-rated doors; prepared for countersunk style tamperproof screws.

2.7 FABRICATION

- A. Fabricate non-rated doors in accordance with AWI Quality Standards requirements.
- B. Fabricate fire rated doors in accordance with AWI Quality Standards and to UL Warnock-Hersey 10B requirements. Attach fire rating label to door.
- C. Premachine doors for finish hardware.
- D. Provide flush doors with 1/2 inch thick edge strips of wood species to match door finish.
- E. Astragals for double doors: Provide T-shaped metal astragals in one piece to conform with UL requirements for rating indicated on Schedule.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify frame opening conditions under provisions of Section 01039.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions.
- B. Trim non-rated door width by cutting equally on both jamb edges.
- C. Trim door height by cutting top and bottom edges to a maximum of 3/4 inch (19 mm). Trim fire door height at bottom edge only, in accordance with fire rating requirements.
- D. Pilot drill screw and bolt holes. Use threaded through bolts for half surface hinges.
- E. Machine cut for hardware. Core for handsets and cylinders.
- F. Coordinate installation of doors with installation of frames specified in Section 08111 and hardware specified in Section 08712.

3.3 INSTALLATION TOLERANCES

- A. Conform to AWI requirements for fit and clearance tolerances.
- B. Conform to AWI Section 1300 requirements for maximum diagonal distortion.
- C. Maximum Diagonal Distortion (Warp): 1/16 inch measured with straight edge or taught string, corner to corner.

3.4 ADJUSTING

- A. Adjust work under provisions of Section 01700.
- B. Adjust door for smooth and balanced door movement.

END OF SECTION 08212

SECTION 08410

METAL-FRAMED STOREFRONTS
(Alternate #1 for Existing Window Replacement)

PART 1 GENERAL

1.1 SUMMARY

A.

1. Section includes aluminum-framed storefronts including aluminum and glass doors and frames including door hardware and glass infill panels and components for both interior and exterior wall applications.
2. Coordinate all hardware, panic hardware and electric strike locations

B. Related Sections:

1. Section 06100 – Rough Carpentry
2. Section 07840- Firestopping: Fire stop at system junction with structure.
3. Section 07900 - Joint Sealers: Joint sealers other than those integral with storefront.
4. Section 08710 - Door Hardware: Mortised hardware reinforcement requirements affecting framing members; hardware items other than specified in this section.
5. Section 08800 - Glazing.
6. Section 09900 - Paints and Coatings: Field painting of interior surface of infill panel surfaces.

1.2 REFERENCES

A. Aluminum Association:

1. AA ADM 1 - Aluminum Design Manual.

B. American Architectural Manufacturers Association:

1. AAMA 501 - Methods of Test for Exterior Walls.
2. AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Glass Doors.
3. AAMA 503 - Voluntary Specification for Field Testing of Metal Storefronts. Curtain Wall and Sloped Glazing Systems.
4. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
5. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
6. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
7. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
8. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
9. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site.
10. AAMA MCWM-1 - Metal Curtain Wall Manual.

11. AAMA SFM-1 - Aluminum Store Front and Entrance Manual.
- C. American Society of Civil Engineers:
1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- D. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 4. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 5. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 7. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 8. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
 9. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
 10. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
 11. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
- E. National Fenestration Rating Council Incorporated:
1. NFRC 100 - Procedures for Determining Fenestration Product U-Factors.
- F. National Fire Protection Association:
1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- G. SSPC: The Society for Protective Coatings:
1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
 2. SSPC Paint 25 - Red Iron Oxide, Zinc Oxide, Raw Linseed Oil, and Alkyd Primer.
- H. Underwriters Laboratories Inc.:
1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 SYSTEM DESCRIPTION

- A. Aluminum-framed storefront system includes tubular aluminum sections with supplementary internal support framing, aluminum and glass entrances, shop fabricated, factory finished, glass and glazing, related flashings, anchorage and attachment devices.

- B. System Assembly: Site assembled.

1.4 PERFORMANCE REQUIREMENTS

- A. System Design: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall, including building corners.
1. As calculated in accordance with applicable code, as tested in accordance with ASTM E330.
- B. Wind-Borne Debris Loads: Design and size glass located less than 60 feet above grade to withstand the following loads:
1. Glass Within 30 feet of Grade: ASTM 1996; large missile impact test.
 2. Glass Within 30 feet of Grade: ASTM 1996; small missile impact test.
- C. Deflection: Limit mullion deflection to 1/175 for spans under 13'-6" and 1/240 plus 1/4 inch for spans over 13'-6"; flexure limit of glass 3/4 inch of span; with full recovery of glazing materials.
- D. System Assembly: Accommodate without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads, deflection of structural support framing.
- E. Air Infiltration: Limit air leakage through assembly to 0.06 cfm/min/sq ft of wall area, measured at reference differential pressure across assembly of 1.57 psf as measured in accordance with AAMA 501.
- F. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
- G. Vapor Seal: Limit vapor seal with interior atmospheric pressure of 1 inch sp, 72 degrees F, 40 Percent RH without seal failure.
- H. Condensation Resistance Factor: CRF of not less than 45 when measured in accordance with AAMA 1503.
- I. Water Leakage: None, when measured in accordance with AAMA 501, ASTM E331 and ASTM E547 with test pressure difference of 20 percent of design pressure, with minimum differential of 2.86 lbf/sq ft and maximum of 12.00 lbf/sq ft.
- J. Thermal Transmittance of Assembly (Excluding Entrances): Maximum U Value of 0.69 Btu/sq ft per hour per deg F when measured in accordance with AAMA 1503.
- K. Expansion / Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over 12 hour period without causing detrimental effect to system components and anchorage.
- L. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior by weep drainage network.

1.5 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details to include entrance door hardware.
- C. Product Data: Submit component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, [door hardware,] and internal drainage details.
- D. Samples: Submit two samples 12 x 12 inches in size illustrating finished aluminum surface, glass units and glazing materials.
- E. Design Data: Indicate framing member structural and physical characteristics, calculations, and dimensional limitations.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with AAMA MCWM-1 - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- B. Surface Burning Characteristics:
 - 1. Foam Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- C. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation board.
- D. Perform Work in accordance with State of South Carolina standards.
- E. Maintain one copy of each document on site.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing aluminum glazing systems with minimum three years documented experience.

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Handle Products of this section in accordance with AAMA MCWM-1 - Curtain Wall Manual #10.

- C. Protect finished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Do not install sealants nor glazing materials when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1.11 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with installation of firestopping, air barrier, and components or materials.

1.12 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for glazed units.

PART 2 PRODUCTS

2.1 ALUMINUM-FRAMED STOREFRONTS

- A. Manufacturers:
 - 1. **Kawneer Co., Inc.** (basis of design, no substitutions)
- B. Furnish materials in accordance with the State of South Carolina standards.
- C. Product Description:
 - 1. Aluminum Frame: Screw spline system
 - a. Exterior Windows Tri-Fab 451, 2" x 4-1/2", center glazed with 1" insulated glazing: solar ban 60; thermally broken with interior tubular section insulated from exterior, applied glazing stops, drainage holes, internal weep drainage system, angled corners with 1" mutton dividers as indicated on drawings.
 - b. Exteriors Doors Tri-Fab 451, 500 wide style: 2" thick, 5" wide top rail, 5" wide vertical stiles, 12" wide bottom rail, beveled glazing stops with 4" side lite base with 1/4" tempered glazing.

2.2 COMPONENTS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical, 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209, 5005 alloy, H15 or H34 temper.
- C. Sheet Steel: ASTM A653/A653M; galvanized to minimum G90.
- D. Steel Sections: ASTM A36/A36M; shaped to suit mullion sections, galvanized.

- E. Glass: Specified in Section 08800.
- F. Glazing Materials: As specified in Section 08800.
- G. Infill Panels:
 - 1. Insulated Panels: Manufacturer's standard insulated panel construction with aluminum outer and inner faces and special insulating core; 1 inch thick.
- H. Entrance System (at exterior locations for Doors 103):
 - 1. Aluminum Entrances: Entrance member profile: 3-1/2" vertical stile, 3-1/2" top rail, 6-1/2" bottom rail with 1" insulated glass.
 - 2. Hardware: Standard Intermediate Pivot (Rixson M-19)
Door-O-Matic 1490 concealed vertical rod
LCN 2030 concealed overhead/single acting closer with hold open
CO-9 single acting pull
 - 3. Brake metal at aluminum store front as indicated on the drawings. Same finish and thickness as storefront system.
 - 4. Provide corner, junction, base, and miscellaneous shapes as defined on drawings for a complete installation.
 - 5. Hardware: Furnish manufacturer's standard hardware for types of doors and applications indicated, and as specified below:
 - 6. Weather Stripping: Wool pile, continuous and replaceable.
 - 7. Sill Sweep Strips.
 - 8. Threshold: Extruded aluminum, one piece for each door opening, ribbed, non-slip surface.
 - 9. Pivots: Offset type: top, intermediate, and bottom.
 - 10. Panic Device: Rim with profile type to fit door stiles; push pad type.
 - 11. Closer: Fully adjustable overhead, surface mount, modern style overhead closer.
 - 12. Finish: Exposed hardware to match hardware finishes specified in Section 08710.
 - 13. Lock Cylinders and Pulls: Specified in Section 08710
- I. Flashings: Minimum 0.032 inch thick aluminum to match mullion sections where exposed.
- J. Firestopping: Specified in Section 07840.
- K. Sealant and Backing Materials:
 - 1. Sealant Used Within System (Not Used for Glazing): Manufacturer's standard materials to achieve weather, moisture, and air infiltration requirements.
 - 2. Perimeter Sealant: Specified in Section 07900.

- L. Fasteners: Stainless steel.

2.3 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to conceal from view.
- E. Reinforce interior horizontal head rail to receive blind track brackets and attachments.
- F. Prepare components with internal reinforcement for door hardware.
- G. Reinforce framing members for imposed loads.

2.4 SHOP FINISHING

- A. Color Anodized Aluminum Surfaces: AAMA 611, AA-M10C22A44 non-specular as fabricated mechanical finish, medium matte chemical finish, and Architectural Class I 0.7 mils **Standard Bronze**.
- B. Concealed Steel Items: Galvanized to ASTM A123/A123M; [minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication. Primed with iron oxide paint.
- C. Apply bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar metals.
- D. Shop and Touch-Up Primer for Steel Components: SSPC Paint 25 red oxide.
- E. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.
- F. Extent of Finish:
 - 1. Apply factory coating to surfaces exposed at completed assemblies.
 - 2. Apply finish to surfaces cut during fabrication so no natural aluminum is visible in completed assemblies, including joint edges.
 - 3. Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify dimensions, tolerances, and method of attachment with other Work.
- C. Verify wall openings and adjoining air and vapor seal materials are ready to

receive Work of this Section.

3.2 INSTALLATION

- A. Install wall system in accordance with AAMA MCWM-1 - Window, Store Front and Entrance - Guide Specifications Manual.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent Work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent Work to form water tight dam.
- G. Coordinate attachment and seal of perimeter air and vapor retarder materials.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install integral flashings and integral joint sealers.
- J. Set thresholds [in bed of mastic and] secure.
- K. Install hardware using templates provided. Refer to Section 08710 for installation requirements.
- L. Coordinate installation of glass with Section 08800 ; separate glass from metal surfaces.
- M. Coordinate installation of perimeter sealants with Section 07900.
- N. Install hardware using templates provided. Refer to Section 08710 for installation requirements. Coordinate all hardware applications with Section 08710 Hardware Supplier.

3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.
- C. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements, 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspection to monitor quality of installation and glazing.
- C. Test to AAMA 502 or 503, ASTM E1105 and AAMA 501.

3.5 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting and balancing.
- B. Adjust operating hardware for smooth operation.

3.6 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Remove protective material from pre-finished aluminum surfaces.
- C. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- D. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Protect finished Work from damage.

3.8 SCHEDULE

- A. Window A, B, C,D,E,F,G,H,J,K,M as shown on sheet A1.2 – **Alternate #1**
- B. Door 103 – Base Bid

END OF SECTION 08410

SECTION 08710
DOOR HARDWARE
ALLOWANCE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes hardware for wood, steel, aluminum doors.
1. Provide door gaskets, including weatherstripping (except at aluminum doors) and seals, and thresholds.
- B. Related Sections:
1. Section 01200 – Price and Payment Procedures
 2. Section 06200 - Finish Carpentry: Wood door frames.
 3. Section 06410 - Custom Cabinets: Cabinet hardware.
 4. Section 08111 - Standard Steel Doors and Frames
 5. Section 08212 - Wood Doors.
 6. Section 10440 - Signage.
- C. Allowances: Include under provisions of Section 01200 - Price and Payment Procedures.
1. The General Contractor shall allow the sum of as indicated in Section 01200 for the furnishing of material. This sum does not include the overhead and profit of the General Contractor. The Architect reserves the right to assign a contract, or purchase order, to the General Contractor. The General Contractor **shall not issue a contract** on the allowance without the prior approval of the Architect and Owner. The installation of the hardware is part of the allowance.

1.2 REFERENCE

- A. American National Standards Institute:
1. ANSI A156.1 - Butts and Hinges.
 2. ANSI A156.2 - Bored and Preassembled Locks and Latches.
 3. ANSI A156.3 - Exit Devices.
 4. ANSI A156.4 - Door Controls - Closures.
 5. ANSI A156.5 - Auxiliary Locks and Associated Products.
 6. ANSI A156.6 - Architectural Door Trim.
 7. ANSI A156.7 - Template Hinge Dimensions.
 8. ANSI A156.16 - Auxiliary Hardware.
 9. ANSI A156.18 - Materials and Finishes
- B. Builders Hardware Manufacturers Association:
1. BHMA Directory of Certified Products.
- C. National Fire Protection Association:
1. NFPA 80 - Standard for Fire Doors, Fire Windows.
- D. Underwriters Laboratories Inc.:
1. UL 10C - Fire Test.
 2. UL 305 - Panic Hardware.
 3. UL - Building Materials Directory.
- E. Intertek Testing Services (Warnock Hersey Listed):

1. WH - Certification Listings.

1.3 PERFORMANCE REQUIREMENTS

- A. Fire Rated Openings: Provide door hardware listed by UL or Intertek Testing Services (Warnock Hersey Listed), or other testing laboratory approved by applicable authorities.
 1. Hardware: Tested in accordance with UL10C and UBC 7-2-1997.
 2. ASTM 2074-00 Fire Test.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings:
 1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts.
 2. Submit manufacturer's parts lists, and templates.
 3. Submit all shop drawings and schedules together at one time.
 4. Submit 6 copies of all required submittals
- C. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Project Record Documents: Record actual locations of installed cylinders and their master key code.
- C. Operation and Maintenance Data: Submit data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- D. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with the following requirements:
 1. ANSI A156 series.
 2. NFPA 80.
 3. UL 305.
- B. Furnish hardware marked and listed in BHMA Directory of Certified Products.
- C. Perform Work in accordance with Georgetown County, South Carolina standard.
- D. Maintain one (1) copy of each referenced document covering installation requirements on site.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Hardware Supplier: Company specializing in supplying commercial and institutional door hardware with minimum five years documented experience, and an established distributor of the products being furnished.
- C. Hardware Installers shall provide a certificate of training from the manufactures of the following hardware products:
 - 1. Locksets.
 - 2. Closers.
 - 3. Exit Devices.
- D. Hardware Installers: Hardware trained personnel employed by the Hardware Supplier, trained hardware installer employed by the General Contractor, or trained independent hardware installer such as Wes Sparks, 843-222-4740.
- E. Hardware Supplier Personnel: The Supplier shall employ a certified Architectural Hardware Consultant (AHC) to assist in work of this section.
- F. Products Requiring Electrical Connection: Listed and classified by [Underwriters' Laboratories, Inc., testing firm acceptable to authority having jurisdiction as suitable for purpose specified and indicated.

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum three weeks prior to commencing work of this section.
- C. Include suppliers of all related trades and all persons involved with installation of doors, frames, and hardware.
- D. Keying Conference: Conduct conference on-site to comply with requirements in Section 01300 for Project Meetings. Include the Owner's representative, Contractor, and hardware supplier. Incorporate keying conference decisions into final keying schedule . Submit four copies of the final keying schedule for final approval prior to ordering the keyed locks and cores.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Package hardware items individually with necessary fasteners, instructions, and installation templates, when necessary; label and identify each package with door opening code to match hardware schedule.

1.10 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.

- B. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware and recessed items.
 - 1. Provide templates or actual hardware as required to ensure proper preparation of doors and frames.
- C. Sequence installation to accommodate required utility connections.
- D. Coordinate Owner's keying requirements during course of Work.

1.11 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Furnish five year minimum manufacturer warranty for locksets and exit devices. Furnish 10-year minimum manufacturer warranty for door closers. Furnish one-year manufacturer's warranty for balance of materials furnished.

1.12 MAINTENANCE MATERIALS

- A. Section 01700 - Execution Requirements: Maintenance materials.
- B. Furnish special wrenches and tools applicable for each different and for each special hardware component.
- C. Furnish maintenance tools and accessories supplied by hardware component manufacturer.

1.13 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Furnish three extra keyed cores for each master keyed group.

PART 2 PRODUCTS

2.1 DOOR HARDWARE

- A. Manufacturers:
 - 1. Bommer Industries, Inc.
 - 2. Corbin-Russwin Locks, Closers and Exit Devices.
 - 3. Dorma Door Controls, Inc.
 - 4. Falcon Lock, Exit Device and Closers.
 - 5. Hager Companies.
 - 6. LCN Closers.
 - 7. Precision Hardware Mfg Co Inc.
 - 8. Reese Industries.
 - 9. Schlage Lock Co.
 - 10. Stanley Hardware.
 - 11. Von Duprin, Inc.

- B. Hinge Manufacturers:
 - 1. Ives Model 5BB1 x sized specified in Sets.
 - 2. Bommer Model BB5000/BB5002.
 - 3. Hager Model BB1279/BB1199.
 - 4. Stanley Model FBB179/FBB191.

- C. Lockset , Latch Set, and Cylinder Manufacturers:
 - 1. Falcon Lock Model T series.
 - 2. Corbin-Russwin Model CL3300 series.
 - 3. Dorma Model CL800 series.

- D. Exit Device Manufacturers:
 - 1. Falcon Model 25/24 series.
 - 2. Corbin-Russwin Model 5200 series.
 - 3. Dorma Model 9300 series.

- E. Closers Manufacturers:
 - 1. Falcon Model SC81 / SC61 series.
 - 2. Corbin-Russwin Model CL3210 series.
 - 3. Dorma 8600 / 7300 series.

- F. Manual Bolts, Protection Plates, Gaskets, Thresholds, and Trim Manufacturers:
 - 1. Ives Model 8400 series
 - 2. NGP Model 896V Thresholds; Model 5050 Gasket.
 - 3. Substitutions: Section 01600 - Product Requirements.

2.2 COMPONENTS

- A. General Hardware Requirements: Where not specifically indicated, comply with applicable ANSI A156 standard for type of hardware required. Furnish each type of hardware with accessories as required for applications indicated and for complete, finished, operational doors.
 - 1. Templates: Furnish templates or physical hardware items to door and frame manufacturers sufficiently in advance to avoid delay in Work.
 - 2. Reinforcing Units: Furnished by door and frame manufacturers; coordinated by hardware supplier or hardware manufacturer.
 - 3. Fasteners: Furnish as recommended by hardware manufacturer and as required to secure hardware.
 - a. Finish: Match hardware item being fastened.
 - 4. Fire Ratings: Provide hardware with UL or Intertek Testing Services (Warnock Hersey Listed) listings for type of application involved.
 - 5. Electrical Devices: Make provisions and coordinate requirements for electrical devices and connections for hardware.

- B. Hinges: ANSI A156.1, full mortise type , template type, ANSI A156.7, complying with following general requirements unless otherwise scheduled.
 - 1. Widths: Sufficient to clear trim projection when door swings 180 degrees.
 - 2. Number: Furnish minimum three hinges to 90 inches high, four hinges to 120 inches high for each door leaf.
 - a. Fire Rated Doors To 86 inches High: Minimum three hinges.
 - 3. Size and Weight: 4-1/2 inch heavy weight typical for 1-3/4 inch doors.

- a. Doors Over 40 inches Wide: Extra heavy weight ball or oilite bearing hinges.
 - b. Doors 1-3/8 inch Thick: 3-1/2 inch size.
 - c. Doors 2 inch Thick: 5 inch extra heavy weight ball or oilite bearing.
 - d. Doors Over 48 inches Wide: 5 inch extra heavy weight ball or oilite bearing.
4. Pins: Furnish nonferrous hinges with non-removable pins (NRP) at exterior and locked out-swinging doors, non-rising pins at interior doors.
 5. Tips: Flat button tips with matching plug Flush tips.
- C. Locksets: Furnish locksets compatible with specified cylinders. Typical 2-3/4 inch backset. Furnish standard strikes with extended lips to protect trim from being marred by latch bolt verify type of cutouts provided in metal frames.
1. Bored (Cylindrical) Locksets: ANSI A156.2, Series 4000, Grade 1 unless otherwise indicated.
 2. Auxiliary Locksets: ANSI A156.5, Grade 1, bored dead locks, unless otherwise indicated.
- D. Latch Sets: Match locksets. Typical 2-3/4 inch backset. Furnish standard strikes with extended lips to protect trim from being marred by latch bolt verify type of cutouts provided in metal frames.
1. Bored (Cylindrical) Latch Sets: ANSI A156.2, Series 4000, Grade 1 unless otherwise indicated.
- E. Exit Devices: ANSI A156.3, Grade 1 rim type, with push pad, unless otherwise indicated. Furnish standard roller strikes.
1. Types: Suitable for doors requiring exit devices.
- F. Cylinders: ANSI A156.5, Grade 1, 6-pin type, interchangeable core type cylinders at exterior doors and doors with exit device.
1. Keying: Keyed as directed by Owner. Key in groups as required and Master key.
 2. Include construction keyed temporary cores for all exterior doors. Temporary cores shall remain the property of the Hardware Supplier. The General Contractor shall replace the temporary cores with the keyed permanent cores at the completion of the project.
 3. Keys: Nickel silver. Stamp keys with "DO NOT DUPLICATE".
 4. Supply keys in the following minimum quantities:
 - a. 5 master keys.
 - b. 3 construction keys.
 - c. 2 control keys.
 - d. 2 change keys for each.
- G. Closers: ANSI A156.4 modern type with and without cover, surface mounted; full rack and pinion type with steel spring and non-freezing hydraulic fluid; closers required for fire rated doors unless otherwise indicated.
1. Adjustability: Furnish controls for regulating closing, latching, speeds, and back checking.
 2. Arms: Type to suit individual condition; parallel-arm closers at reverse bevel doors and where doors swing full 180 degrees.
 3. Location: Mount closers on inside of exterior doors, room side of interior doors typical; mount on pull side of other doors.
 4. Operating Pressure: Maximum operating pressure as follows.
 - a. Interior Doors: Maximum 5 pounds.

- b. Exterior Doors: Maximum [10] [8.5] pound.
 - c. Fire Rated Doors: As required for fire rating, maximum 15 pounds.
- H. Manual Bolts, Gaskets, Thresholds, and Trim: Furnish as indicated in Schedule, with accessories as required for complete operational door installations.
- 1. Manual Bolts: ANSI A156.16 Grade 1 top bolt.
 - 2. Kickplates: ANSI A156.6, metal; height indicated in Schedule by 2 inch less than door width; minimum 0.050 inch thick stainless steel.
 - 3. Weatherstripping: Furnish continuous weatherstripping at top and sides of exterior doors.
 - 4. Fire Rated Gaskets: Furnish continuous fire rated gaskets at top and sides of fire rated doors.
 - 5. Thresholds: Maximum 1/2 inch height.
 - 6. Wall Stops: ANSI A156.1, Grade 1, 3 inch wall stop; convex pad wall stop.
 - 7. Floor Stops: ANSI A156.1 Grade 1 dome type; furnish with accessories as required for applications indicated.

2.3 ACCESSORIES

- A. Lock Trim: Furnish levers with rose as indicated in Schedule.
- B. Through Bolts: Verify the use of through bolts and grommet nuts on door faces in occupied areas.
- C. Key Cabinet:
 - 1. Cabinet Construction: Sheet steel construction, piano hinged door with wafer cylinder type lock manufactured by American, series 7122D.
 - 2. Cabinet Size: Size for Project keys plus sufficient room to allow for 10 percent growth.
 - 3. Furnish complete system with labels and index for key hook labeling. Finish: Powder coat enamel.

2.4 FINISHING

- A. Finishes: ANSI A156.18; furnish following finishes except where otherwise indicated in Schedule at end of section.
 - 1. Hinges:
 - a. BHMA 630 and 652, satin finish.
 - 2. Typical Interior Door Hardware:
 - a. BHMA 652, satin chromium plated steel.
 - b. BHMA 626, satin chromium plated brass or bronze.
 - c. BHMA 630, satin finished stainless steel.
 - 3. Closers: Finish appearance to match door hardware on same face of door.
 - 4. Thresholds:
 - a. BHMA 628, satin aluminum, clear anodized.
 - 5. Other Items: Furnish manufacturer's standard finishes to match similar hardware types on same door, and maintain acceptable finish considering anticipated use and BHMA category of finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify doors and frames are ready to receive door hardware and dimensions are as indicated on shop drawings.
- C. Verify electric power is available to power operated devices and is of correct characteristics.

3.2 INSTALLATION

- A. Coordinate mounting heights with door and frame manufacturers. Use templates provided by hardware item manufacturer.
- B. Mounting Heights From Finished Floor to Center Line of Hardware Item: Comply with manufacturer recommendations and applicable codes where not otherwise indicated.

3.3 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Architectural Hardware Consultant shall inspect installation and certify hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.4 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust hardware for smooth operation.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Do not permit adjacent work to damage hardware or hardware finish.

3.6 SCHEDULES

- A. Hardware Set #1 – hinges, privacy lock
- B. Hardware Set #2 – cylinder lock only, remainder of hardware by ASF supplier
- C. Hardware Set #3 – hinges, storeroom lock
- D. Hardware Set #4 – hinges, closer, panic device

- E. Hardware Set #5 – hinges, cylindrical lock, closer
- F. Hardware Set #6 - hinges, cylindrical lock, closer
- G. Hardware Set #7 - hinges, cylindrical lock, closer
- H. Hardware Set #8 – hinges, push/pull, closer
- I. Hardware Set #9 - hinges, closer, panic device

END OF SECTION 08710

SECTION 08800
GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Glass and glazing for Sections referencing this Section for products and installation.

1.2 RELATED SECTIONS

- A. Section 06200 - Finish Carpentry.
- B. Section 07900 - Joint Sealers: Sealant and back-up material.
- C. Section 08410 - Metal Framed Storefront

1.3 REFERENCES

- A. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- B. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.
- C. ASTM C1036 - Flat Glass.
- D. ASTM C1048 - Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
- E. ASTM E546 - Test Method For Frost Point of Sealed Insulating Glass Units.
- F. ASTM E576 - Test Method For Dew/Frost Point of Sealed Insulating Glass Units in Vertical Position.
- G. ASTM E773 - Test Method for Seal Durability of Sealed Insulating Glass Units.
- H. ASTM E774 - Sealed Insulating Glass Units.
- I. FGMA - Glazing Manual.
- J. FGMA - Sealant Manual.
- K. FS TT-C-00598 - Caulking Compound, Oil and Resin Base Type.
- L. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type.
- M. FS TT-S-00227 - Sealing Compound, Rubber Base, Two Component.
- N. FS TT-S-00230 - Sealing Compounds, Synthetic-Rubber Base, Single Component, Chemically Curing.
- O. FS TT-S-01543 - Sealing Compound, Silicone Rubber Base.

- P. FS TT-G-410 - Glazing Compound, Sash (Metal) for Back Bedding and Face Glazing (Not for Channel or Stop Glazing).
- Q. Laminators Safety Glass Association - Standards Manual.
- R. SIGMA - Sealed Insulated Glass Manufacturers Association.

1.5 PERFORMANCE REQUIREMENTS

- A. Glass and glazing materials of this Section shall provide continuity of building enclosure vapor and air barrier:
 - 1. In conjunction with materials described in Section 07900 and Section 09260.
 - 2. To utilize the inner pane of multiple pane sealed units for the continuity of the air and vapor seal.
 - 3. Maintain continuous air and vapor barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.
- B. Size glass to withstand dead loads and positive and negative live loads acting normal to plane of glass calculated in accordance with Standard Building Code.
- C. Limit glass deflection to flexure limit of glass with full recovery of glazing materials, whichever is less.

1.6 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- D. Samples: Submit two samples, 12 x 12 inch in size, illustrating glass units, coloration and design.
- E. Samples: Submit 4 inch long bead of glazing sealant, color as selected.
- F. Manufacturer's Installation Instructions: Indicate special precautions required.
- G. Manufacturer's Certificate: Certify that sealed insulated glass, meet or exceed specified requirements.

1.8 QUALITY ASSURANCE

- A. Perform Work in accordance with FGMA Glazing Manual, FGMA Sealant Manual, SIGMA and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- B. Perform Work in accordance with State of South Carolina standards.
- C. Maintain one (1) copy of each document on site.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.10 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on Shop Drawings.

1.11 COORDINATION

- A. Coordinate Work under provisions of Section 01039.
- B. Coordinate the Work with glazing frames, wall openings, and perimeter air and vapor seal to adjacent Work.

1.12 WARRANTY

- A. Provide five year manufacturer's warranty under provisions of Section 01700.
- B. Warranty: Include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

PART 2 PRODUCTS

2.1 FLAT GLASS MATERIALS

- A. Safety Glass (Type FG-B): ASTM C1048, Kind FT fully tempered with horizontal tempering Condition A uncoated, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select; conforming to ANSI Z97.1; 3/8 inch thick minimum.
 - a. At lobby display cabinets: CR Laurence 180 degree offset pivot hinge FA044CH with corresponding center lock at bottom. Use three hinges vertically per panel.
 - b. At the AV counter within the auditorium: the upper part of the low wall.
- B. Insulated Glass Units (Type SG-A): ASTM E774 and E773; double pane with glass elastomer edge seal; outer pane of 1/8 inch glass inner pane of 1/8 inch glass, interpane space purged dry hermetic air; total unit thickness of 3/4 inch minimum. Low E glazing (solar ban 60), U Value of 0.57 or better, shading coefficient of 0.25 or better, shading coefficient of 0.39 or better on north facing walls (units as defined on elevations).

2.3 GLAZING COMPOUNDS

- A. Butyl Sealant (Type GC-B): FS TT-S-001657; Shore A hardness of 10-20 white color; non-skinning.
- B. Acrylic Sealant (Type GC-C): Single Component, solvent curing, cured Shore A hardness of 15-25; non-bleeding; color as selected.

2.4 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene 80 - 90 Shore A durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene 50 - 60 Shore A durometer hardness, minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 - 15 Shore A durometer hardness; coiled on release paper; black color.
- D. Glazing Splines: Resilient polyvinyl chloride extruded shape to suit glazing channel retaining slot; white color.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify prepared openings under provisions of Section 01039.
- B. Verify that openings for glazing are correctly sized and within tolerance.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.

3.3 EXTERIOR - WET/DRY METHOD (PERFORMED TAPE AND SEALANT)

- A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.
- B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- D. Rest glazing on setting blocks and push against tape and heel bead of sealant] with sufficient pressure to attain full contact at perimeter of pane or glass unit.
- E. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch. Place glazing tape on glazing pane or unit with tape flush with sight line.
- F. Fill gap between glazing and stop with 6C-A type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.

- G. Apply cap bead of GC-A type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.4 CLEANING

- A. Clean work under provisions of Section 01700.
- B. Remove glazing materials from finish surfaces.
- C. Remove labels after work is complete.
- D. Clean glass.

3.5 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01500.
- B. After installation, mark pane with an "X" by using removable plastic tape or paste.

3.6 SCHEDULE

- A. Type FG-B - at interior display cabinets at lobby, low wall at av counter
- B. Type SG-A - at all exterior metal framed storefront units and doors

END OF SECTION 08800

SECTION 08830
MIRROR GLASS

PART 1 GENERAL

1.1 SCOPE

- A. Perform all work required to complete the Mirror Glass indicated by the Contract Documents and furnish all supplementary items necessary for their proper installation.
- B. The requirements of Division 0 - "Bidding Requirements" and Division 1 "General Requirements" of this Project Manual shall apply to all Work required for this Section.

1.2 SUBMITTALS

- A. Shop Drawings:
 - 1. Submit manufacturer's literature and mark sufficiently to indicate compliance with these specifications. Show locations, methods of supporting, methods of anchoring and finishes.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with State of South Carolina standards.
- A. Maintain one (1) copy of each document on site.

1.4 WARRANTY

- A. Mirrors shall be warranted for a period of five (5) years against silver spoilage.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Mirror: Float glass, 1/4" thick, with silvering hermetically sealed by electrolytic copper plating, wiped (seamed) edges, without frames.
- B. Mounting Mastic: Palmer "Mirror Mastic", by Palmer Products Corporation, P.O. Box 7155, Louisville, Kentucky 40207.
Phone: (502) 893-3668.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install mirrors in locations indicated.
- B. Exercise extreme caution to avoid scratching silvering on mirror back during installation. Mirrors which are scratched, cracked, chipped or in any manner damaged shall be removed and shall be replaced with new, undamaged mirrors, at no cost to the Owner.

- C. Install mirrors with mastic in exact accordance with mastic manufacturer's recommendations.

3.2 CLEANING

- A. Remove all manufacturer's temporary labels or marks of identification. Clean and polish to remove all oil, grease and foreign material. Leave mirrors in a clean, neat, and orderly condition acceptable to the Architect.

3.3 SCHEDULE

- A. At all Bathrooms as indicated on plans.

END OF SECTION 08830

SECTION 09230

GYPSUM PLASTERING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes repairs to existing gypsum plaster at auditorium and other related areas.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C28/C28M - Standard Specification for Gypsum Plasters.
 - 2. ASTM C35 - Standard Specification for Inorganic Aggregates for Use in Gypsum Plaster.
 - 3. ASTM C37/C37M - Standard Specification for Gypsum Lath.
 - 4. ASTM C61/C61M - Standard Specification for Gypsum Keene's Cement.
 - 5. ASTM C206 - Standard Specification for Finishing Hydrated Lime.
 - 6. ASTM C631 - Standard Specification for Bonding Compounds for Interior Gypsum Plastering.
 - 7. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 8. ASTM C842 - Standard Specification for Application of Interior Gypsum Plaster.
 - 9. ASTM C847 - Standard Specification for Metal Lath.
 - 10. ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters.
 - 11. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - 12. ASTM C1002 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases.
 - 13. ASTM C1396/C1396M - Standard Specification for Gypsum Board.
 - 14. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 15. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- B. Gypsum Association:
 - 1. GA 216 - Application and Finishing of Gypsum Board.
 - 2. GA 600 - Fire Resistance Design Manual Sound Control.
- C. Underwriters Laboratories Inc.:
 - 1. UL - Fire Resistance Directory.
- D. Intertek Testing Services (Warnock Hersey Listed):
 - 1. WH - Certification Listings.

1.3 SUBMITTALS

- A. Section 01300 - Submittal Procedures: Submittal procedures.

- B. Product Data: Submit data on plaster materials, characteristics, and limitations of products specified.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C841, GA-216, GA-600.
- B. Perform Work in accordance with State of SC standard.
- C. Maintain one copy of each document on site.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years [documented] experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years [documented] experience.

1.6 MOCKUP

- A. Section 01400 - Quality Requirements: Requirements for mockup.
- B. Construct mock-up 4 feet by 4 feet, illustrating surface finish of interior wall.
- C. Locate where directed by Architect/Engineer.
- D. Incorporate accepted mockup as part of Work.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Preinstallation meetings.
- B. Convene minimum one week prior to commencing Work of this section.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Do not apply plaster when substrate or ambient air temperature is less than 50 degrees F .nor more than 80 degrees F.
- C. Maintain minimum ambient temperature of 50 degrees F during and after installation of plaster.

PART 2 PRODUCTS

2.1 GYPSUM PLASTER

- A. Manufacturers:
 - 1. National Gypsum Co
 - 2. Premix-Marbletie Manufacturing Co.

3. United States Gypsum Co.
4. Substitutions: Section 01600 - Product Requirements

B. Furnish materials in accordance with State of SC standards.

2.2 COMPONENTS

A. Plaster Base Materials:

1. Plaster: ASTM C28/C28M; gypsum neat hardwall type, fibrated
2. Bonding Agent: ASTM C631; type recommended for bonding plaster to concrete and concrete block surfaces;

B. Finishing Plaster:

1. Gypsum/Lime Putty Type: ASTM C28/C28M; mixture of gaging plaster and lime;
2. Sand Float Type: ASTM C28/C28M and ASTM C35 ASTM C897; prepared mixture of gypsum plaster and sand;
3. Sand Float Type: ASTM C61/C61M and ASTM C35 ASTM C897; prepared mixture of gypsum Keene's cement/lime putty and sand;
4. Water: Clean, fresh, potable and free of mineral and organic matter capable of affecting plaster.

C. Gypsum Lath:

1. Gypsum Lath: ASTM C37/C37M ASTM C1396/C1396M; thickness indicated;

2.3 ACCESSORIES

- A. Casing Bead: Formed PVC, depth governed by plaster thickness, maximum possible lengths, solid flanges, with square edges;
- B. Corner Bead: Formed PVC, depth governed by plaster thickness, maximum possible lengths, solid flanges, with square edges;
- C. Base Screed: Formed PVC, depth governed by plaster thickness, maximum possible lengths, solid flanges, with beveled edges;
- D. Anchorage: Nails, staples, or other approved metal supports, of type and size to suit application, to rigidly secure lath and associated metal accessories in place.
- E. Gypsum Base and Gypsum Lath Screws: ASTM C954 ASTM C1002; length to suit application.
1. Screws for Steel Framing: Type S.
 2. Screws for Wood Framing: Type W.

2.4 MIXES

A. Mix and proportion plaster in accordance with ASTM C842.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. **Verify existing conditions and sound the entire area for a loose areas and remove to provide a sound and solid base substrate. Apply total thickness to match existing conditions in a plumb and flat surface.**
- C. Masonry: Verify joints are cut flush and surface is ready to receive work of this section. Verify no bituminous or water repellent coatings exist on masonry surface.
- D. Concrete: Verify surfaces are flat, honeycomb is filled flush, and surface is ready to receive work of this section. Verify no bituminous, water repellent, or form release agents exist on concrete surface that are detrimental to plaster or plaster bond.
- E. Grounds and Blocking: Verify items within walls for other sections of work have been installed.
- F. Gypsum Lath and Accessories: Verify substrate is flat and surface is ready to receive work of this section. Verify joint and surface perimeter accessories are in place.

3.2 PREPARATION

- A. Dampen masonry surfaces to reduce excessive suction.
- B. Clean concrete surfaces of foreign matter. Thoroughly dampen surfaces before using acid solutions, solvent, or detergents to perform cleaning. Wash surface with clean water.
- C. Roughen smooth concrete surfaces [and smooth faced masonry].
- D. Apply bonding agent.

3.3 INSTALLATION

- A. Install gypsum lath in accordance with GA-216.
- B. Install gypsum lath perpendicular to framing members, with lath face exposed. Stagger end joint of alternate courses. Butt joints tight. Maximum gap allowed: 1/8 inch
- C. Place corner reinforcement diagonally over gypsum lath and across corner immediately above and below openings. Secure to gypsum lath only.
- D. Apply metal lath taut, with long dimension perpendicular to supports.
- E. Lap ends minimum 1 inch. Secure end laps with tie wire where they occur between supports.
- F. Attach metal lath to concrete, concrete masonry using wire hair pins, hooks or loops. Ensure anchors are securely attached to concrete and spaced at maximum 24 inches on center.

- G. Installation of Accessories:
1. Continuously reinforce internal angles with corner mesh, return metal lath 3 inches from corner to form angle reinforcement; fasten at perimeter edges only.
 2. Place corner bead at external wall corners; fasten at outer edges of lath only.
 3. Place strip mesh diagonally at corners of lathed openings. Secure rigidly in place.
 4. Place 4 inch wide strips of metal lath centered over junctions of dissimilar backing materials. Secure rigidly in place.
 5. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.
 6. Install door [and glazed] frames plumb and level in opening. Secure rigidly in place.
 7. Coordinate work with installation of metal access panels. Refer to Section 08310.
- H. Plastering:
1. Apply gypsum plaster in accordance with ASTM C842.
 2. Apply brown and finish coats over masonry concrete surfaces. Apply brown coat to nominal thickness of 3/8 inch (9 mm).
 3. Apply finish coat to minimum 1/8 inch thickness.
 4. Work finish coat flat and smooth, with steel trowel.
 5. Perform work in panels to nearest natural break or between accessories.
- I. Install Work in accordance with State of SC standards.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements {01400 - Quality Requirements}: Tolerances.
- B. Maximum Variation from Flat Surface: 1/8 inch.

3.5 SCHEDULES

- A. Repair at auditorium as defined on drawing.
- B. At all existing window replacements, Alternate #1.

END OF SECTION

SECTION 09260
GYPSUM BOARD SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wood stud wall framing
- B. Acoustical insulation
- C. Gypsum board: Level 5 finish
- D. Taped and sanded joint treatment
- E. Reglets

1.2 RELATED SECTIONS

- A. Section 06100 – Rough Carpentry.
- B. Section 07213 - Batt Insulation: Thermal Insulation.
- C. Section 08112 - Standard Steel Frames.
- D. Section 09900 - Painting: Surface finish.

1.3 REFERENCES

- A. ASTM C36 - Gypsum Wallboard.
- B. ASTM C475 - Joint Treatment Materials for Gypsum Wallboard Construction.
- C. ASTM C514 - Nails for the Application of Gypsum Wallboard.
- D. ASTM C630 - Water Resistant Gypsum Backing Board.
- E. ASTM C645 - Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
- F. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- G. ASTM C754 - Installation of Framing Members to Receive Screw Attached Gypsum Wallboard, Backing Board, or Water Resistant Backing Board.
- H. ASTM C840 - Application and Finishing of Gypsum Board.
- I. ASTM C1002 - Steel Drill Screws for the Application of Gypsum Board.
- J. ASTM E90 - Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
- K. ASTM E119 - Fire Tests of Building Construction and Materials.

- L. GA-201 - Gypsum Board for Walls and Ceilings.
- M. GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.
- N. GA-600 - Fire Resistance Design Manual.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Product Data: Provide data on metal framing, gypsum board, joint tape.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C840, GA-201, GA-216 and GA-600.
- A. Perform Work in accordance with State of South Carolina standards.
- B. Maintain one (1) copy of each document on site.
- C. **Single Source Responsibility for the Gypsum Board installation Section 09260 and Acoustical Ceiling Tile Section 09510**

1.6 QUALIFICATIONS

- A. Applicator: Company specializing in performing the work of this section with minimum ten (10) years experience. The specialized company cannot be the General Contractor without receiving prior approval from the Architect. Approval will require documented information of previous installations and previous purchasing of materials on a consistent basis for the duration required.

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire rated assemblies as follows:
 - 1. Fire Rated Partitions: Listed assembly by UL No. 306, one hour fire rated partition.

1.8 SINGLE SOURCE CONTRACTOR

- A. **For Sections 09260 and 09510, the project will require a single source contractor. The single source contractor shall be responsible for all products and services and may use various suppliers and subcontractors for this work under their supervision**

PART 2 PRODUCTS

2.1 MANUFACTURERS - GYPSUM BOARD SYSTEM

- A. U.S. Gypsum.
- B. Gold Bond. Building Products Division National Gypsum Co.
- C. Georgia - Pacific Corporation.

2.02 FRAMING MATERIALS

- A. Studs: Wood Framing in accordance with Section 06100
- B. Furring and Bracing Members: Of same material as studs; thickness to suit purpose.
- C. Fasteners: Self drilling, self tapping screws.
- D. Anchorage Devices: Power actuated, drilled expansion bolts.
- E. Acoustic Sealant: As specified in Section 09260.

2.3 GYPSUM BOARD MATERIALS

- A. Standard Gypsum Board: ASTM C36; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges.
- B. Fire Rated Gypsum Board: ASTM C36; fire resistive type, UL rated; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges.
- C. Moisture Resistant Gypsum Board: ASTM C630; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges.
- D. Exterior Gypsum Board.

2.4 ACCESSORIES

- A. Acoustical Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced as indicated on drawings. Owens Corning, sound attention batt fiberglass 3-1/2" thickness, or to accommodate associated wall thickness.
- B. Acoustical Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
- C. Corner Beads: Metal.
- D. Edge Trim: GA 201 and GA 216;
- E. Joint Materials: ASTM C475; GA 201 and GA 216; reinforcing tape, joint compound, adhesive, and water.
- F. Fasteners: ASTM C1002, Type GA-216.
- G. Reglets: Fry Reglet; as indicated on drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01039.
- B. Verify that site conditions are ready to receive work.
- C. The existing wallpaper shall be removed and the existing Gypsum Board shall be prepared to receive a Level 5 finish as defined below.

3.2 WOOD STUD FRAMING INSTALLATION

- A. Align and secure top and bottom plates at 16 inches o.c..
- B. Place two beads of acoustic sealant between runners and substrate.
- C. Install studs vertically at 16 inches o.c. unless otherwise noted.
- D. Align stud web openings horizontally.
- E. Secure studs to tracks on all services
- F. Stud splicing not permissible.
- G. Fabricate corners using a minimum of three studs.
- H. Double stud at wall openings, door and window jambs, not more than 2 inches (50 mm) from each side of openings.
- I. Brace stud framing system rigid.
- J. Coordinate erection of studs with requirements of door frames, window frames, and install supports and attachments.
- K. Coordinate installation of wood bucks, anchors, and wood blocking with electrical, mechanical work and fire extinguishers to be placed within or behind stud framing.
- L. Blocking: Secure wood blocking to studs. Secure steel channels to studs. Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware to meet ADA, ANSI 1117.1 (86) requirements for supportive devices and height for handicapped.
- M. Refer to drawings for indication of partitions extending to finished ceiling only and for partitions extending through the ceiling to the structure above. Maintain clearance under structural building members to avoid deflection transfer to studs.
Provide extended leg ceiling runners.
- N. Coordinate placement of insulation in stud spaces made inaccessible after stud framing erection.

3.3 INSTALLATION TOLERANCES

- A. Maximum Variation From True Position: 1/8 inch.
- B. Maximum Variation of any Member from Plane: 1/8 inch.
- C. Maximum Variation From Plumb: 1/8 inch.

3.4 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with GA-201, GA-216, GA-214 and GA-600 and manufacturer's instructions. All new and existing walls shall be prepared to receive a **Level 5** finish. No marks or ridges. Entire surface covered with skim coat of compound which shall completely cover the paper and ready to for drywall primer before applying finish painting.
 - 1. **Level 5** – All appropriately prepared gypsum board surfaces shall have one coat of drywall primer applied to yield a properly painted surface. Two separate coats of topcoat material shall be applied over the drywall primer to yield a properly painted surface. Paint shall be applied to the mil film thickness and application conditions specified by the paint manufacturer. Note that this level is recommended where the best paint finish is required, such as under critical lighting conditions or when paints that have a glossy surface are used.
- B. Erect single layer standard gypsum board in most economical direction, with ends and edges occurring over firm bearing unless conflicting with UL assembly requirements.
- C. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.
- D. Use screws when fastening gypsum board to metal furring or framing.
- E. Treat cut edges and holes in moisture resistant gypsum board with sealant.
- F. Place corner beads at external corners as indicated. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.
- G. Install sound insulation where indicated, prior to gypsum board.
- H. Where sound insulation is installed in partitions. Seal construction at perimeters, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions.

3.05 JOINT TREATMENT

- A. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
- B. Feather coats onto adjoining surfaces so that camber is maximum 1/32.
- C. Erect in accordance with manufacturer's instructions.

3.06 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION 09260

SECTION 09510
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes suspended metal grid ceiling system and perimeter trim; acoustic tile.
- B. Related Sections:
 - 1. Section 01700 - Execution Requirements: Execution requirements for placement of special anchors or inserts for suspension system specified by this section.
 - 2. Section 07213 - Batt Insulation.
 - 3. Section 07900 - Joint Sealers.
 - 4. Section 15850 - Air Outlets and Inlets: Air diffusion devices in ceiling system.
 - 5. Section 16500 - Light Fixtures and Accessories: Light fixtures in ceiling system.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - 2. ASTM C636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
 - 3. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 4. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 5. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 6. ASTM E580 - Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint – latest edition
 - 7. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.
- B. Ceilings and Interior Systems Construction Association:
 - 1. CISCA - Acoustical Ceilings: Use and Practice.
- C. Intertek Testing Services (Warnock Hersey Listed):
 - 1. WH - Certification Listings.
- D. National Fire Protection Association:
 - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
 - 2. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.
- E. Underwriters Laboratories Inc.:
 - 1. UL - Fire Resistance Directory.
 - 2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 PERFORMANCE REQUIREMENTS

- A. Suspension System: Rigidly secure acoustic ceiling system according to Seismic Design Category D.
- B. The ceilings shall be installed according to Seismic Design Category D.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system and indicate seismic conditions. Indicate method of suspension where interference exists.
- C. Coordination Drawings: Reflected ceiling plans, drawing to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - 1. Ceiling suspension system members.
 - 2. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 - 3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - 4. Minimum Drawing Scale: 1/8 inch = 1 foot.
- D. Product Data: Submit data on metal grid system components and acoustic units.
- E. Samples: Submit two full size samples illustrating material and finish of acoustic units and parabolic louver.
- F. Samples: Submit two samples each, 6 inches long, of suspension system main runner, cross runner, and perimeter molding.
- G. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.5 QUALITY ASSURANCE

- A. Conform to CISCA requirements. Comply with Guidelines for Seismic Restraints of Direct Hung Suspended Ceiling Assemblies Seismic Zone 3 and Zone 4 and Seismic Design Category D or E. Provide all perimeter tees with hanger wires attached in accordance with guidelines.
- B. Source Limitations:
 - 1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
 - 2. Suspension System: Obtain each type through one source from the same manufacturer.
 - a. Panels, grid and wall moldings to be supplied by same manufacturer to maximize warranty.
- C. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

- D. Perform Work in accordance with State of South Carolina standards.
- E. Maintain one copy of each document on site.
- F. **Single Source Responsibility for the Gypsum Board installation and finishing Section 09260 and Acoustical Ceiling Tile Section 09510.**

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum 5 years documented experience approved by manufacturer.
- C. Provide seismic design of suspended ceiling under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of South Carolina.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustic unit installation.

1.9 SEQUENCING

- A. Section 01100 - Summary: Requirements for sequencing.
- B. Sequence Work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- C. Install acoustic units after interior wet work is dry and panels have reached room temperature and a stabilized moisture content.

1.10 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.11 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Furnish 225 sq. ft. of attic stock tile to Owner.

1.12 SINGLE SOURCE CONTRACTOR

- A. For Sections 09260 and 09510, the project will require a single source contractor. The single source contractor shall be responsible for all products and services and may use various suppliers and subcontractors for this work under their supervision

PART 2 PRODUCTS

2.1 SUSPENDED ACOUSTICAL CEILINGS

- A. Manufacturers:
1. USG Interiors.
 2. Substitutions: Section 01600 - Product Requirements: Requests must include certification that products are classified as formaldehyde free or low formaldehyde according to standards set by ASHRAE, ANSI and CHPS .

2.2 COMPONENTS

- A. All grid to be installed in accordance with seismic guidelines category 'd'. All acoustic tile panels to conform with ASTM E1264, conforming to the following:
1. ACT 1 - Astro ClimaPlus #8223
 - a. Size: 24 in. x 24 in.
 - b. Thickness: 5/8 inch
 - c. Composition: Mineral, Class A
 - d. Light Reflectance (LR): Not less than .86
 - e. Noise Reduction Coefficient (NRC) Range: Not less than .55
 - f. CAC Minimum: 35
 - g. EDGE: SLT, Shadowline Tapered
 - h. Surface Color: White
 - i. Surface Finish: Fine Texture - Non-Perforated
 - j. Recycle Content: Minimum 62%
 - k. Grid: USG Donn DX 26 HD Grid - 15/16 inch with MS 274 2" Shadow moulding
- B. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273 and evaluated according to ASTM D3274. Provide 30-year written warranty against growth of mold and mildew.
- C. Grid
1. Non-Fire Rated Grid: ASTM C635, heavy duty, exposed T/one direction; components die cut and interlocking.
 2. Grid Materials: Commercial quality cold rolled steel with galvanized coating.
 3. Exposed Grid Surface Width: 15/16 inch.
 4. Grid Finish: White
 5. Accessories: Stabilizers bars, clips, splices, perimeter moldings, and hold down clips required for suspended grid system.

6. Support Channels and Hangers: Galvanized steel; size and type to suite application, seismic requirements, and ceiling system flatness requirement specified.

2.3 ACCESSORIES

- A. Acoustic Batt Insulation: Specified in Section 07213.
- B. Acoustic Sealant For Perimeter Moldings: Specified in Section 07900.
- C. Touch-up Paint: Type and color to match acoustic and grid units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify layout of hangers will not interfere with other work.

3.2 INSTALLATION

- A. Lay-In Grid Suspension System:
 1. Install suspension system in accordance with ASTM C635, ASTM C636 and as supplemented in this section.
 2. Install system in accordance with Seismic Design Category D.
 3. Install system capable of supporting imposed loads to deflection of 1/360 maximum.
 4. Locate system on room axis according to reflected plan.
 5. Install after major above ceiling work is complete. Coordinate location of hangers with other work.
 6. Install hanger clips during steel deck erection. Install additional hangers and inserts as required.
 7. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
 8. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest affected hangers and related carrying channels to span extra distance.
 9. Do not support components on main runners or cross runners when weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.
 10. Do not eccentrically load system, or produce rotation of runners.
 11. Perimeter Molding: Donn MS 274 Shadow Molding.
 - a. Install edge molding at intersection of ceiling and vertical surfaces into bed of acoustic sealant.
 - b. Use longest practical lengths.
 - c. Miter and rivet corners.
 - d. Install at junctions with other interruptions.
 12. Form expansion joints to accommodate plus or minus 1 inch movement. Maintain visual closure.
- B. Suspend ceiling hangers from building's structural members and as follows:

1. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 2. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 3. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hangers inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 4. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 5. Do not attach hangers to steel deck tabs.
 6. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 7. Space hangers not more than 48 inches oc along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 8. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Where area of ceiling exceeds 2500 square feet provide seismic separation joints as indicated, or if not indicated, as directed by Architect.
- E. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Install USG Shadow Molding in accordance with manufacturer's written recommendations with all accessories necessary to comply with ICC Report ESR-1308.
 2. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 3. Screw attach moldings to substrate at intervals not more than 16 inches oc and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 4. Do not use exposed fasteners, including pop rivets, on moldings and trim
- F. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- G. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

- H. Acoustic Units:
 - 1. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
 - 2. Lay directional patterned units one way with pattern parallel to longest room axis. Fit border trim neatly against abutting surfaces.
 - 3. Install units after above ceiling work is complete.
 - 4. Install acoustic units level, in uniform plane, and free from twist, warp, and dents.
 - 5. Cutting Acoustic Units:
 - a. Cut to fit irregular grid and perimeter edge trim.
 - b. Cut bevel edges to field cut units.
 - c. Double cut and field paint exposed edges of tegular units.
 - 6. Where bullnose concrete block corners or round obstructions occur, install preformed closures to match perimeter molding.
 - 7. Lay acoustic insulation for distance of 48 inches on both sides of acoustic partitions as indicated on Drawings.

3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- C. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.4 SCHEDULES

- A. See Room Finish Schedule.

END OF SECTION 09510

SECTION 09641

WOOD FLOORING NAILED

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes site finish for existing hardwood floors.

1.2 REFERENCES

- A. APA-The Engineered Wood Association:
 - 1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.
- B. ASTM International:
 - 1. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- C. Maple Flooring Manufacturers Association:
 - 1. MFMA - MFMA Guide Specifications.
- D. National Fire Protection Association:
 - 1. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
- E. National Oak Flooring Manufacturers Association:
 - 1. NOFMA 24 - Installing Hardwood Flooring - Strip, Plank & Parquet.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution and Closeout Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, suggested schedule for cleaning, [stripping, and re-finishing,] stain removal methods, and polishes and waxes.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with MFMA - Maple Flooring Manufacturers Association and NOFMA 24 - National Oak Flooring Manufacturers Association.
- B. Perform Work in accordance with State of SC standard.
- C. Maintain one copy of each document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five (5) years documented experience.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one (1) week prior to commencing work of this section.
- C. Review installation procedures including procedures for acclimation of flooring materials.
- D. Requirements: Spare parts and maintenance products.

PART 2 PRODUCTS

2.1 ACCESSORIES

- A. Floor Finish: Polyurethane, to achieve satin sheen surface; type recommended by flooring manufacturer, Rose Talbert. #1943 polyurethane satin
- B. Flooring material is to match existing size and species.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Install Work in accordance with State of SC standard.

3.2 CLEANING

- A. Section 01700 - Execution and Closeout Requirements: Final cleaning.
- B. Clean and polish floor surfaces in accordance with manufacturer's, MFMA, NOFMA 24 instructions.

3.3 INSTALLATION

- A. Machine sand installed unfinished flooring to remove offsets and non level conditions, ridges, cups and sanding machine marks which would be visually noticeable after finishing. Do not permit traffic on floor after sanding, and until finish is completed. Cover sanded flooring with building paper to provide access for application of first finish coats.

- B. Apply polyurethane finish in accordance with manufacturer's instructions and recommendations. Apply three coats of finish minimum over one coat of stain.
- C. Protect completed wood flooring during remainder of construction with heavy Kraft paper or with other suitable covering, so that flooring and finish will be without damage or deterioration at time of acceptance.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution and Closeout Requirements: Protecting installed construction.
- B. Prohibit traffic on floor finish for 48 hours after installation.
- C. Protect installed flooring with sheets of hardboard on kraft paper.

3.5 SCHEDULES

- A. Rooms 101, 116, 119, 125, 126: Sand existing floors to bare wood and apply three coats of finish. Patch areas with new wood as indicated.

END OF SECTION

SECTION 09650
RESILIENT FLOORING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes; resilient tile flooring; resilient base.
- B. Related Sections:
 - 1. Section 03300 – Cast In Place Concrete.
 - 2. Section 09651 – Resilient Tile Flooring
 - 3. Section 09686 – Sheet Carpet

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 - 2. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.
 - 3. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing.
 - 4. ASTM F1344 - Standard Specification for Rubber Floor Tile.
 - 5. ASTM F1861 - Standard Specification for Resilient Wall Base.
- B. Federal Specification Unit:
 - 1. FS L-F-475 - Floor Covering Vinyl, Surface (Tile and Roll), with Backing.
 - 2. FS RR-T-650 - Treads, Metallic and Nonmetallic, Skid Resistant.
- C. National Fire Protection Association:
 - 1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate seaming plan, custom patterns and inlay designs.
- C. Product Data: Submit data describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- D. Samples:
 - 1. Submit manufacturer's complete set of color samples for initial selection.
 - 2. Submit two samples, 12 x 12 inch in size illustrating color and pattern for each resilient flooring product specified.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.

- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.5 QUALITY ASSURANCE

- A. Surface Burning Characteristics:
 - 1. Floor Finishes: Class I, minimum 0.45 watts/sq cm when tested in accordance with NFPA 253.
 - 2. Base Material: Class I, minimum 0.45 watts/sq cm when tested in accordance with NFPA 253.
- B. Perform Work in accordance with State of South Carolina standards.
- C. Maintain one copy of each document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Protect roll materials from damage by storing as per manufacturers recommendation.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- C. Store materials for not less than 48 hours prior to installation in area of installation at temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.9 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Furnish 100 sq ft of flooring, 100 lineal feet of base, of each type and color specified.

PART 2 PRODUCTS

2.1 TILE FLOORING (VCT)

- A. Manufacturers:

1. Armstrong World Industries, Inc. (basis of design)
Model: Stonex Excelon
2. Azrock Commercial Flooring
3. Congoleum Corp.
4. Marley Floors-Flexco
5. Johnsonite, Div. of Duramax, Inc.
6. Mannington Commercial
7. Roppe Corp.
8. Substitutions: Section 01600 - Product Requirements.

- B. Vinyl Composition Tile: ASTM F1066:
1. Size: 12 x 12 inch.
 2. Thickness: 0.125 inch.
 3. Pattern: Marbleized
 4. Color: to be selected by architect. Provide a field color for each room with a contrasting color of one full tile as a border for each room.

2.2 RESILIENT BASE (RWB)

- A. Manufacturers:
1. Armstrong World Industries, Inc.
 2. Azrock Commercial Flooring
 3. Johnsonite, Div. of Duramax, Inc..
 4. Marley Floors-Flexco
 5. Roppe Corp.
 6. Substitutions: Section 01600 - Product Requirements
- B. Base: ASTM F1861Rubber; top set coved:
1. Height: 4 inch.
 2. Thickness: 0.125 inch thick.
 3. Finish: Matte
 4. Length: Roll.
 5. Color: to be selected by architect
- C. Subfloor Filler: Cementitious or Premix latex; type recommended by adhesive material manufacturer.
- D. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- E. Moldings and Edge Strips: Same material as flooring
- F. Filler for Coved Base: Plastic
- G. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify concrete floors are dry to maximum moisture content as recommended by manufacturer, and exhibit negative alkalinity, carbonization, and dusting.

- C. Verify floor and lower wall surfaces are free of substances capable of impairing adhesion of new adhesive and finish materials.

3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- B. Prohibit traffic until filler is cured.
- C. Clean substrate.
- D. Apply primer as required to prevent "bleed-thru" or interference with adhesion by substances cannot be removed.

3.3 INSTALLATION - TILE FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed.
- B. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.
- C. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- D. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
- E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated. Secure metal strips before installation of flooring with stainless steel screws.
- F. Install flooring in recessed floor access covers. Maintain floor pattern.
- G. At movable partitions, install flooring under partitions without interrupting floor pattern.
- H. Install feature strips and floor marking where indicated. Fit joints tightly.

3.4 INSTALLATION - BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.5 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.

- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean, seal, and maintain resilient flooring products.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Prohibit traffic on resilient flooring for 48 hours after installation.

3.7 SCHEDULES

- A. Refer to the Room Finish Schedule on architectural drawings for VCT1 and RWB.

END OF SECTION 09650

SECTION 09651

RESILIENT TILE FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient tile flooring and accessories.

1.1 RELATED SECTIONS

- A. Section 03300 - Cast in Place Concrete: Concrete substrate.
- B. Section 06100 - Rough Carpentry: Plywood subflooring and underlayment.
- C. Section 09650 – Resilient Flooring
- D. Section 09686 – Sheet Carpet

1.2 REFERENCES

- A. American Association of Textile Chemists and Colorists, AATCC 134 - Electrostatic Propensity of Carpets.
- B. ASTM International (ASTM):
 1. ASTM C 1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
 2. ASTM D 2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials.
 3. ASTM D 3884 - Standard Guide for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method), Abrasion Wheels- H18 with 1000grams load.
 4. ASTM E 492 - Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine.
 5. ASTM E 662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 6. ASTM E 648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 7. ASTM E 989 - Standard Classification for Determination of Impact Insulation Class (IIC).
 8. ASTM F 137 - Standard Test Method for Flexibility of Resilient Flooring Materials with Cylindrical Mandrel Apparatus.
 9. ASTM F 386 - Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces.
 10. ASTM F 925 - Standard Test Method for Resistance to Chemicals of Resilient Flooring.
 11. ASTM F 970 - Standard Test Method for Static Load Limit.
 12. ASTM F 1514 - Standard Test Method for Measuring Heat Stability of Resilient Flooring by Color Change.
 13. ASTM F 1515 - Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Change.
 14. ASTM F 1700 - Standard Specification for Solid Vinyl Floor Tile.
 15. ASTM F 1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

16. ASTM F 1914 - Standard Test Methods for Short-Term Indentation and Residual Indentation of Resilient Floor Covering.
17. ASTM F 2055 - Standard Test Method for Size and Squareness of Resilient Floor Tile by Dial Gage Method.
18. ASTM F 2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
19. ASTM F 2199 - Standard Test Method for Determining Dimensional Stability of Resilient Floor Tile after Exposure to Heat.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide detailed data on each product to be used including but not limited to the following information as applicable:
 1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation methods.
 4. Maintenance recommendations.
- C. Selection Samples: For each finish product specified, two sets of each type, colors and finish of resilient flooring and accessory required, indicating full range of color and pattern variation.
- D. Verification Samples: For each finish product specified, two sets of each type, colors and finish of resilient flooring and accessory required, indicating color and pattern of actual product, including variations, as proof of application compliance.
- E. Closeout Submittals: Submit three copies of the following:
 1. Maintenance and operation data includes - methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
 2. Documentation of warranty specified herein.
- F. Flame Spread Certification: Submit manufacturer's certification that resilient flooring furnished for areas indicated to comply with required flame spread rating has been tested and meets or exceeds indicated or required standard.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum two years experience and completed at least three projects of similar magnitude, material and complexity. Upon request, provide project references including contact names and telephone numbers for three projects.
- B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 1. Finish areas designated by Architect.
 2. Do not proceed with remaining work until workmanship, color, sheen and finished appearance are approved by Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Flooring material and adhesive shall be acclimated to the installation area for a minimum of 48 hours prior to installation.

- C. Store cartons of tile products flat and squarely on top of one another, not on edge.
- D. Store tubes of feature strips and borders in a horizontal position. Storage in a vertical or inclined position causes uneven weight distribution, which will spaghetti the ends of the feature strips. Store all tubes laying flat.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements/Conditions: In accordance with manufacturer's recommendations. Areas to receive flooring shall be clean, fully enclosed, weather tight with the permanent HVAC set at a uniform temperature of at least 65 degrees F (18 degrees C) and less than 85 degrees (30 degrees C) 48 hours prior to and during and for not less than 48 hours after installation. The flooring material shall be conditioned in the same manner prior to installation.
- B. Close spaces to traffic during resilient flooring installation and for a period of time after installation as recommended in writing by the manufacturer.
- C. Install resilient flooring materials and accessories after other finishing operations, including painting, have been completed.
- D. Where demountable partitions and other items are indicated for installation on top of sheet resilient flooring material, install flooring material before these items are to be installed.
- E. Concrete substrates should not exceed 82 percent RH and/or 6 lbs. X 24 hrs. X 1000 sf. moisture vapor emissions rate tested in accordance to ASTM F 2170 and ASTM F 1869.
- F. Store tubes of feature strips and borders in a horizontal position. Storage in a vertical or inclined position causes uneven weight distributions, which will spaghetti the ends of the feature strips. Store all tubes laying flat.

1.7 WARRANTY

- A. Warranty Period: Manufacturer's standard warranty against manufacturing defects and wearing for flooring and as follows:
 - 1. 10 year commercial warranty.

1.8 EXTRA MATERIALS

- A. Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 closeout submittals requirements.
 - 1. Quantity: Furnish quantity of flooring units equal to 2 percent of amount installed. Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Mohawk Select Step Luxury Vinyl Tile, which is located at: 160 S. Industrial Blvd, Calhoun, GA 30701; Toll Free Tel: 888-740-6936; Web: www.mohawkgroup.com
- B. Substitutions: Not permitted.

- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 RESILIENT TILE FLOORING (LVT)

Resilient Tile Flooring: Mohawk Select Step Luxury Vinyl Tile (Basis of Design)

1. Dimensions: 48 inches by 6 inches
2. Material Compliance: ASTM F 1700, BS EN 649, BSEN 654.
 - a. Reaction to Fire: ASTM E 662, ASTM E 648.
 - b. Slip Resistance: ASTM C 1028, R9 classification.
3. Antimicrobial Properties: AATCC Method 174, Part 174.
4. Wear Layer Thickness: 20 mil (0.5 mm).
5. Tile Thickness: 3 mm.
6. Edge: Non-beveled edge.
7. Item Number and Name:
 - a. TBD from standard colors

2.3 ACCESSORIES

- A. Manufacturer's Floor Care Kit with cleaning and maintenance products in quantities appropriate to size and scope of resilient flooring application are available but not required.
- B. Adhesive: Manufacturer's recommended adhesive as follows.
 1. Manufacturer's Epoxy adhesive.
 - a. Provide manufacturer's recommended concrete floor sealer for high moisture applications.
 2. Manufacturer's 332 acrylic "wet set" adhesive.
 - a. Provide manufacturer's recommended concrete floor sealer for high moisture applications.
 3. Manufacturer's pressure sensitive adhesive.
 - a. Provide manufacturer's recommended concrete floor sealer for high moisture applications.
- C. Portland based cementitious base leveler. Gypsum based not acceptable.
- D. Manufacturer approved substrate board

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect floor to be installed immediately upon arriving at job site; perform a moisture test.
- B. Do not begin installation until substrates have been properly prepared.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. The installation of the resilient flooring shall not begin until the work of all other trades has been completed, particularly wet and overhead trades.
- E. Areas to receive flooring shall be adequately lighted during all phases of the installation process.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Using Portland based cementitious base leveler fill and cover all seams, nail heads, voids, cracks, and expansion joints. Achieve smooth, even, firmly attached substrate for best finish results. Gypsum based underlayment not acceptable with Vinyl Flooring unless it is first properly prepared.
 - 1. Encapsulate the gypsum with a premium latex primer/sealer.
 - 2. Float with a Portland cement compound using a latex additive (as recommended by the manufacturer) instead of water.
 - 3. Once substrate levelness is achieved continue with the next step.
- C. Apply concrete floor sealer to substrate in accordance with manufacturer's recommendations.
- D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- E. Concrete Substrates: The Contractor shall verify to the Owner and installer a minimum of 30 days prior to the scheduled resilient flooring installation the following substrate conditions. All substrate testing shall be documented and submitted to the Architect and Owner before commencement of the flooring installation.
 - 1. Verify that substrates are dry, free of debris, and that all curing compounds, sealers, and hardeners have properly cured.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.

3.3 INSTALLING RESILIENT TILES AND PLANKS

- A. General:
 - 1. Permanent HVAC system shall be turned on and set to a minimum of 65 degrees F (20 degrees C) for a minimum of 48 hours prior to, during and 48 hours after installation. After the installations, the maximum temperature should not exceed 125 degrees F (37 degrees C).
 - 2. All products must be allowed to acclimate at least 24 to 48 hours before installation. This means product must be placed in the same room as the install that is taking place and removed from its factory packaging.
 - 3. Material shall be visually inspected prior to installation.
 - 4. Ensure that all recommendations for sub-floor and jobsite conditions are met prior to beginning the installation. Once the installation is started, Contractor and installer have accepted those conditions.
 - 5. Install in accordance with manufacturer's installation instructions for each product type and application specified.
- B. Layout and Installation:
 - 1. In order to achieve a random natural wood look, take planks and cut nominal lengths to be used on the first course; example: 10 inches, 40 inches, 15 inches, 25 inches, 8 inches. At the end of the first course, all cut planks remaining should be used on the next course. Position planks so the end seams are no closer than the width of the plank being installed. Maintain this approach to staggering the planks throughout the entire installation.
 - 2. Center tiles or planks in rooms and hallways so borders are not less than half

- a tile or plank when possible.
3. Cut edges shall always be installed against a wall.
4. Install using tile and plank installation techniques recommended by manufacturer.
5. Install tiles, planks, borders and feature strips in locations and configurations indicated on the Drawings.

C. Adhesive Application:

1. Any spread glue has to be covered with material and rolled within the recommended time frame described on the adhesive container.
2. If troweled adhesive skims over, scrape up and reapply.
3. Install in accordance with adhesive manufacturer's recommendations.
4. Refer to manufacturer's literature for selection criteria for trowel size, type.
5. Using proper trowel size, apply adhesive in accordance with label on adhesive.
6. Spread a 4 inch wide band of adhesive around the perimeter of the area designated as an extreme condition area.
7. An additional 4 inch band should be spread at approximately 10 foot (3 m) intervals.
8. For transitional areas, from loose lay to another floor covering of a different height, a 4 inch band of adhesive should be spread across the length of the transition.

3.4 CLEANING

- A. Wipe off any adhesive on floor as installation proceeds. Wait 48 hours before applying the cleaning and maintenance products.
- B. Prior to installation of permanent fixtures or furniture, remove all dirt, debris, or residual adhesive and clean the floor. If desired, a protective coating may be applied at this time. Specific products and instructions are available from the manufacturer.

3.5 PROTECTION

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

3.6 MAINTENANCE

- A. Comply with manufacturers instructions for proper cleaning and maintenance of the products.

3.7 SCHEDULE

- A. Refer to the Room Finish Schedule on the architectural drawings for VCT2.

END OF SECTION

SECTION 09686
SHEET CARPET
ALLOWANCE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes carpet direct-glued to substrate; carpet, stretched-in with cushion underlay; and accessories.
- B. Related Sections:
1. Section 03300 - Cast-In-Place Concrete.
 2. Section 09650-Resilient Flooring: Base finish.
 3. Division 15: Plumbing: Plumbing floor cover plate with recess for carpet.
 4. Division 16: Electrical: Electrical and telephone floor cover plate with recess for carpet.
- C. The sequence of work will be performed in several phases. Reference General Contractor for further description.
- D. **Allowances: Include under provisions of Section 01200 - Price and Payment Procedures.**
The General Contractor shall allow the sum of as indicated in Section 01200 for the furnishing and installation of sheet carpet. This sum does not include the overhead and profit of the General Contractor. The Architect reserves the right to assign a contract, or purchase order, to the General Contractor. The General Contractor **shall not issue a contract** on the allowance without the prior approval of the Architect.

Note: The General Contractor is responsible for all floor covering and prep for approval by flooring installer prior to starting installation.

1.2 REFERENCES

- A. Carpet and Rug Institute:
1. CRI 104 - Standard for Installation of Commercial Carpet.
- B. Consumer Products Safety Commission:
1. CPSC 16 CFR 1630 - Standard for the Surface Flammability of Carpets and Rugs.
- C. National Fire Protection Association:
1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source.
- D. ANSI 1117.1 and ADA A6.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.

- B. Shop Drawings: Indicate seaming plan, method of joining seams, direction of carpet pile and pattern, location of edge moldings and edge bindings.
- C. Product Data: Submit data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- D. Samples:
 - 1. Submit two samples 12 x 12 inches in size illustrating color and pattern for each carpet material specified.
 - 2. Submit two 6 inch long samples of edge strip, base cap, material for each color specified.
- E. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention, and cleaning maintenance manuals.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.5 QUALITY ASSURANCE

- A. Surface Burning Characteristics:
 - 1. Floor Finishes: Comply with one of the following:
 - a. Class I, minimum 0.45 watts/sq cm when tested in accordance with NFPA 253.
 - b. CPSC 16 CFR 1630.
- B. Perform Work in accordance with State of South Carolina standards.
- C. Maintain one copy of each document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum twenty years documented experience approved by manufacturer.
 - 1. FCIB or IFCI certified carpet installers.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.

- B. Store materials in area of installation for 48 hours prior to installation.
- C. Maintain minimum 70 degrees F ambient temperature 3 days prior to, during and 24 hours after installation.
- D. Ventilate installation area during installation and for 3 days after installation.

1.9 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Supply a 10 square yards of carpet of each type, color, and pattern specified, wrapped and identified to Owner.

PART 2 PRODUCTS

2.1 CARPET

- 1. To be determined – allowance.

2.2 ACCESSORIES

- A. Sub-Floor Filler: Cementitious Type recommended by flooring material manufacturer.
- B. Moldings and Edge Strips: Rubber; color as selected.
- C. Seam Adhesive: Adhesive (NO SUBSTITUTE) To maintain warranty use only Shaw 3500 adhesive with Antimicrobials per ASTM G21. Successful Carpet Contractor shall submit adhesive data and MSDS sheet along with carpet sample.
- D. Contact Adhesive: Compatible with carpet material and recommended by carpet manufacturer, releasable type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify floor surfaces are smooth and flat within tolerances specified in Section 0330 and are ready to receive work.
- C. Verify concrete floors are ready for carpet installation by testing for moisture emission rate and alkalinity. Obtain instructions when test results are not within specified limits.
 - 1. Moisture emission rate: Not greater than 3 lbs per 1000 sq ft per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
 - 2. Alkalinity: pH range of 5-9.
 - 3. Calcium Chloride Moisture Tests – Carpet Contractor shall include in his price and complete at least 12 tests. Three for the first 1,000 square feet of floor and One for each additional 1,000 square feet. Notify Architect and GC prior to

beginning installation if moisture is not in range required by carpet manufacturer.

- D. The General Contractor is responsible for the protection and cleaning of all new flooring until the Owner occupies the building.

3.2 PREPARATION

- A. General Contractor to remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- C. Vacuum clean substrate.

3.3 INSTALLATION

- A. Install carpet in accordance with CRI 104.
- B. Verify carpet match before cutting to ensure minimal variation between dye lots.
- C. Lay out carpet and locate seams in accordance with CRI 104 section 7.2 shop drawings:
 - 1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
 - 2. Do not locate seams perpendicular through door openings.
 - 3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
 - 4. Locate change of color or pattern between rooms under door centerline.
 - 5. Provide monolithic color, pattern, and texture match within each contiguous area.
- D. Install carpet tight and flat on subfloor, well fastened at edges, with uniform appearance. Do not change run of pile in any room where carpet is continuous through a wall opening into another room.
- E. Comply with manufacturer's recommendations for seam locations and direction of carpet. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed. Apply seam adhesive to cut edges of woven carpet immediately.
 - 1. At doorways, center seams under door in closed position; do not place seams perpendicular to door frame, in direction of traffic through door. Do not bridge building expansion joints with continuous carpet.
 - 2. Extend carpet under removable flanges and furnishings and into alcoves and closets of each space.
 - 3. Provide cutouts where required, and bind cut edges where not concealed by protective edge guards or overlapping flanges.
- F. Direct Glue-Down Installation: CRI 104 Section 8.
 - 1. Fit sections of carpet prior to application of adhesive.
 - 2. Apply contact adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.
 - 3. Apply seam adhesive. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.

- 4. Roll with appropriate roller for complete contact of adhesive to carpet backing.
 - G. Trim carpet neatly at walls and around interruptions.
 - H. Complete installation of edge strips, concealing exposed edges. Bind cut edges where not concealed by edge strips.
- 3.4 CLEANING
- A. Section 01700 - Execution Requirements: Final cleaning.
 - B. Remove excess adhesive without damage, from floor, base, and wall surfaces.
 - C. Clean and vacuum carpet surfaces.
- 3.5 PROTECTION OF INSTALLED CONSTRUCTION
- A. Section 01700 - Execution Requirements: Protecting installed construction.
 - B. Do not permit traffic over unprotected floor surface.
 - C. General Contractor to cover carpeting in traffic areas with protective non-staining building paper. Do not use plastic sheeting.

END OF SECTION

SECTION 09900
PAINTS AND COATINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and field application of paints, stains, varnishes, and other coatings.
- B. Paint and stain all surfaces that are primed for painting. Do not paint any surfaces that are factory primed unless noted otherwise.
- C. Related Sections:
 - 1. Section 04810 - Unit Masonry Assemblies
 - 2. Section 08111 - Standard Steel Doors and Frames
 - 3. Section 09260 - Gypsum Wallboard Assemblies
 - 4. Division 15
 - 5. Division 16

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D16 - Standard Terminology Relating to Paint, Varnish, Lacquer, and Related Products.
 - 2. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
 - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. National Fire Protection Association:
 - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- C. Painting and Decorating Contractors of America:
 - 1. PDCA - Architectural Painting Specification Manual.
- D. SSPC: The Society for Protective Coatings:
 - 1. SSPC - Steel Structures Painting Manual.
- E. Underwriters Laboratories Inc.:
 - 1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on finishing products. Samples:
 - 1. Submit color charts for selection by architect for review not less than four weeks before painting is scheduled to start.

- C. Manufacturer's Installation Instructions: Submit special surface preparation procedures, substrate conditions requiring special attention.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.6 QUALITY ASSURANCE

- A. Surface Burning Characteristics:
 - 1. Fire Retardant Finishes: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- B. Perform Work in accordance with State of South Carolina standards.
- C. Maintain one copy of each document on site.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.
- B. Applicator: Company specializing in performing work of this section with minimum ten years documented experience and approved by manufacturer.

1.8 MOCKUP/FIELD SAMPLES

- A. Section 01400 - Quality Requirements: Mock-up and Field Sample requirements.
- B. Construct field sample on actual walls as directed by architect, 6 feet long by 6 feet wide, illustrating coating color, texture, and finish. Repaint field sample until all colors are selected. Provide a field sample for each color selected by the architect. Provide finish lighting conditions where sample is to be painted. Ample time to review the samples shall be incorporated.
- C. Locate where directed by Architect/Engineer.
- D. Incorporate accepted mockup as part of Work.

1.9 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section. **Do not proceed with remaining work until Architect approves of the mark-up samples.**

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.

- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.11 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish and Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candle measured mid-height at substrate surface.

1.12 SEQUENCING

- A. Section 01100 - Summary: Work sequence.
- B. Sequence application to the following:
 - 1. Do not apply finish coats until paintable sealant is applied.
 - 2. Back prime wood trim before installation of trim.

1.13 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for paints and coatings.

1.14 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Supply 1 gallon of each color, type, and surface texture; store where directed.
- C. Label each container with color, type, texture, room locations, in addition to manufacturer's label.

PART 2 PRODUCTS

2.1 PAINTS AND COATINGS

- A. Manufacturers: Paint, Transparent Finishes, Stain, Primer Sealers, Block Filler, Field Catalyzed Coatings.
 - 1. Sherman Williams (basis for design)
 - 2. Devoe Paint Co.
 - 3. Duron Inc.
 - 4. The Glidden Co.
 - 5. PPG Architectural Finishes
 - 6. Substitutions: Section 01600 - Product Requirements

2.2 COMPONENTS

- A. Coatings: Ready mixed, except field catalyzed coatings. Prepare coatings:
 - 1. To soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.
 - 2. For good flow and brushing properties.
 - 3. Capable of drying or curing free of streaks or sags.
 - 4. Exterior: GC-03
 - 5. Clear Wood Finishes: SCAQMD Rule 113
 - 6. Interior: Maximum Volatile Organic Compound Content in accordance with GS-11 with a maximum of 50 g/L for flat paints and coatings and 150 g/L for non-flat paints and coatings.
- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified; commercial quality.
- C. Patching Materials: Latex filler.
- D. Fastener Head Cover Materials: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify surfaces and substrate conditions are ready to receive Work as instructed by product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report conditions capable of affecting proper application.
- D. Test shop applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 - 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
5. Concrete Floors: 8 percent.

3.2 PREPARATION

- A. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- B. Surfaces: Correct defects and clean surfaces capable of affecting work of this section.
- C. Marks: Seal with shellac those which may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- F. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.
- G. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- H. Concrete Floors: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- I. Copper Surfaces Scheduled for Paint Finish: Remove contamination by steam, high pressure water, or solvent washing. Apply vinyl etch primer immediately following cleaning.
- J. Copper Surfaces Scheduled for Natural Oxidized Finish: Remove contamination by applying oxidizing solution of copper acetate and ammonium chloride in acetic acid. Rub on repeatedly for required effect. Once attained, rinse surfaces with clear water and allow to dry.
- K. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- L. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- M. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- N. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- O. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool wire

brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.

- P. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.
- Q. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
- R. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.
- S. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior paintable caulking compound after prime coat has been applied.
- T. Exterior Wood Scheduled to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior caulking compound after sealer has been applied.
- U. Wood Doors Scheduled for Painting: Seal wood door top and bottom edge surfaces with clear sealer.
- V. Metal Doors Scheduled for Painting: Prime metal door top and bottom edge surfaces.
- W. Existing wood floors that are painted black: Clean the surface, scuff sand and remove all loose material.

3.3 EXISTING WORK

- A. Extend existing paint and coatings installations using materials and methods compatible with existing installations and as specified.
- B. With regards to latex or oil, existing conditions are unknown and both options are specified. The General Contractor shall verify conditions prior to installation.

3.4 APPLICATION

- A. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- B. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.
- C. Sand wood and metal surfaces lightly between coats to achieve required finish.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

- E. Where clear finishes are required, tint fillers to match wood. Work fillers into grain before set. Wipe excess from surface.
- F. Prime concealed surfaces of interior and exterior woodwork with primer paint.
- G. Prime concealed surfaces of interior wood surfaces scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with thinner.
- H. Finishing Mechanical And Electrical Equipment:
 - 1. Refer to Division 15 and Division 16 for schedule of color coding and identification banding of equipment, duct work, piping, and conduit.
 - 2. Paint shop primed equipment.
 - 3. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
 - 4. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are shop finished.
 - 5. Paint interior surfaces of air ducts visible through grilles and louvers with one coat of flat black paint to visible surfaces. Paint dampers exposed behind louvers, grilles, to match face panels.
 - 6. Paint exposed conduit and electrical equipment occurring in finished areas.
 - 7. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
 - 8. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.
 - 9. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.5 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements and 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

3.6 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.

3.7 SCHEDULE - EXTERIOR SURFACES

- A. Pavement Markings: See Division Two
- B. Steel - Unprimed:
 - 1. One coat of Procryll primer.
 - 2. Two coats of alkyd enamel, semi-gloss.
- C. Steel - Shop Primed:
 - 1. Touch-up with Procryll primer.
 - 2. Two coats of alkyd enamel, semi-gloss.
- D. Steel - Galvanized:
 - 1. One coat All Surface latex Primer A41 Series.

2. Two coats of alkyd semi-gloss.
- E. Steel – Exterior Railings, post and ornamental work
 1. One coat of Procrull primer.
 2. Two coats of alkyd enamel, semi-gloss.
- F. Aluminum Handrail
 1. To be shop finished with powder coating.
- G. Fiber Cementitious Siding & Trim – Brush Applied Only – No spray application allowed
 1. Unprimed: Prime with first coat 100% acrylic primer Loxon A24W300. Prime all cut edges in accordance with manufacturer's recommendations
 2. Topcoat: Two coats of Exterior Super Paint A80 series flat.
 - a. Trim Color will differ from siding color

3.8 SCHEDULE - INTERIOR SURFACES

- A. Steel - Unprimed:
 1. Touch-up with Procrull primer.
 2. Two coats of alkyd enamel, semi-gloss.
 3. For all exposed sprinkler pipe in Rooms 116, 125, 126.
- B. Steel - Primed:
 1. Touch-up with Procrull primer.
 2. Two coats of alkyd enamel, semi-gloss.
 3. For all exposed sprinkler pipe in Rooms 116, 125, 126.
- C. Steel - Galvanized:
 1. One coat All Surface latex Primer A41 Series.
 2. Two coats of alkyd semi-gloss.
 3. For all exposed sprinkler pipe in Rooms 116, 125, 126.
- D. Gypsum Board Walls and Existing Plaster Surfaces:
 1. One coat of SW Preprite primer 200 B28200 Series.
 2. Two coats of SW Cashmere Low Lustre D17 Series
 3. If existing conditions have oil based products installed, then use oil based primer Problock Oil B79W8810.
- E. Gypsum Board Ceilings:
 1. One coat of SW Preprite primer 200 Series B28200.
 2. Two coats of SW Promar 400 Series B30W400 Flat.
- F. Interior wood trim/wood doors:
 1. One coat of SW Preprite primer 200 B28200 Series.
 2. Two coats of SW Cashmere Low Lustre D17 Series
- G. Existing Hardwood Floors at Auditorium that are black:
 1. Armorseal Treadplex
 2. If existing conditions have oil based products installed, then use oil Industrial Enamel B54B11.

3.9 SCHEDULE –

1. See Finish Schedule on the Drawings for rooms and spaces scheduled to receive paint and coatings.
2. A color schedule showing colors selected will be prepared after the Contract has been awarded. The Contractor is to allow for multiple selection of paint in multiple rooms.
3. In all rooms that work is being performed, the wall surface shall have three different colors. Each color will be divided separately by trim. The base trim/chairrail and crown trim will have different colors.

END OF SECTION 09900

SECTION 10170
TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes solid plastic toilet compartments and urinal screens.
- B. Related Sections:
 - 1. Section 05500 - Metal Fabrications: Concealed steel support members.
 - 2. Section 06114 - Wood Blocking: Concealed wood framing and blocking for compartment support.
 - 3. Section 10800 - Toilet, Bath, and Laundry Accessories.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall and floor supports, door swings.
- C. Product Data: Submit data on panel construction, hardware, and accessories.
- D. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.

1.4 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with placement of support framing and anchors in wall.

PART 2 PRODUCTS

2.1 SOLID PLASTIC TOILET COMPARTMENTS

- A. Manufacturers:
 - 1. Bobrick
 - 2. Atlanta Sunbelt Products
 - 3. Columbia Partitions
 - 4. Lambaton/Universal
 - 5. Substitutions: Section 01600 - Product Requirements.

- B. Product Description: Floor mounted overhead braced.

2.2 COMPONENTS

- A. Toilet Compartments: Solid molded plastic panels, doors, and pilasters, floor-mounted headrail-braced.
 - 1. Color: Single color as selected.
- B. Door and Panel Dimensions:
 - 1. Thickness: 1 inch
 - 2. Door Width: 24 inch
 - 3. Accessible Door Width: 36 inch, out-swinging.
 - 4. Height: 58 inch
 - 5. Thickness of Pilasters: 1-1/4 inch.
- C. Urinal Screens: Wall mounted with two panel brackets, and floor-to-ceiling vertical upright consisting of tubular headrail stock and sockets anchored to floor and ceiling.

2.3 ACCESSORIES

- A. Pilaster Shoe: Formed chromed steel with satin finish, ASTM A666 Type 304 stainless steel with No. 4 finish, 3 inch high, concealing floor fastenings. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
- B. Head Rails: Hollow stainless steel tube, 1 x 1-5/8 inch size, with cast socket wall brackets.
- C. Brackets: Stainless steel color as selected.
- D. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
 - 1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.
- E. Hardware: Stainless steel:
 - 1. Pivot hinges, gravity type, adjustable for door close positioning; two for each door.
 - 2. Nylon bearings.
 - 3. Thumb turn door latch.
 - 4. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
 - 5. Coat hook with rubber bumper; one for each compartment, mounted on door panel.
 - 6. Furnish door pull for out-swinging doors.
 - 7. Furnish metal heat sink at bottom of doors and partitions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify field measurements are as indicated on shop drawings.

- C. Verify correct spacing of and between plumbing fixtures.
- D. Verify correct location of built-in framing, anchorage, and bracing.

3.2 INSTALLATION

- A. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.
- B. Attach panel brackets securely to walls using anchor devices.
- C. Attach panels and pilasters to brackets.
- D. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation From Indicated Position: 1/4 inch.
- C. Maximum Variation From Plumb: 1/8 inch.

3.4 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- C. Adjust hinges to position doors in full closed position when unlatched. Return out-swinging doors to closed position.
- D. Adjust adjacent components for consistency of line or plane.

END OF SECTION 10170

SECTION 10523
FIRE EXTINGUISHERS AND CABINETS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fire extinguishers; fire blankets; fire extinguisher cabinets; and brackets for wall mounting.
- B. Related Sections:
 - 1. Section 06114 - Wood Blocking and Curbing: Wood blocking and shims.
 - 2. Section 09900 - Paints and Coatings: Field applied paint finish.
 - 3. Division 15: Mechanical: - Standpipes and Hoses: Cabinet enclosure for extinguishers.

1.2 REFERENCES

- A. National Fire Protection Association:
 - 1. NFPA 10 - Standard for Portable Fire Extinguishers.
- B. Underwriters Laboratories Inc.:
 - 1. UL - Fire Protection Equipment Directory.

1.3 PERFORMANCE REQUIREMENTS

- A. Conform to NFPA 10 and applicable code.
- B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for purpose specified and indicated.
- C. Provide fire extinguisher cabinets classified and labeled by Underwriters Laboratories Inc. for purpose specified and indicated.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, wall bracket mounted measurements, location, and fire ratings.
- C. Product Data: Submit extinguisher operational features, color and finish, and anchorage details.
- D. Manufacturer's Installation Instructions: Submit special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with State of South Carolina standards.

- B. Maintain one copy of each document on site.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit test, refill or recharge schedules and re-certification requirements.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install extinguishers when ambient temperature is capable of freezing extinguisher ingredients.

PART 2 PRODUCTS

2.1 FIRE EXTINGUISHERS

- A. Manufacturers:
 - 1. JL Industries
 - 2. Larsen's Manufacturing Co.
 - 3. Potter Roemer
 - 4. Substitutions: Section 01600 - Product Requirements.
- B. Furnish materials in accordance with State of South Carolina standards.
- C. Water Type: UM Series, Water Mist, WM 2-1/2 to be installed with standard bracket #864.
- D. Dry Chemical Type: Cast steel tank, with pressure gage; Class B: C, Size 10. Model MP 10.
- E. Extinguisher Finish: Stainless steel, satin chrome finish.

2.2 FIRE EXTINGUISHER CABINETS

- A. Manufacturers:
 - 1. Larsens Model 24096R-Semi Recessed.
 - 2. Substitutions: Section 01600 - Product Requirements.
- B. Configuration: Semi-recessed type, sized to accommodate accessories.
- C. Trim Type: Flat returned to wall surface, with 4 inch projection.
- D. Door: 0.016 inch thick, reinforced for flatness and rigidity; latch, full glass access.
- E. Door Glazing: Glass, clear, 1/8 inch thick tempered.
- F. Cabinet Mounting Hardware: Appropriate to cabinet.
- G. Form cabinet enclosure with right angle inside corners and seams. Form perimeter trim.

- H. Pre-drill for anchors.
- I. Hinge doors for 180 degree opening with continuous piano hinge. Furnish nylon catch.
- J. Weld, fill, and grind components smooth.
- K. Glaze doors with resilient channel gasket glazing.
- L. Finishing Cabinet Exterior Trim and Door: Satin chrome color as selected.

2.3 ACCESSORIES

- A. Fire Blanket: Fire retardant treated wool.
- B. Extinguisher Brackets: Formed steel, chromed finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify rough openings for cabinet are correctly sized and located.

3.2 INSTALLATION

- A. Install cabinets plumb and level in wall openings, maximum 48 inches from finished floor to top of extinguisher handle.
- B. Install wall brackets, maximum 48 inches from finished floor to top of extinguisher handle.
- C. Secure rigidly in place.
- D. Place extinguishers and accessories in cabinets on wall brackets.
- E. Position cabinet signage as required by authorities having jurisdiction.

3.3 SCHEDULES

- A. Main Building as indicated on floor plans: FE1 - Semi recessed Model 24096R.

END OF SECTION 10523

SECTION 10800
TOILET AND BATH ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes toilet accessories; custodial accessories.
- B. Related Sections:
 - 1. Section 06114-Wood Blocking: In-wall framing and plates for support of accessories.
 - 2. Section 08830 – Mirror Glass

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 2. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 3. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - 4. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 5. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 - 6. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - 7. ASTM C1036 - Standard Specification for Flat Glass.
- B. Federal Specification Unit:
 - 1. FS A-A-3002 - Mirrors, Glass.

1.3 DESIGN REQUIREMENTS

- A. Designs grab bars, and attachments to resist minimum 250 lb concentrated load applied at any point in any direction, forces as required by applicable code.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, attachment methods.
- C. Manufacturer's Installation Instructions: Submit special procedures, and conditions requiring special attention.

1.5 QUALITY ASSURANCE

- A. Flame Resistant Fabric: Passes when tested in accordance with NFPA 701, Test 1 or Test 2.
- B. Perform Work in accordance with State of South Carolina standards.
- C. Maintain one copy of each document on site.

1.6 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS

2.1 TOILET AND BATH ACCESSORIES

- A. Manufacturers:
 - 1. A & J Washroom Accessories
 - 2. American Specialties, Inc.
 - 3. Bobrick Washroom Accessories
 - 4. Bradley Corp.
 - 5. Substitutions: Section 01600 - Product Requirements.

2.2 COMPONENTS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Keys: Furnish Four keys for each accessory to Owner; master key.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269, stainless steel.
- E. Galvanized Sheet Steel: ASTM A653, G90 Z180 Hot-Dip zinc coating.
- F. Mirror Glass: Float glass, Type I, Class 1, Quality q2 (ASTM C 1036), with silvering, copper coating, and suitable protective organic coating to copper backing in accordance with FS A-A-3002.
- G. Adhesive: Two component epoxy type, waterproof.
- H. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof.
- I. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 TOILET ROOM ACCESSORIES

- A. See Schedule on drawings. The Owner will provide the toilet paper and paper towel dispensers.

2.4 FACTORY FINISHING

- A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.
- B. Galvanizing for Items Other than Sheet: ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness]; galvanize after fabrication.
- C. Galvanizing for Nuts, Bolts and Washers: ASTM A153/A153M.
- D. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- E. Back paint components where contact is made with building finishes to prevent electrolysis.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify exact location of accessories for installation.
- C. Verify field measurements are as indicated on product data and instructed by manufacturer.
- D. See Section 06114 for installation of blocking, reinforcing plates and concealed anchors in walls and ceilings.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

- A. Install plumb and level, securely and rigidly anchored to substrate.
- B. Mounting Heights and Locations: As required by accessibility regulations ANSI 111.7 ADA A6 and as indicated on Drawings.

3.4 SCHEDULES: See Accessory List on Plans.

END OF SECTION 10800

SECTION 11130
AUDIO VISUAL

PART 1 GENERAL

1.1 REQUIREMENTS

- A. Contractor shall review all other documents for additional requirements and information that apply to the Work. If conflicts between this Section and/or the General Requirements and General Conditions occur, the more stringent shall apply. Contractor shall deliver the complete Audio Visual System of this section and the following drawings:

1.2 GENERAL DESCRIPTION

- A. Overview
 - 1. The audiovisual systems described below are for the Hampton Street Auditorium. Audio or audiovisual and control systems will be installed in the following spaces:
 - a. Stage/Auditorium: Stage, dressing rooms, green room, lobby, and front of house control booth
 - b. Gallery

1.3 ROOM BY ROOM REQUIREMENTS

- A. Stage/Auditorium
 - 1. Audio Systems
 - a. Audio system will consist of properly placed microphones and loudspeakers that will allow all participants to clearly hear.
 - b. Audio from these microphones will be routed to digital stage boxes, connected to a mixing console, by way of a digital signal processor (DSP). Audio processing shall be adjusted to allow proper gain for feedback and maximum speech intelligibility.

1.4 SCOPE OF WORK

- A. Contractor shall provide a turn-key audio-visual system installation, including, but not limited to, all cabling, loudspeakers, projection equipment, mounting hardware and electrical components including the necessary equipment, interconnections, transducers, labor and services required to meet the functional requirement outlined in the design documents.
- B. The Contractor will be held responsible to have examined the site and premises and satisfied themselves as to existing conditions under which they will be obligated to operate in performing their part of the work or that, which will in any manner affect the work under this contract.
- C. Permits: Obtain any necessary permits for the execution of this work, in conformance with applicable union regulations, local, state and federal codes and regulations.

- D. All aesthetic issues are to be coordinated and approved by the Owner, Architect and design consultant.
- E. Verify all conduit and penetrations, wire raceways, back boxes, mounting hardware to building structure and cabling connecting system components, as required by the Audiovisual System and installed by the General Contractor/Electrical Contractor as part of the base building fit out. Notify Architect of any discrepancies that may exist between the contract Documents and existing conditions.
- F. Verify 120-volt AC power requirements for each equipment location. Notify Architect of any discrepancies that may exist between Contract Documents and existing conditions.
- G. Patch, repair, finish and paint any surfaces that are damaged or demolished for access during this work. Room finishes to be returned to initial condition.
- H. Coordinate the installation of the audiovisual system issues including, but not limited to, architectural and structural items associated with the project.
- I. Coordinate with other trades to ensure that all required access and clearances to equipment and services are provided and maintained.
- J. Verify site conditions including dimensions and clearances. Coordinate and size the exact location of the equipment racks with the architectural drawings.
- K. Conduct preliminary testing and adjustment. Submit documentation required by this specification. Participate in approval testing for acceptance by the Owner. Perform final adjustments as required to meet the specifications.
- L. Deliver to the owner bound, as built system documentation. Transfer all warranties and equipment guarantees to the Owner and provide a written description of system operation at the time of acceptance of work by the Architect/Owner.
- M. Provide system operation training as specified in Part 3 of this section.

1.5 QUALITY ASSURANCE

- A. All materials must be newly manufactured current production models and conform to all applicable codes and the relevant standards listed below:
 - American National Standards Institute (ANSI)
 - Electronic Industries Alliance (EIA)
 - Institute of Electrical and Electronic Engineers (IEEE)
- B. Experience: The Contractor shall specialize in the installation of audiovisual systems, have a minimum of five years of documented experience in the field of audiovisual system installation and be a manufacturer approved vendor for all the components installed.
- C. Supervision: Contractor shall designate a Project Manager and Foreman to oversee the installation work for the duration of the Work, to ensure that the system is installed in accordance with the specification and drawings.

1. Project Manager shall maintain adequate staff and be responsible for installing and testing the system on schedule.
 2. Project Manager and Foreman/Project Supervisor shall have at least five years of documented, recent and similar project experience.
- D. The Owner reserves the right to make use of system prior to the completion of the work. Temporary use of the equipment shall not constitute an acceptance of the system or any part. The Owner shall not pay additional cost to the Contractor and the commencement of the Warranty prior shall not begin for the system or any device prior to the completion of the punch list and final acceptance of the system by the Owner.
- E. Contractor shall promptly notify the Architect in writing of any difficulties that may prevent proper coordination of time of completion of the work. Failure to do so shall constitute acceptance of work and indicate that the site is suitable in all ways for this work, except for defects that may develop in the work of others after commencement of system installation.
- F. Insurance: Provide evidence of insurance for the full value of equipment and material located on-site. Insurance shall cover losses due to fire, theft and vandalism, until the final acceptance of the system by the Owner. Maintain additional liability insurance to protect the supplier and/or Owner, Architect, Design Consultant against damage claims for personal injury, including death, which may arise during the performance of this work.

1.6 REFERENCES

- A. All requirements of the latest published edition, unless otherwise noted, shall apply.
- B. National Electric Code (NEC)
- C. National Electric Safety Code (NESC)
- D. Davis, Don, Sound System Engineering, Second Edition, Howard W. Sams and Co., Indianapolis, Indiana 1997
- E. American National Standards Institute (ANSI)
- F. Electronics Industries Alliance (EIA)
- G. Audio-Design and Installation, Giddings, Howard W. Sams, 1990
- H. Society of Motion Picture and Television Engineers (SMPTE)
- I. American Society for Testing Materials (ASTM)

1.7 SUBMITTALS

- A. Contractor shall comply with the General Requirements and General Conditions of this specification
- B. Bid Submittals: Contractor shall submit the following qualification documents with the bid proposal:

1. Firm Description of the Contractor and a copy of the Contractor's license as well as a statement regarding the relationship of the license holder to the Contractor.
 2. Provide a minimum of ten related projects, four of which must have been completed within the last 12 months.
 3. Resume of Project manager and foreman/project supervisor, documenting related experience. Foreman/Project Supervisor must have completed at least two similar installations in the past 12 months.
 4. Submit a list of major equipment components, along with any deviations, to the system design and specification. Indicate which products will not be purchased directly from manufacturer.
 5. Submit a list of names for the lead installers who will be working on this project and indicate for each, if they are NSCA NICET/EST or ICIA CTS-Install, certified or registered.
- C. CONSTRUCTION SUBMITTALS
1. Provide shop drawings and record drawings using the following scales:
 - a. Plans – no less than 1/8" = 1'-0"
 - b. Details – no less than 1/4" = 1'-0"
 2. Before ordering equipment, submit catalog data sheets, neatly bound with title page, space for submittal stamps and tabbed dividers between sections.
 3. Submit point-to-point wiring diagrams and typed wire lists identifying with every connection. Include electronic devices such as switches, transformers and terminal blocks. Indicate location of all components. Identify cables by types, colors and wire numbers.
 4. Submit system plans showing all device locations.
 5. Submit reflected ceiling plans showing distributed loudspeaker layouts with wattage tap settings, project systems, cameras and other ceiling mounted devices.
 6. Submit conduit riser diagrams showing connection of all devices along with types and quantities of cables to be used and cable identification tags.
 7. Submit rack layouts indicating the proposed arrangement of mounted equipment including junction boxes and locations of conduit penetrations.
 8. Submit fully dimensioned construction details of all panels, plates and other custom fabricated items or modifications (ie, installation of av equipment in lecterns). Include complete parts lists and as required, schematic diagrams.
 9. Submit fully dimensioned construction details of all coordination items such as panel or plate installation in casework or millwork.
 10. Submit a schedule of finishes indicating proposed materials and color selections for all exposed items subject to Architect's approval.
 11. Submit samples of engraved labels, cable marking system, faceplate etching/finishes and loudspeaker grilles.
 12. Submit mounting and support details for distributed ceiling loudspeakers, video projectors and all other items mounted overhead, complete with parts list and dimensions. Include a full plan view, front elevation and side elevation of each item, with corresponding support structure and mounting hardware. Verify load ratings of all hanging components including attachment hardware. A Structural engineer registered in the state shall stamp details.
 13. Submit a list showing coordination of selected frequencies for all wireless transmitters.
 14. Before final control system program installation, submit printed copies of all control system touch panel pages as well as an electronic copy of the pages as required by Part 2 of this Section.

1.8 PROJECT CLOSE OUT

A. General

1. Furnish one set of initial set of Project Close Out Documents including but not limited to manuals, record drawings along with the results of all source quality control tests and field quality control tests specified in Part 3 of this section, to the Design Consultant, for use during acceptance testing.
2. If 'as installed' documents are rejected, correct and resubmit in the manner specified.
3. One set of 11x17 drawings showing the components and wiring in each individual rack shall be mounted in a plastic jacket to the rear door of the associated rack.
4. After approval of 'as installed' documents, submit four sets of record drawings each consisting of the following:
 - a. One full size set of prints
 - b. One set of 11x17 size prints
 - c. One set of manuals
 - d. One electronic submittal on CD or USB stick with backup
5. Furnish one initial set of product brochures to the Design Consultant for use during acceptance testing and equalization. At the time of contract closeout, submit four sets of the system Operation Manual and the Maintenance Data Manual.

B. As Installed Drawings

1. Maintain a full set of shop/submittal drawings at the project site, marked up to indicate actual locations, wattage tap settings and in general, the true state of the installation.

C. Manuals

1. Neatly bind each manual with tabbed dividers between sections, including a title page between sections, binder title covers and spines
2. Manuals shall be presented in 3" thick, 3 ring – d-style binders.
3. The manuals shall be broken into the following minimum sections:
4. Operations Manual
 - a. Table of Contents
 - b. Typed description of each system including key features and operational concepts (ie, remote control features, switching or routing functions, patch points, mixing and linking capabilities)
 - c. Set up diagrams and typed instructions for use in typical situations as directed by the design consultant
 - d. Small scale plans showing locations and circuit numbers for all system outlets and receptacles
 - e. Single line diagrams showing all major system components
 - f. One set of 11x17 drawings showing the components and wiring in each individual rack
 - g. Manufacturer's operations manuals for equipment intended for operations by system users
5. Maintenance Data Manual
 - a. Table of Contents
 - b. Company name, address, telephone number and contact name for system service or maintenance
 - c. Listing of all equipment and materials with names of manufacturers and model numbers or part numbers.
 - d. Catalog data sheets displaying manufacturer's names, addresses and telephone numbers.

- e. Product manufacturer's warranties and a typed, one year system warranty, explicitly covering all materials and labors.
 - f. Manufacturer's service manual for all major equipment
 - g. Test documentation showing results of source quality control tests, field quality control tests, acceptance testing and equalization. Document final settings for all non-user devices and controls after completion of acceptance testing and equalization, including raw and equalized house curves. Document the physical position of settings as well as input/output signal levels as required by Part 3 of this section.
 - h. Provide a recommended preventative maintenance schedule for reference to the applicable pages in the manufacturer's maintenance manuals. Where the manufacturer provides inadequate information, develop and provide the information necessary for proper maintenance.
- D. Software
- 1. A properly licensed working copy of any and all software required to operate or configure the systems specified within, shall be part of the system supplied, including all software, firmware and hardware required for configuration, adjustment, diagnosis and repair.
 - 2. All software shall be fully documented, and that documentation included.
 - 3. Software shall be included in its 'installable' state or industry standard, CDROM, or other appropriate format from the manufacturer. Where possible, a single master CDROM should be provided. If file is too large, a USB thumbdrive (and backup) is acceptable.
- E. Electronic Submittal – in addition to the above listed hard copy submittals, submit all files necessary to produce the above submittals as follows: could based storage via Google Drive, dropox, etc, that is available to the Owner/User Group.

1.9 GUARANTEES AND WARRANTIES

- A. Transfer all manufacturer and subcontractor's warranties to the Owner at the completion of all work.
- B. Guarantee all installation work to be free of faulty system-wide workmanship. Guarantee all new components purchased under this Contract and workmanship to be free from defects for a period of 12 months from the final date of acceptance, by the Owner, including solid state devices.
- C. Guarantee the replacement of faulty materials and workmanship within 48 hours of notification at no cost to the Owner if the failure occurs during the warranty period. Provide loaner equipment as required to keep system operational if the system cannot be repaired within 48 hours of notification.
- D. Register warranty in the Owner's name for any product with a manufacturer's warranty of more than one year.

1.10 OWNER FURNISHED EQUIPMENT

- A. Certain equipment may be identified as Owner Furnished Equipment (OFE). This OFE may presently be part of the Owner's system or will be provided by the Owner and will be delivered to the Contractor's off-site construction facility, delivered to the Contractor's on-site construction facility, installed by others, as appropriate, for incorporation into the system.

- B. Clean and inspect the OFE, and notify the Owner in writing of damage/defects and the extent of repair/adjustment required to bring the OFE to original specification. Service OFE only as directed by the Owner under the arrangements of a separate contract.
- C. Incorporate into the system as if provided new, excepting warranty coverage.

1.11 MAINTENANCE

- A. With the bid, submit an annually renewable service and maintenance proposal meeting the same conditions for service and repair as required for the initial one year warranty. If accepted, the service and maintenance proposal shall commence upon conclusion of the one-year system warranty.

PART 2 PRODUCTS

2.1 GENERAL

- A. Components are to operate on a 110-120 volt, 60Hz electrical supply. Rack mounted equipment is to be mounted in a standard EIA 19" wide rack. The components listed in the equipment schedule are to be the basis of the audiovisual system design and represent the minimum standards of each of the components. All of the properties of each component or system should be considered listed in full.
- B. Equipment, excepting the Owner Furnished Equipment (OFE), and materials shall be new. The latest version at time of delivery and shall conform to applicable UL, CSA or ANSI provisions. Take care during installation to prevent scratches, dents, chips, etc; equipment with significant or disfiguring cosmetic flaws will be rejected.

2.2 ACCEPTABLE AV CONSULTANTS (to purchase and install listed equipment)

- A. Integrated System Design – 843.448.5030
- B. StageFront Presentation Systems – 912.236.1345
- C. Stage Sound – 540.342.2040
- D. Any other AV provider wanting to be considered must submit appropriate substitution paperwork as per Bidding and Contract Requirements.

2.3 CABLE

- A. General
 1. Conductor jackets shall be color coded to enable consistent polarity.
 2. Use plenum rated cable where required by code.
 3. Cables noted are referenced for minimum level of quality.
 4. Acceptable Manufacturers: West Penn, Canare, Belden, Extron, Covid, Gepco, Liberty
- B. Audio Cables
 1. Microphone: Shielded, stranded 20 AWG, twisted pair cable (West Penn 292)
 2. Line Level Cable: Shielded, stranded 20 AWG, twisted pair cable (West Penn 292)

3. Program Loudspeaker Cable: Stranded 12 AWG, twisted pair cable (West Penn 227)
 4. Surround Sound Loudspeaker Cable: Stranded 14 AWG
 5. Distributed (70V) Loudspeaker Cable: Stranded 16 AWG, twisted pair cable (West Penn 224)
- C. Video Cables
1. Video Cable: 75 ohm RG 59 Digital Video coaxial cable (Extron RG-59)
 2. High Resolution Mini Cable: Multiple 75 ohm coaxial cables in one jacket (Extrol MHR-5)
 3. Distribution from front of house control booth to projector can be HD over CAT6 or Higher, using quality balun boxes.
 4. All Ethernet cable installed will be shielded CAT 6 (CAT 5 or CAT 6 not acceptable).

PART 3 EXECUTION

3.1 GENERAL

The following is required for acceptance of the audiovisual system by the Owner

- A. Install complete and functioning audiovisual system
- B. Label equipment and cables corresponding to functional diagram.
- C. Conduct adjustments and preliminary testing
- D. Report results of preliminary testing along with system documentation.
- E. Participate in acceptance test and deliver final system and documentation
- F. Conduct any adjustments or re-testing required to meet the performance specifications.
- G. Provide training to an individual designated by the Owner/Architect/Consultant.

3.2 AUDIOVISUAL OPERATIONAL REQUIREMENTS

Care shall be taken to eliminate electro-magnetic radio frequency and electro-static interference; the system shall be free of audible hum, rattles, buzzing sounds, distortion and visible hum bars or distortion.

3.3 OWNER PERSONNEL TRAINING

- A. As part of Work of this section, provide a total of 24 hours of on-site training for personnel, designated by the Owner for instruction, in the proper orientation and maintenance of the systems. This training shall take place after the installation is operational but before the acceptance testing in four hour blocks.
- B. Provide the additional eight hours of training in a minimum of two-hour blocks during the first year after the system has been accepted. These training sessions are at the request of the Owner.

- C. Provide one initial set of manuals for the system as described in this specification at the time of training for review and comment by the owner's personnel.

3.4 PERFORMANCE SPECIFICATIONS

- A. The sound pressure level spectrum from the distributed speaker system in each 1/3 octave band shall be +3dB from 100 Hz to 15 Hz with 6 dB per octave roll off above 15 kHz and below 100 Hz. Total acoustical harmonic distortion shall not exceed 1% at sound levels of 85 dBC (1 kHz reference tone) at four feet above finish floor in the middle of the room.
- B. The gain structure for all audio systems components (mixer input to amplifier output) shall be adjusted to achieve the highest signal to noise ration, 75 dB from 100 Hz to 10 kHz minimum.
- C. The electronic system audio distortion shall be less than .5% at 1 kHz at the equipment's rated input signal level.
- D. High resolution video frequency response: the high resolution video frequency response for the data and graphic systems shall be at least +2.0 dB = 3.0 dB, 100 Hz to 100 MHz.

3.5 CONTRACTOR'S TESTING AND ADJUSTMENTS

- A. Furnish all equipment and personnel to conduct these tests in accordance with the performance specification requirements.
- B. Audio Testing
 1. Before connecting high impedance (distributed) loudspeaker lines to the power amplifiers, measure and record the impedance curves of all loudspeaker circuits, using a sweep test or impedance bridge for at least six frequencies from 125 Hz to 8,000 Hz.
 2. Test all low level audio cables and connections for continuity and ground faults and correct polarity.
 3. Apply a sine wave sweep signal to each loudspeaker system, sweeping from 50 Hz to 5,000 Hz at a sound pressure level, which is 10 dB below the loudspeakers rated electrical input power. Listen for rattles or objectionable noise and correct if apparent.
 4. Check for proper polarity of loudspeakers by applying music program or pink noise to each system and walking through the transition areas of coverage from one loudspeaker to the next. Transition should be smooth with no apparent shifting of the source, back and forth from one loudspeaker to the next.
 5. Coverage Uniformity – Scan the areas served by the system and record sound pressure level in 1/3 octave bands. Perform any necessary adjustments to loudspeaker orientations as required to achieve the specified uniformity.
 6. Adjust all system gain controls, both physical and virtual in software, for optimum signal to noise ratio. After all adjustments required to meet the performance specification requirements are made, measure and report the resulting system electrical signal-to-noise ratio at the amplifier outputs from 20-20 kHz in 1/3 octave bands referenced to the voltage required to achieve 85 dBC in the center of the room (1 kHz reference tone) at four feet above finished floor.
- C. Video Testing

1. Verify and document performance off all video cables and connections by injecting full SMPTE color bars and a multi-burst signal. Monitor performance on a calibrated waveform monitor. Confirm that all signal paths maintain a full 140 IRE signal and that frequency response is flat across a 6 Mhz band range, Continuity tests will not be acceptable.
 2. Check all paths and outlets for appropriate compliance with the Performance Standards. Measure levels at all termination points. Compare actual values to design calculations and investigate any difference. Rectify or justify these discrepancies to the satisfaction of the Owner. In all cases, the more stringent of the referenced standards shall apply.
- D. Wireless Systems
1. Ensure that all wireless systems operate on different frequencies from each other and from any other transmitters in the area.
- E. Report
1. Prepare a letter/report documenting the results of these tests and readings. Include final equalizer and gain settings for review by the Design Consultant.

3.6 ACCEPTANCE TESTS

- A. Provide a statement of completion, certifying that the system is installed and is ready for acceptance testing by the Design Consultant.
- B. Schedule a time for the Design Consultant to perform system acceptance testing and adjustment with at least 14 days notice.
- C. Qualification for Acceptance – Subsequent to completing a preliminary testings, Contractor shall furnish the Owner/Design Consultant with copies of As Built documentation as required in this specification
- D. Furnish a technician who is familiar with the system to assist the Design Consultant during the acceptance testing and equalization for the duration it takes to complete the adjustments. A minimum of 24 hours is required to complete the adjustments.
- E. Acceptance Test: The Owner and Design Consultant shall be present during the acceptance testing and require the assistance and cooperation of the Contractor.
 1. Each major component shall be demonstrated to function.
 2. Measurements: Electrical, optical and acoustical measurements may be performed at the discretion of the Owner and/or their representative. The Design Consultant will supply acoustical measuring equipment. Such measurements may include sound pressure levels, uniformity of coverage, distortion, or other pertinent characteristics. Contractor shall provide equipment for performing any necessary electrical test or adjustments.
 3. Viewing and listening tests may include subjectivity tests by observers at any location in the facility.
 4. Operating test may include use of any individual or combination of systems provide and from any control location.
 5. Each cable may be inspected for proper termination.
 6. Under the direction of the Design Consultant adjust signal levels and loudspeaker aiming, as required, to achieve the uniform sound distribution required by the specification.

- F. Such tests may be performed on any piece of equipment or system. If any test shows the equipment or system is defective or does not comply with the specifications, Contractor shall perform any remedies at their expense and pay the subsequent expenses of any re-testing required.
- G. Contractor shall provide a final report, which will document the final equipment settings and adjusted levels and values.
- H. If the system does not meet criteria or if additional job site trips are required for testing or adjustment, the Contractor shall reimburse the Owner for all expenses and professional time encountered by the Design Consultant.

PART 4 BIDDING INSTRUCTIONS

PART 5 MAJOR EQUIPMENT LIST

5.1 PRICE BREAKDOWN

- A. Provide unit cost for each item listed below.
- B. Provide a list of other equipment and hardware required for a complete and working system.
- C. Provide a total line cost for each item listed below based on quantity.
- D. A bidder may provide a price for one and/or all categories; therefore multiple companies may be selected for this work.
- E. The attached list is to be made available to the Architect/Owner within 24 hours of bid close. However, the lump sum for all items within spreadsheet shall be included in the base bid.

END OF SECTION

The Owner reserves the right to select items from the list below, without obligating themselves to the purchase of any specific package, items, etc.

HAMPTON STREET AUDITORIUM
AV BID INFORMATION

ITEM	UNIT	EACH
1	32 Channel Digital Mixer	
	Yamaha TF5 32 Channel Digital Mixing Console	1
	Yamaha TIO-1608D Digital Stage Boxes	2
	Yamaha NY64-D Dante Card for TF5	1
	OR	
	Midas M32 Digital Mixing Console	1
	Midas DL16 Digital Stage Boxes	2
	<u>Main Speaker System</u>	
7	JBL CBT70J-1 + 70JE-1 Column Array System with Extension Cabinet	2
8	Crown XTI4002 Power Amplifier (Stereo @ 4ohms)	1
9	JBL PRXT18XLF Portable Powered Subwoofers	2
10	DBX Driverack PA2 System Processor	1
	Necessary speaker and line level cable, Two (2) Single XLR Wallplates at sub locations for connection - wallplates wired directly to sub outs on	
11	DBX Driverack.	1
	Front fill speaker system (mounted on lip of stage thrust) – to be fed by a matrix from mixing console.	
13	JBL Control 25AV 5" Speakers	4
14	Crown XLS1002 Power Amplifier (Parallel @ 4ohms)	1
15	Necessary speaker and line level cable	1
16	Powered Monitor/General Use Speakers	
	<i>Acceptable Options</i>	
17	Turbosound Milan M12 12" monitor/pole mount speakers	4
	OR	
18	JBL EON612 12" monitor/pole mount speakers	4
19	Assortment of line level audio and power extension cables.	1

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HAMPTON STREET AUDITORIUM
AV BID INFORMATION

	<u>Wireless Microphone Systems</u>		
20	Shure SLX124/85/SM58 Wireless Combo System with SM58 Handheld receiver, SLX4 beltpack, and WL185 lavalier mic. Acceptable frequency bands: G4, G5, H5, J3	4	
21	Microphone Cables to connect to Digital Snake in amp rack	4	
	<u>Wired Microphone Package</u>		
22	Shure SM58 Handheld Vocal Microphones	6	
23	Shure SM57 Dynamic Microphones	4	
24	Audix FP5 Drum Microphone Kit	1	
25	Audix F9 Small Diaphragm Condenser Microphones	2	
26	Whirlwind IMP Passive Direct Boxes	3	
27	Radial ProAV2 Stereo Direct Box for computer interfaceCable Package	1	
28	Assorted microphone cables: (10x 10', 12x 25', 2x 50')	1	
29	25' Hosa Little Bro 8ch Microphone Snakes SH 8x0 25	2	
30	50' Hosa Little Bro 8ch Microphone Snake SH 8x0 50	1	
	<u>Microphone Stands Package</u>		
31	straight, round base stands (black)	6	
32	tall boom stands (black)	6	
33	short boom stands (black)	4	
34	Desktop microphone stands (black)	4	
	<u>Accessories and Supplies</u>		
35	Denon DN-300C Rackmount CD Player	1	
36	Middle Atlantic RK6 6 Space Rack for FOH Control Booth	1	
37	Middle Atlantic ERK2720LRD 27 Space Metal Rack – no rear door.	1	
38	Furman M-8Dx Rack Mount Power Conditioner w/ Lights	2	
39	Rackmount Panel in Amplifier Rack with Six (6) Cat6 Tielines to FOH Control Booth. Tielines should be labeled SL 1-6, also three (3)	1	
40	Cat6 tielines from a dual gang wallplate on Stage Right to FOH Control Booth (labeled SR 1-3). This is a total of nine (9) Cat6 runs from Control Booth to stage. There should be enough slack at FOH control booth for cables to reach any booth position.	1	

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HAMPTON STREET AUDITORIUM
AV BID INFORMATION

55	Neutrik 203M Dual XLRM Single Gang Wall Plates (Label Ch. A, Ch.B.)	5	
56	Various custom 6pin jumper cables (8x 10', 4x 25')	1	
57	Wiring to distribute A+B channels to wall panels	1	
	<u>Wireless Communication System</u>		
58	HME DX200 4 User Wireless Comm System w/Four (4) Wireless Beltpacks	1	
59	HME HS15 Headsets	4	
60	Connection cables to interface with MS702 wireless main station.	1	
			THEATRICAL COMMUNICATIONS SUBTOTAL
	<u>VIDEO PROJECTION</u>		
	<u>Video Equipment List and Specifications</u>		
61	14K Lumen Video Projector with 2K resolution	1	
	<i>Acceptable Products</i>		
62	Christie HD14K-M 14k Lumen Projector	1	
	OR		
63	Eiki LC-HDT2000 15k lumen 2k Res Projector	1	
64	Set of replacement projector lamps	1	
	Motorized Projector lens capable of projecting on a 240"x135" (16:9 ratio) screen at a throw distance of 66'-0".	1	
66	240"x135" 16:9 electric roll-down Projection Screen	1	
	<i>Acceptable manufacturers</i>		
	Da-Lite		
	Draper		
	<i>Additional Notes regarding screen installation</i>		
	The roll-down screen to be mounted on the upstage side of proscenium arch header. Screen will need to be reversed and 108" of black leader will be required to "center" the screen within the proscenium box. A low voltage control will be provided in the FOH control booth area (location TBD) to allow for remote raising and lowering of screen.		

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HAMPTON STREET AUDITORIUM
AV BID INFORMATION

	HD Video Mixer			
67	Roland V-1HD 4ch HDMI Video Mixer	1		
	Playback Devices			
68	Denon DN-500BD Blu-ray Disc Player with discreet analog 7.1 outputs	1		
69	Apple iMac 21.5" 2.8gb Quad Core Processor, 8gb RAM	1		
	Accessories			
70	Middle Atlantic RK6 Rack (Black)	1		
71	Furman M-8Dx Rack Mount Power Conditioner w/ Lights	1		
72	Samsung 22" TV Monitor with HDMI Input	1		
73	HDMI over Cat5/6 Balun System	2		
74	VGA to HDMI Scaler	1		
	Necessary cabling to distribute signal to projector via HDMI or Cat6 or Fiber, adaptors for iMac to HDMI, HDMI Cables for external sources to video mixer.			
75		1		
			VIDEO PROJECTION	SUBTOTAL
	SURROUND SOUND SYSTEM			
	System will be distributed from the analog outputs of the Blu-ray DVD player to eight available inputs on digital mixing console, where EQ processing and output distribution will occur. A 6pr line level audio snake cable will run from the outputs on the back of the mixing console to the appropriate amplifiers in the stage left amplifier rack. System will utilize existing main Left/Right speakers and portable subwoofers. Side and rear surround speakers will be permanently mounted on sidewalls and balcony front (locations TBD) and the center speaker will be portable and can be placed in position when necessary.			
76	JBL 8320 Surround Speakers	8		
77	JBL 3677 Center Speaker	1		
78	Crown xT11002 Amplifiers	3		
79	Eight-Channel Snake	1		

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HAMPTON STREET AUDITORIUM
AV BID INFORMATION

	Acceptable Products – this is dependent on the choice of console in section 1.1		
80	Hosa CPR-803 8ch RCA to 1/4" Snake (w/Yamaha TF5) OR	1	
81	ProCo RCA male to XLR male 10' Snake (w/Midas M32)	1	
82	Necessary speaker and interconnect wire, including 6pr audio cable from FOH control booth to amp rack on stage left for SideL, SideR, RearL, RearR, and Center lines (Can also be routed via Digital Stagebox outs.)	1	
			SURROUND SOUND SYSTEM SUBTOTAL
	<u>THEATRICAL LIGHTING</u>		
	<u>Lighting Control</u>		
	Control Console will have 1024 DMX channels, ability to control LED and basic moving lights and a minimum of 40 faders.		
	Acceptable Products		
83	ETC ELEMENT 250 Control Console OR	1	
84	Leprecon, LP-X48+ with Touchscreen Monitor	1	
85	Dimming		
86	ETC SmartBar 2, 4-CIR, 2P&G #SB4-10-B Safety Cables for SmartBar2s	8 16	
87	Conventional Fixtures Tungsten Lamp Ellipsoidal Reflector Spotlights Acceptable Products		
88	ETC SourceFour 19° OR	7	
89	Altman Phoenix 19°	7	
90	Modular PARs Acceptable Products		
91	ETC SourceFour PAR EA	9	

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HAMPTON STREET AUDITORIUM
AV BID INFORMATION

92	Initial Lamps Stock: Sixteen (16) HPL 575/115 All fixtures must include:	16	
93	C-Clamp (or equivalent mounting hardware)	16	
94	Safety Cable	16	
95	2P&G Stage Pin connectors.	16	
96	575W HPL Lamp	16	
97	Operate at 120V to 115V		
	<u>LED Fixtures</u>		
98	<u>LED Ellipsoidal Reflector Spotlights</u>		
	<i>Acceptable Products</i>		
99	ETC ColorSource Spot w/shutters, Black	6	
100	ETC Lens Tube 26 EDLT OR	6	
101	Chauvet Professional Ovation E-910FC.26°	1	
102	ETC LED PAR Wash fixtures <i>Acceptable Products</i>		
103	ETC ColorSourcePAR OR	18	
104	Chauvet Professional COLORado Tri Tour 7 All fixtures must include	18	
105	C-Clamp (or equivalent mounting hardware)	18	
106	safety Cable.	18	
107	2P&G Stage Pin connectors.	18	
108	Operate at 120V to 115V		
	<u>Data Distribution - Lighting data will be sent via a DMX network. The following list is a rough estimate of lighting data network cable needs is listed below.</u>		
109	DMX Cable 5-pin B/G 10'	20	
110	DMX Cable 5-pin B/G 150'	4	
111	DMX Cable 5-pin B/G 25'	5	
112	Opto-splitters	2	

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HAMPTON STREET AUDITORIUM
AV BID INFORMATION

	NB. Additional Raw cable may be necessary to provide signal to FOH position and attic.		
	<u>Follow Spot Lights for use from the balcony</u>		
113	Lycian Midget Model 1206 Follow-Spot	2	
		THEATRICAL LIGHTING	SUBTOTAL
	<u>CHAIN MOTOR/RIGGING</u>		
114	Teaser/Valance @2" off plaster line **Hung from upstage side of proscenium arch** NB: Roll-down screen will be hung on the upstage side of proscenium arch, above the Teaser	1	
115	Main Curtain @ 10" off plaster line Operational capacity 300 lb	1	
116	First Electric (Motorized) @ 3' off plaster line Operational capacity 500 lb.	1	
117	First Border/Legs hang @ 7' off plaster line Operational capacity 300 lb.	1	
118	Second Electric (Motorized) @ 10' off plaster line Operational capacity 500 lb.	1	
119	Second border/legs hang @ 13' off plaster line Operational capacity 300 lb.	1	
120	Third Electric @ 16' off plaster line Operational capacity 500 lb.	1	
121	Third border/legs hang @ 18' off plaster line Operational capacity 300 lb.	1	
122	Empty utility batten @ 17' off plaster line Operational capacity 300 lb.	1	
123	Cyc batten @ 19' off plaster line Operational capacity 300 lb.	1	
	<u>Motorized Rigging System</u>		
	Electric Chain Hoists and control and power distribution:		
124	Six (6) one quarter ton chain hoists for the support of the theatrical lighting installation.	6	
	Chain hoist will be CM ET Prostar 3 phase 208 volt with 60' lift.		
	Connector type TBD.		

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HAMPTON STREET AUDITORIUM
AV BID INFORMATION

	<u>Electric Chain Hoist Control and power distribution.</u>			
	<u>Acceptable Products</u>			
	Skjoberg motor control system:			
125	One (1) PIM-10 Relay control in a NEMA 1 rated enclosure	1		
126	One (1) PIJ-CONT-100 Control cabinet	1		
127	Three (3) P10-HCS-D37 Remote or Three (3) individual wall-mounted boxes, one for each batten	3		
128	Six (6) CBL-CAN-37K-50 Power/Control Cable	6		
129	Six (6) PIJ-HST-HBL junction boxes (placed above each chain hoist hanging point)	6		
	Comparable system from Motion Laboratories			
130	One (1) Relay control in a NEMA 1 rated enclosure	1		
131	One (1) Control cabinet	1		
132	Three (3) Remote or Three (3) individual wall-mounted boxes, one for each batten. Each box shall have pipe load rating posted immediately above.	3		
133	Six (6) Power/Control Cable	6		
134	Six (6) junction boxes (placed above each chain hoist hanging point)	6		
	<u>Motorized Batten Rigging</u>			
	<u>Electric Chain Hoist connection to overhead steel:</u> The Electric Chain Hoists will be hung to left and right of center above			
	each of the 3 lighting battens, placement upstage to downstage listed in the Section 5 Overhead Rigging Notes. The Electric Chain Hoists will be attached to the overhead structure with beam clamps or an appropriate replacement with a minimum WLL of 1000 lb. The Electric Chain Hoists will be hung motor up/chain down. Electric Chain Hoist will hang at 29'-0" from the stage floor.			
	Battens for use with Electric Chain hoists			
135	Three (3) Battens at 28'-0" in length	3		

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HAMPTON STREET AUDITORIUM
AV BID INFORMATION

	Battens will be ladder battens or "two-pipe ladder trusses". Ladder battens are constructed from two 1.5" Sch. 40 pipes with flat bar spacers on 4' centers. The ladder batten will be constructed with and upper and lower pipe connected with 0.25" x2.5" flat steel spaced on 4' centers with the top and bottom chord separated by 10".			
	<i>Acceptable product</i>			
	J.R. Clancy #015-67T at 28' long.			
	Standard 1.5" battens are to be provided with safety yellow vinyl end caps, making the batten ends easier to see.			
	Connection of Battens to Chain hoists			
	Connection from the hook to the batten will make use of two bridles			
	Bridle Specification			
	Each bridle will have two legs			
	Each leg of the bridle will be a thimble & thimble sling made of ¼" 7x19 Steel Rope, mechanically swaged.			
	Each sling will be 2'-6" in length.			
	Bridle Connection to Hook			
	The bridle connection will use a 5/8" roll pin shackle			
	Bridle connection to the batten			
	Ladder batten connection to the bridle points will be made with theatrical clamshell batten clamp. Batten clamps will be J.R. Clancy 02622x series.			
	The brida will attach to the batten 4' apart centered under motor point.			
	Rigging of Static Battens (for the suspension of soft goods).			
	<u>General Static Rigging</u>			
	Battens			
136	Seven (7) 1.5" schedule- 40 battens at 40'-0" in length		7	
	NB. Battens longer than 21'-0" must be internally spliced using 18" internal splice (J.R. Clancy # 015-67S)			
137	Six (6) 1.5" schedule- 40 battens at 10'-0" in length		6	

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HAMPTON STREET AUDITORIUM
AV BID INFORMATION

	<p>Only Leg Batten will be acceptable for rigging the Teaser, Main Curtain borders, utility batten and cyclorama. Forty-foot battens will be dead-hung with a minimum of six suspension points using all domestic hardware. Battens should be hung centered over the stage. Dead hung batten pipes connected to the building steel via one of the following methods. Chain rated for overhead lifting. Custom mechanically swaged steel slings, beam clamps, and domestic shackles.</p>			
138	<p>Teaser Batten Batten will carry the following, weighing approximately 100 lb. The teaser batten will be anchored to the proscenium wall to preserve as much space in the downstage area as possible. Batten will hang at 20'6" from stage floor.</p>	1		
139	<p>Main Curtain Batten Main Curtain battens will be schedule-40 1.5" pipe at 40'-0" in length. Main Curtain batten will carry the following. ADC #1700 Besteel curtain track with appropriate associated hardware.</p>	1		
140	<p>Main Curtain Total weight will be approximately 240 lb. The Main Curtain will be dead hung upstage of the Teaser separated by 6 to 8" to allow the roll down screen room to deploy as listed above. Batten will hang at approximately 22'-0" from stage floor. Final Main Curtain trim height should allow for ease of travel and minimal dragging.</p>	1		
141	<p>Border Battens Border battens will be schedule-40 1.5" pipe at 40'-0" in length. Each border batten will carry the following. One (1) Border weighing approximately 110 lb. Two (2) Leg Battens, one at either end, weighing approximately 60 lb. Batten will hang at 21'-6" from stage floor</p>	1		
142	<p>Leg Battens</p>	2		

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HAMPTON STREET AUDITORIUM
AV BID INFORMATION

	Leg battens will be schedule 40 1.5" pipe at 19'-0" in length, with tail down from border batten 1'-6". The end of the tail down pipe will be even with the batten of the corresponding border to allow legs to be "tied on" at varying widths. Tails down will use chain rated for overhead lifting. Pipe clamps will be J.R. Clancy 02622x series. Battens will hang at 20'-0" from stage floor			
143	Utility Batten	1		
	Utility batten will be schedule-40 1.5" pipe at 40'-0" in length. Batten will carry miscellaneous scenic objects weighing no more than 300 lb. Batten will hang at 21'-6" from stage floor.			
144	Cyc Batten	1		
	Cyc batten will be schedule 40 1.5" pipe at 19'-0" in length. Cyc batten will carry the following - One (1) Cyc. Batten will hang at 19'-0" from stage floor.			
			CHAIN MOTOR/RIGGING	SUBTOTAL
	GALLERY AV			
			4	
150	JBL Control 28 8" Speakers (8ohm)	1		
151	Crown XLS1002 Power Amplifier	1		
152	Denon DN500-BD Blu-ray/DVD Player	1		
153	Kanex Pro HDSC51D Presentation Scaler/Switcher	1		
154	BenQ MH741 4000 Lumen Video Projector (or similar)	1		
155	Da-Lite 92581 Cosmopolitan Motorized Screen (65"x116")	1		
156	Da-Lite Low Voltage Kit with wall mount screen control	1		
157	Furman M8-X Power Conditioner	1		
	Accessories to include: ceiling mount for projector, 6 space equipment rack for table top placement, speaker wire, connections from Blu-ray player to presentation, switcher, microphone wire connection to presentation switcher, video signal line from switcher to projector (HDMI), VGA, HDMI, and audio connection cables			
158		1		
			GALLERY AV	SUBTOTAL

SECTION 15010

MECHANICAL GENERAL PROVISIONS

PART 1: GENERAL

1.1 SCOPE:

a. Applicable requirements of the General Conditions, Supplementary General Conditions, and Special Conditions bound at the front of these specifications shall govern work under this heading.

b. The Contractor shall coordinate the work and equipment of this Division with the work and equipment specified elsewhere in order to assure a complete and satisfactory installation. Work such as excavation, backfill, concrete, flashing, wiring, etc., which is required by the work of this section shall be performed in accordance with the requirements of the applicable section of the specifications.

c. It is the intention of these specifications and drawings to call for finished work, tested and ready for operation. Whenever the word "provide" is used, it shall mean "furnish and install complete and ready for use".

d. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work, the same as if herein specified or shown.

e. This Contractor is referred to the General and Special Conditions of the Contract which shall form a part and be included in this section of the specification and shall be binding on this Contractor.

f. Some items of equipment are specified in the singular; however, the Contractor shall provide and install the number of items or equipment as indicated on the drawings, and as required for complete systems.

1.2 DEFINITION:

a. The word "Contractor" as used in this section of the specification refers to the HVAC and Plumbing unless specifically noted otherwise. The word "provide" means furnish, fabricated, complete, install, erect, including labor and incidental materials necessary to complete in place and ready for operation or use the item referred to or described herein and/or shown or referred to on the Contract Drawings.

1.3 CONTRACTOR'S QUALIFICATIONS:

a. It is assumed that the Contractor has had sufficient general knowledge and experience to anticipate the needs of a construction of this nature. The Contractor shall furnish all items required to complete the construction in accordance with reasonable interpretation of the intent of the Drawings and Specifications. Any minor items required by code, law or regulations shall be provided whether or not specified or specifically shown where it is a part of a major item of equipment, or of the control system specified or shown on the plans.

PART 2: PRODUCTS

2.1 MATERIALS AND WORKMANSHIP:

a. All materials and apparatus required for the work, except as specifically specified otherwise, shall be new, of first-class quality, and shall be furnished, delivered, erected, connected and finished in every detail, and shall be so selected and arranged as to fit properly into the building spaces.

Where no specific kind or quality of material is given, a first-class standard article as approved by the Architect shall be furnished.

b. The Contractor shall furnish the services of an experienced superintendent, who shall be constantly in charge of the installation of the work, together with all skilled workmen, fitters, metal workers, helpers and labor required to unload, transfer, erect, connect-up, adjust, start, operate and test each system.

c. Unless otherwise specifically indicated on the plans or specifications, all equipment and material shall be installed with the approval of the Architect in accordance with the recommendations of the manufacturer. This shall include the performance of such tests as the manufacturer recommends.

d. All work must be done by first-class and experienced mechanics properly supervised and it is understood that the Architect has the right to stop any work that is not being properly done and has the right to demand that any workman deemed incompetent by the Architect be removed from the job and a competent workman substituted therefor.

2.2 EQUIPMENT APPLICATION AND PERFORMANCE:

a. The Contractor and/or Equipment Supplier shall be responsible to see that equipment supplied is correct for the intended application and will perform within the limits of capacity, noise, life expectancy, pressure drop and space limitations intended for that equipment as shown on the plans or described in the specifications. The shop drawings shall show the capacity and operating characteristics of the equipment.

2.3 EQUIPMENT DEVIATIONS:

a. Where the Contractor proposes to use an item of equipment other than that specified or detailed on the drawings, which requires any redesign of the structure, partitions, foundations, piping, wiring or any other part of the mechanical, electrical, or architectural layout, all such redesign, and all new drawings and detailing required therefor, shall be prepared by the Sub-contractor at his own expense and submitted for approval by the Architect.

b. Where such approved deviation requires a different quantity and arrangement of ductwork, piping, wiring, conduit, and equipment from that specified or indicated on the drawings, the Contractor shall furnish and install any such ductwork, piping, structural supports, insulation, controllers, motors, starters, electrical wiring and conduit, and any other additional equipment required by the system, at no additional cost to the Owner.

2.4 MOTORS:

a. Motors shall be built in accordance with the latest standards of NEMA and as specified. Motors shall be tested in accordance with standards of A.S.A. C40 and conform thereto for installation resistance and dielectric strength. Each motor shall be provided with conduit terminal box, adequate starting and protective equipment as specified or required. The capacity shall be sufficient to operate associate driven devices under all conditions of operation and load and without overload, and at least shall be the horsepower indicated or specified. Each motor shall be selected for quiet operation. Motors 1 HP or more shall have a minimum acceptable nominal full load efficiency not less than the minimum as stated in the energy code.

2.5 DRIVES:

a. Machinery drives shall be provided for all power driven equipment specified in this section.

b. Drives shall be V-belt and shall be selected to overcome the starting inertia of the equipment without slippage, but in no case shall be less than 150% of the full motor load. Drives 1/2 HP and smaller may be provided with single belts. Drives 3/4 HP and larger shall be provided with the number of belts necessary to transmit the required power with 95% minimum efficiency.

c. Where adjustable type sheaves are indicated they shall be selected such that the schedule speed of the driven equipment is at the midpoint in the adjustment range of the sheave.

d. Where fixed type sheaves are indicated the Contractor shall include in his price changing sheave sizes once during the balancing period to achieve proper air quantities.

e. Sheaves shall be machined cast iron of the same manufacturer as the belt provided. Shop drawings shall be submitted of each drive which shall include actual transmission capacity of each drive.

2.6 FOUNDATIONS, SUPPORTS, PIERS, ATTACHMENTS:

a. This Contractor shall furnish and install all necessary foundations, supports, pads, bases and piers required for all air conditioning equipment, piping and for all other equipment furnished under this contract, and shall submit drawings to the Architect for approval before purchase, fabrication or construction of same.

b. Construction of foundations, supports, pads, bases, and piers where mounted on the floor, shall be of the same materials and same quality of finish as the adjacent and surrounding flooring material.

c. All equipment, unless otherwise shown, shall be securely attached to the building structure in an approved manner. Seismic restraint shall be provided in accordance with the Standard Building Code.

2.7 VIBRATION ISOLATION:

a. All work shall operate under all conditions of loads without any sound or vibration which is objectionable in the opinion of the Architect. If

requested, the Contractor shall record sound power level readings in all areas adjacent to mechanical rooms, over, under or beside, after all equipment is fully operational and all wall and ceiling systems are completed. Sound level readings shall not exceed NC levels as recommended in Table 2, Chapter 43 of 1995 ASHRAE Applications Handbook.

b. The readings are to be tabulated in the Maintenance and Operating Instruction Booklets.

c. Sound or vibration conditions in excess of listed quantities shall be corrected in an approved manner by the Contractor at his expense.

d. Unless otherwise noted mechanical equipment over one horsepower shall be isolated from the structure with resilient vibration and noise isolators supplied by one manufacturer to the Mechanical Contractor. Where isolator type and required deflection are not shown, equipment shall be isolated in accordance with the 1995 ASHRAE Applications Handbook, Chapter 43, Table 42. Submittals shall include complete design for the equipment bases, a tabulation of the design data for the isolators, including lateral stiffness, O.D., free operating and solid height of the spring isolators, free and operating height of the neoprene or fiberglass isolators. Selection of isolators for proper loading to obtain desired efficiency shall be the responsibility of the manufacturer of isolating units to suit the equipment being supplied on the job and shall be fully guaranteed by this supplier. All vibration isolation equipment complete with thorough selection data shall be submitted. Units shall be Vibration Eliminator Company, Mason, Peabody, or approved equal.

e. Flexible duct connections shall be provided at inlet and outlet of all fans or cabinets containing fans and shall be constructed such as to allow a minimum movement of 2 inches in any direction and will not restrict normal movement of any equipment.

2.8 DRAINS AND VENTS:

a. In addition to the drains and vents indicated on the plans and piping details, the Contractor shall install additional drains and vents as required to remove all water and air from the piping systems.

2.9 MOTOR STARTERS AND DISCONNECTS:

a. Individual motor controllers complete with auxiliary contacts, control transformers, push buttons, selector switches and remote push button stations not specifically specified to be furnished with the equipment shall be provided under this section. Motor controllers shall comply with NEMA Standards and be complete with proper size heaters and auxiliary contacts and shall be in NEMA enclosures as required. Unless otherwise noted, push button stations shall be oil-tight heavy duty type. Controllers shall be manual, magnetic, or combination type with disconnect switch or circuit breaker as indicated on the drawings or where required by the NEC. Controllers shall include motor overcurrent protection in each phase conductor. Each motor controller shall be provided with phenolic nameplate, black with 1/4" high letters and white border, indicating equipment served, attached using counter sunk screws.

b. The Electrical Contractor shall furnish and install all disconnecting switches unless otherwise indicated or specified. Where disconnecting

switches are indicated to be furnished under this Section, they shall be General Electric, Type TH in NEMA 1 enclosures, with voltage and amperage rating appropriate to the application. Unless otherwise noted, fuses shall be Buss "Fusetrons", or approved equal. Unfused motor disconnecting switches shall be Type TH in NEMA 1 or 4 applicable enclosures. Similar and equivalent equipment as manufactured by I.T.E., Square D, or Westinghouse is equally acceptable. Switches used as service switches shall bear such U.L. Label and nameplate on switch shall so indicate.

2.10 PAINTING:

a. Paint material shall be selected from the products listed below and, insofar as practical, products of only one manufacturer shall be used. Contractor shall submit to the Architect the listed manufacturer he proposes to use in the work. Should the Contractor desire to use products of a manufacturer not listed below, or products made by a listed manufacturer but not scheduled herein, Contractor shall submit complete technical information on the proposed products to the Architect for approval. Only products approved by the Architect shall be used.

1. Rust Inhibitive Primer:

- a. Devoe: Ready-Mixed Red No. 20.
- b. Duron: Deluxe Red Primer.
- c. Glidden: Rustmaster Tank and Structure Primer.
- d. Pittsburgh: Inhibitive Red Primer.

2. Galvanized Metal Primer:

- a. Devoe: Devoe Zinc Dust Primer.
- b. Duron: Duron Deluxe Galvanized Metal Primer
- c. Glidden: Rustmaster Galvanized Iron Metal Primer.
- d. Pittsburgh: Speedhigh Galvanized Steel Primer.

PART 3: EXECUTION

3.1 DUTIES OF CONTRACTOR:

a. Contractor shall furnish and install all materials called for in these Specifications and accompanying drawings, and must furnish the apparatus complete in every respect. Anything called for in the specifications and not shown on the drawings or shown on the drawings and not called for in the specifications, must be furnished by the Contractor.

b. Contractor is responsible for familiarizing himself with the details of the construction of the building. Work under these specifications installed improperly or which requires changing due to improper reading or interpretation of building plans shall be corrected and changed as directed by the Architect without additional cost to the Owner.

c. The Contractor shall follow drawings in laying out work and check drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space condition appear inadequate, Architect shall be notified before proceeding with installation.

d. The plans are diagrammatic and are not intended to show each and every fitting, valve, pipe, pipe hanger, or a complete detail of all the work to be done; but are for the purpose of illustrating the type of system, showing pipe sizes, etc., and special conditions considered necessary for the experienced mechanic to take off his materials and lay out his work. This Contractor shall be responsible for taking such measurements as may be necessary at the job and adapting his work to local conditions.

e. Conditions sometimes occur which require certain changes in drawings and specifications. In the event that such changes in drawings and specifications are necessary, the same are to be made by the Contractor without expense to the Owner, providing such changes do not require furnishing more materials, or performing more labor than the true intent of the drawings and specifications demands. It is understood that while the drawings are to be followed as closely as circumstances will permit, the Contractor is held responsible for the installation of the system according to the true intent and meaning of the drawings. Anything not entirely clear in the drawings and specification will be fully explained if application is made to the Architect. Should, however, conditions arise where in the judgment of the Contractor certain changes will be advisable, the Contractor will communicate with the Architect and secure his approval of these changes before going ahead with the work.

f. The right to make any responsible change in location of apparatus, equipment, routing of piping up to the time of roughing in, is reserved by the Architect without involving any additional expense to the Owner.

g. It shall be the duty of the Contractors to visit the job site and familiarize themselves with job conditions. No extras will be allowed because of additional work necessitated by, or changes in plans required because of evident job conditions, that are not indicated on the drawings.

h. Contractor shall determine the schedule of work as laid down by the General Contractor and must schedule his work to maintain the building construction schedule so as not to interfere with or hold up any other Contractors.

i. Contractor shall leave the premises in a clean and orderly manner upon completion of the work, and shall remove from the premises all debris that has accumulated during the progress of the work.

3.2 CODES, RULES, PERMITS AND FEES:

a. The Contractor shall give all necessary notices, obtain all permits and pay all sales taxes, fees and other costs, including utility connections or extensions, in connection with his work; file all necessary plans prepare all documents and obtain all necessary approvals of all authorities having jurisdiction. Obtain all required certificates of inspection for his work and deliver same to the Architect before request for acceptance and final payment of the work.

b. The Contractor shall include in his work, without extra cost to the Owner, any labor, materials, service, apparatus, drawings, in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on drawings and/or specified.

c. All materials furnished and all work installed shall comply with the National Fire Codes of the National Fire Protection Association, and with the requirements of all governmental departments having jurisdiction.

d. All materials and equipment for the electrical portion of the mechanical system shall bear the approval label, and shall be listed by the Underwriters' Laboratories, Inc..

e. All work shall be done in accordance with the IBC Code, and requirements of governmental agencies having jurisdiction.

3.3 COOPERATION WITH OTHER TRADES:

a. This Contractor shall give full cooperation to other trades and shall furnish any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

b. Where the work of the Contractor will be installed in close proximity to, or may interfere with the work of other trades, he shall assist in working out space conditions to make a satisfactory adjustment. If so directed by the Architect, the Contractor shall prepare composite working drawings and sections at a suitable scale not less than $3/8" = 1'-0"$, clearly showing how his work is to be installed in relation to the work of other trades. If the Contractor installs his work before coordination with other trades, or so as to cause any interference with work of other trades, he shall make the necessary changes in his work to correct the condition without extra charge.

c. The Contractor shall furnish to other trades, as required, all necessary templates, patterns, setting plans, and shop details for the proper installation of work and for the purpose of coordinating adjacent work.

3.4 RECORD DRAWINGS:

a. The Contractor shall furnish drawings showing dimensioned location and depths of all exterior piping and structures, and shall indicate any and all changes in location of piping, ductwork, equipment or valves from that shown on the Contract Drawings. The drawings shall consist of clean, legible sepia prints of the Contract Drawings, available from the Architect on which the Contractor shall mark all notes, dimensions, sizes and information required. The sepias shall be kept for this purpose only. Before final inspection the Contractor shall submit to the Architect eight (8) sets of black line prints of the sepias.

3.5 SURVEYS AND MEASUREMENTS:

a. This Contractor shall base all measurements, both horizontal and vertical, from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at the site and check the correctness of same as related to the work.

b. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Architect through the General Contractor, and shall not proceed with his work until he

has received instructions from the Architect.

3.6 SAFETY REQUIREMENTS:

a. All systems shall be installed so as to be safe operating and all moving parts shall be covered where subject to human contact. All rough edges of equipment and materials shall be made smooth.

b. All safety controls shall be checked under the supervision of the Architect's representative and eight (8) copies of test data showing setting and performance of safety controls shall be submitted to the Architect. All pressure vessels shall be ASME stamped and shall have stamped relief valves. Water heaters shall be provided with ASME stamped T & P relief valve.

3.7 SHOP DRAWINGS:

a. Contractor shall submit within ten (10) days after award of contract eight (8) copies of a complete list of all manufacturers to be used on the job.

No substitutions will be allowed after this date except in extenuating circumstances as determined by the Architect.

b. Submission of a manufacturer's name or equipment number on this list shall not be considered as equipment approved by the Architect.

c. The Contractor shall submit for approval eight (8) sets of detailed shop drawings of all equipment and all material required to complete the project, and no materials or equipment may be delivered to the job site or installed until the Contractor has in his possession the approved shop drawings for the particular material or equipment. The shop drawings shall be complete as described herein. The Contractor shall furnish the number of copies required by the General and Special Conditions of the Contract, but in no case less than eight (8) copies.

d. Prior to delivery of any material to the job site, and sufficiently in advance of requirements to allow the Architect ample time for checking, submit for approval detailed, dimensioned drawings or cuts, showing construction, size, arrangement, operating clearances, performance, characteristics and capacity. Each item of equipment proposed shall be standard catalog product of an established manufacturer and of equal quality, finish, performance, and durability to that specified.

e. Samples, drawings, specifications, catalogs, submitted for approval, shall be properly labeled indicating specific service for which material or equipment is to be used, Section and Article number of specification governing, Contractor's Name and Name of Job.

f. Catalogs, pamphlets, or other documents submitted to describe items on which approval is being requested, shall be specific and identification in catalog, pamphlet, etc. of item submitted shall be clearly marked. Data of a general nature will not be accepted. Data shall include eight (8) copies of computation sheets indicating how unit capacity was determined where ratings are at other than standard conditions. No payment for any equipment or labor will be allowed until all major pieces of equipment specified have been submitted to the Architect for approval.

g. Static pressure drops across fittings, dampers, heaters, attenuators, etc. shall not exceed minimum ASHRAE Standards when not specified.

h. The submittal of shop drawings shall be with the Contractor stamp affixed, this shall assure the Engineer that they are being submitted in accordance with Sub-Paragraph 4.13.4 in AIA Document A201. This stamp indicates that the Contractor, by approving and submitting shop drawings, represents that he has determined and verified all field measurements and quantities, field construction criteria, material, catalog material, and similar data that he has reviewed and coordinated information in the shop drawings with the requirements of the work and the Contract Documents. It, also, indicates that any deviation from the Contract Documents has been shown on the submittal and clearly defines the deviations from the specifications.

j. Approval rendered on shop drawings shall not be considered as a guarantee of quantities, measurements, or building conditions. Where drawings are approved, said approval does not mean that drawings have been checked in detail: said approval does not in any way relieve the Contractor from his responsibilities or necessity of furnishing material or performing work as required by the contract drawings and specifications.

k. Failure of the Contractor to submit shop drawings in ample time for checking shall not entitle him to an extension of Contract time, and no claim for extension by reason of default will be allowed.

l. All shop drawings and submittals are to be in the office of the Architect within 30 days after the Contracts have been awarded. Contractor shall be financially responsible for any price increase of shop drawing items from the time these drawings are issued until they are returned to the Contractor for purchase of items.

m. Contractor shall keep on the job at all times copies of all approved shop drawings.

3.8 OBSERVATION:

a. The project will be observed periodically as construction progresses. The Contractor will be responsible for notifying the Architect at least 72 hours in advance when any work to be covered up is ready for inspection. No work will be covered up until after observation has been completed on such items as piping and insulation, etc..

3.9 PERMITS, INSPECTION FEES, ETC.:

a. Contractor shall obtain and pay for all permits required, give all legal notices and pay all fees for inspection or otherwise required for the work.

3.10 ACCESSIBILITY:

a. Contractor shall be responsible for the sufficiency of the size of shafts and chases, the adequate clearance in double partitions and hung ceilings for the proper installation of his work. He shall cooperate with the General Contractor and all other Contractors whose work is in the same space, and shall advise the General Contractor of his requirements. Such spaces and

clearances shall; however, be kept to the minimum size required.

b. The Contractor shall locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Equipment shall include but not be limited to valves, traps, cleanouts, motors, controllers, switch-gear, and drain points. If required for better accessibility, furnish access doors for this purpose. Minor deviations from drawings may be made to allow for better accessibility and any change shall be submitted for approval.

c. The Contractor shall provide the General Contractor with exact locations of access panels for each concealed valve, control damper or other device requiring service. Access panels shall be provided and installed by the General Contractor and as specified in the Architectural sections of the specifications. Locations of these panels shall be submitted in sufficient time to be installed in the normal course of work.

3.11 CONCEALED PIPE:

a. In general, all pipe in finished spaces shall be run concealed in floors, walls, partitions and above ceilings.

b. Concealment of pipe and covering of same shall not be done until authorized by the Architect, after proper tests have been made. This applies to all interior work and exterior work.

3.12 CUTTING AND PATCHING:

a. This Contractor shall provide all cutting and patching necessary to install the work specified in this section.

b. No structural members shall be cut without the approval of the Architect and all such cutting shall be done in a manner directed by him.

c. This Contractor shall arrange for proper openings in building to admit his equipment. If it becomes necessary to cut any portion of building to admit his equipment, portions cut must be restored to their former condition by this Contractor through agreeable arrangement with the General Contractor.

3.13 SLEEVES AND PLATES:

a. Sleeves shall be provided for all mechanical piping passing through concrete floor slabs and concrete, masonry, tile and gypsum wall construction.

b. Where pipe motion due to expansion and contraction will occur, make sleeves of sufficient diameter to permit free movement of pipe. Where sleeves pass insulated pipes, the sleeves shall be large enough to pass the pipe and insulation. Check floor and wall construction finishes to determine proper length of sleeves for various locations; make actual lengths to suit the following:

1. Terminate sleeves flush with walls, partitions and ceiling.

c. Sleeves shall be constructed of schedule 40 black steel pipe unless otherwise indicated on the drawings.

d. Where piping penetrates fire rated floors or walls, penetrations shall be sealed with a U.L. approved fire stopping system. System shall be as manufactured and detailed by 3M Company or approved equal.

e. Escutcheon plates shall be provided for all exposed pipes and all exposed conduit passing through walls, floors and ceilings. Plates shall be nickel plated, of the split ring type, of size to match the pipe or conduit. Where plates are provided for pipes passing through sleeves which extend above the floor surface, provide deep recessed plates to conceal the pipe sleeves.

3.14 SCAFFOLDING, RIGGING, HOISTING:

a. This Contractor shall furnish all scaffolding, rigging, hoisting and services necessary for erection and delivery into the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

3.15 ELECTRICAL CONNECTIONS:

a. The Electrical Contractor shall furnish and install all wiring except: (1) temperature control wiring; (2) equipment control wiring and (3) interlock wiring. The Electrical Contractor shall receive from the Mechanical Contractor and mount all individually mounted motor starters and provide all power wiring to the motor terminals unless otherwise indicated. The Electrical Contractor will provide branch circuit protection and disconnects unless otherwise indicated or specified. The Mechanical Contractor shall provide all other control and protective devices, and perform all control and interlock wiring required for the operation of the equipment. Power wiring, from nearest panel, for control components (dampers, panels, etc.) shall be provided by the Mechanical Contractor unless specifically called for by Division 16.

b. After all circuits are energized and complete, the Electrical Contractor shall be responsible for all power wiring, and all control wiring shall be the responsibility of this Contractor. Motors and equipment shall be provided for current characteristics as shown on the drawings.

c. Motors less than $\frac{3}{4}$ HP shall be 115 volts, single phase. Motors $\frac{3}{4}$ HP and larger shall be 208 volts, 3 phase unless otherwise indicated.

d. It shall be the responsibility of this Contractor to check with the Electrical Contractor on service outlets provided for this Contractor, to determine that the switches and wiring provided are of adequate size to meet Code requirements for this Contractor's equipment. Any discrepancy shall be brought to the attention of the Architect before work is installed. Otherwise, any cost for changes shall be at the expense of this Contractor, and in any case electrical cost increase due to equipment substitution of different electrical characteristics shall be this Contractor's expense.

3.16 PIPE WORK:

a. All pipe work shown on the drawings and/or specifications or implied herein and required for a complete and operating system shall be done by experienced mechanics in a neat and workmanlike manner and subject to the approval of the Architect.

b. Because of the small scale of the drawings, it is not possible to

indicate all offsets, fittings and accessories which may be required and it shall be the responsibility of the Contractor to furnish and install all materials and equipment required for the operating systems.

c. The piping shall be installed as shown on the plans with strict conformity to the sizes listed and due provisions for expansion and contraction.

3.17 LUBRICATION:

a. All bearing, except those specifically requiring oil lubrication, shall be pressure lubricated. All lubrication points shall be readily accessible, away from locations dangerous to workmen. In areas where lubrication points are not readily accessible Contractor shall provide extended lubrication tubes to positions where lubrication can be easily accomplished. Pressure grease lubrication fittings shall be "Zerk-Hydraulic" type as made by the Stewart-Warner Corporation, or approved equal, for each type of grease required.

b. The Contractor shall furnish lubrication charts or schedules for each piece of equipment or machinery. The charts or schedules shall designate each point of lubrication. Eight (8) copies of charts and schedules shall be submitted to the Architect prior to final inspection and approved copies of each schedule and chart shall be framed by the Contractor in metal frames with glass front and installed in the Equipment Room.

3.18 PROTECTION:

a. The Contractor shall protect all work and material from damage, and shall be liable for all damage during construction.

b. The Contractor shall be responsible for work and equipment until all construction is finally inspected, tested and accepted. He shall protect work against theft, injury or damage; and shall carefully store material and equipment received on site which is not immediately installed. He shall close open ends of work including pipe, duct, or equipment with temporary covers or plugs during storage and construction to prevent entry of obstructing materials or dust and debris.

c. Provide a protective covering of not less than 0.004" thick vinyl sheeting (or a similar approved material) to be used in covering all items of equipment, immediately after the equipment has been set in place, (or if in a place of storage within the building under construction) to prevent the accumulation of dirt, sand, cement, plaster, paint or other foreign materials from collecting on the equipment and/or fouling working parts.

3.19 CLEANING:

a. Clean from all exposed insulation and metal surfaces grease, debris or other foreign material.

b. Chrome plated fittings, fixtures, piping and trim shall be polished upon completion.

3.20 LABELS AND INSTRUCTIONS:

a. Label all switches and controls furnished under this Section with engraved bakelite permanent labels to indicate the function of each and the apparatus serviced.

b. Post in the Equipment Room framed under glass the following:

1. Lubrication instructions listing all equipment which requires lubrication, the type of lubricant to be used and the frequency of lubrication.

2. Photostatic copy of wiring diagram of temperature controls.

3. Step-by-step operating instruction for each piece of equipment with control sequence description.

c. All units shall be marked with unit numbers in three inch high letters with unit designated numbers.

d. A tabulation shall be made of each panel number and circuit number serving each air conditioning unit, fan or other device with electrical service. This list shall be prepared and be ready to turn over to inspectors prior to calling for final inspection.

3.21 EQUIPMENT SERVICEABILITY:

a. All equipment shall be serviceable. All equipment shall be installed so that it can be removed. All equipment in or connected to piping systems shall have valves to isolate this equipment from the piping system. This includes, but not necessarily limited to control valves, water heaters, sensors, switches, pumps, traps and strainers. Unions (screwed or flanged) shall be provided so that all equipment is removable.

b. Equipment installed in walls, ceilings or floors shall be accessible for service or removal without cutting walls, etc..

c. Equipment requiring periodic service shall be installed to allow clearance for service and have removable panels, access doors, etc. through which the service is to be performed.

d. Elevated equipment shall have service platforms.

3.22 ACCEPTANCE OF EQUIPMENT:

a. In the event that the Architect considers it impractical, because of unsuitable test conditions, or some other factors, to execute simultaneous final acceptance of all equipment portions of the installation may be certified by the Architect for final acceptance when that portion of the system is complete and ready for operation.

b. Contractor shall make all necessary tests, trial operation balancing and balance tests, etc., as may be required as directed by the engineer to prove that all work under these plans and specification is in complete serviceable condition and will function as intended.

c. Upon completion of all work the system shall be tested to determine if

any excess noise or vibration is apparent during operation of the system. If any such objections are detected in the system or noisy equipment found, the Contractor shall be responsible for correcting same. Ducts, plenums and casings shall be cleaned of all debris and blown free of all particles of rubbish and dust before installing outlet faces. Equipment shall be wiped clean with all traces of oil, dust, dirt and paint spots removed. Temporary filters shall be provided for all fans that are operated during construction and after all construction dirt has been removed from the building, new filters shall be installed. Bearings shall be lubricated as recommended by the equipment manufacturer. All control valves and equipments shall be adjusted to setting indicated. Fans shall be adjusted to the speed indicated by the manufacturer to meet specified conditions.

3.23 GUARANTEE:

a. The Contractor shall guarantee the complete mechanical system against defect due to faulty materials, faulty workmanship or failure due to negligence of the Contractor. This guarantee will exclude normal wear and tear, maintenance lubrication, replacement of expendable components, or abuse. The guarantee period shall begin on the date of the final acceptance and shall continue for a period of 12 months during which time the Contractor shall make good such defective workmanship and materials and any damage resulting therefrom, within a reasonable time of notice given by the Owner.

b. The period of Guarantee for equipment driven by electrical motors, etc., shall be 12 months from the date of acceptance. Refrigeration compressors shall have a five (5) year warranty.

3.24 OPERATING AND MAINTENANCE INSTRUCTIONS:

a. Submit 5 sets of complete operating and maintenance instructions.

b. Bind each set in plain black vinyl-covered, hard back, 3-ring binder. Individual paper shall be Boorum and Pease Reinforced Ring Book Sheet, No. S-212-101 or equivalent.

c. Organize material in the following format:

1. Section I:

- (a) Name of Project
- (b) Address
- (c) Owner's Name
- (d) General Contractor's Name and Address
- (e) Mechanical or Plumbing Contractor's Name and Address
- (f) Control Subcontractor's Name and Address (Mechanical Only)
- (g) Warranty Dates

2. Section II:

- (a) Description of System

3. Section III:

- (a) Major Equipment List (name, manufacturer, serial no., H.P. and

- voltage) (include all equipment with motors)
- (b) Control Sequence Description (Mechanical Only)
- (c) Routine Maintenance Instructions in Step-by-Step form
- (d) Lubrication Charts and Schedules
- (e) Valve Schedules
- (f) Test and Balance Reports (Mechanical Only)
- (g) Sound Power Level Readings (Where Required)

4. Section IV:

- (a) Operating and Maintenance Instructions by Manufacturer
- (b) Shop Drawings (Major Requirement)
- (c) Wiring Diagrams
- (d) Control Drawings (Mechanical Only)

3.25 PAINTING:

- a. Painting shall be performed as detailed in Division 9.
- b. All surfaces to receive paint shall be dry and clean.
- c. Before priming, all surfaces shall be thoroughly cleaned of all dirt, oil, grease, rust, scale and other foreign matter. Cleaning shall be done with sandpaper, steel scraper, or wire brush where appropriate and necessary. Metallic surfaces which have been soldered shall be cleaned with benzol and all other metal surfaces washed with benzine.
- d. Mixing shall be in galvanized iron pans. Paint shall be mixed in full compliance with manufacturer's directions. Thinning shall be done only in full compliance with manufacturer's directions.
- e. Workmanship shall be highest quality, free from brush marks, laps, streaks, sags, unfinished patches, or other blemishes. Edges where paint joins other material or colors shall be sharp and clean without overlapping. Paint shall be brushed or sprayed on in strict compliance with manufacturer's directions and shall work evenly and be allowed to dry at least 48 hours before subsequent coating. Paint shall not be applied in damp or rainy weather or until surface has thoroughly dried. Contractor shall furnish and lay drop-cloths in all areas where painting is done as necessary to protect work of other trades. Varnish and enamel shall not be applied when temperature in the area is less than 60 degrees Fahrenheit nor paint when under 50 degrees Fahrenheit. Prior to final acceptance, Contractor shall touch up or restore any damaged finish. All insulation materials shall be provided with a paint suitable jacket.
- f. The following materials and equipment require painting as noted:
 - 1. All concealed piping, sheet metal, hangers and accessories except galvanized sheet metal or piping and tar coated cast iron piping:
 - (a) One coat rust-inhibitive primer except where exterior insulation is provided.
 - 2. All exposed, exterior and interior, piping, sheet metal, hangers and accessories, air handling units, etc. except galvanized sheet metal or

piping and tar coated cast iron piping:

(a) One coat rust-inhibitive primer except where exterior insulation is provided.

3. All concealed galvanized sheet metal, piping and accessories.

(a) One coat galvanized metal primer on threaded portions of piping and any damaged galvanized surfaces.

4. All exposed, exterior and interior galvanized sheet metal, piping and accessories.

(a) One coat galvanized metal primer except where exterior insulation is provided.

5. All tar coated cast iron piping, and accessories.

(a) Two coats tar coat paint on any damaged surfaces.

6. All exposed, exterior and interior, insulation equipment.

(a) Two coats exterior glass enamel over paint suitable insulation jacket.



Fire Protection Sprinkler System Specification Sheet

(Per §40-10-250)



Project Data

Project name: Renovation to the Hampton Street Auditorium

Location in South Carolina:	Address (street # & street name): 494 Hampton St	State project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
	City: Walterboro	County: Colleton State project #: n/a

Water Supply Information

(flow test data must be less than 1 year old per §40-10-250(A)(1))

Date test conducted: 10/20/2016 (Note 2)	Static pressure (psi): 56	Residual pressure (psi): 40	Flow (gpm): 790
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Distances of test gauges relative to the base of the riser:	Horizontal (ft): 1000	Vertical (elevation difference in ft): 5
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Source of water supply:	<input type="checkbox"/> Municipal dead-end <input checked="" type="checkbox"/> Municipal circulation <input type="checkbox"/> Other:	Pipe Size (in.): 6
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Test data by/from:	Name: Michael Walker	Title:
	Organization: Tych & Walker Architect	Telephone #:

Fire pump:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Pump Capacity (gpm):	Churn Pressure (psi):
	<input type="checkbox"/> New <input type="checkbox"/> Existing	Rated Pressure (psi):	Pressure @ 150% flow (psi):

On-site storage tank:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> New <input type="checkbox"/> Existing	Tank capacity (gallons):
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NFPA Hazard Classification

(attach continuation page when necessary)

Area #	Class or Code Reference	Description of Hazard Protected (commodity description, storage height, and arrangement as applicable.)
1	Light	Auditorium, Office and Amenities areas
2	Light	Attic/Floor Joist – combustible spaces
3	Ordinary Hazard Grp 2	Auditorium Stage

Design Parameters

(attach continuation page when necessary)

Area #	System Type	Density (gpm/ft ²) / Area (ft ²) or Other (reference code section)	Inside Hose (gpm)	Outside Hose (gpm)
1	Wet	0.10/1500	0	100
2	Dry	0.10/1950	0	100
3	Wet	0.20/1500	100	150

Seismic Design Data: S_S=

Codes and Standards

(attach continuation page when necessary)

Applicable Codes, Standards & Editions (i.e. "2006 IBC", "2007 NFPA 13", etc.) for the Scope of Work on the Sprinkler System

2015 IBC, 2013 NFPA 13, 2013 NFPA 14

Scope of work (such as sprinkler system A.G. from 1'-0" A.F.F., U.G. from tap to 5'-0" outside, etc.) and notes (attach continuation page when necessary):

- 1- Sprinkler System A.G. from 1'-0" AFF
- 2- Fire Protection Contractor to confirm available water flow and pressure by test prior to beginning design.

Specifier's Information

Name: David Pearce, PE	Certificate of Authorization	Professional Engineer's Seal
Engineering services provided through a firm: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Firm name: Mcknight-Smith-Ward-Griffin Engineers, Inc.		
Address: 4223 South Blvd.		
City: Charlotte		
State: NC Zip: 28209		
Phone #: 704-527-2112 Fax #: 704-523-1315		
E-mail:		

Revision No.: _____

Page _____ of _____

Signature: _____

Date: _____

SECTION 15180

TESTING, ADJUSTING, AND BALANCING

PART 1: GENERAL

1.1 SCOPE:

a. The provisions of Section 15010 apply to all the work in this Section.

b. Work shall be performed by technicians competent in the trade of testing and balancing environmental systems and shall be done in an organized manner utilizing appropriate test and balance forms.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

a. Manufacturer's cut sheets for all equipment to be used.

b. Sample balancing charts and forms.

c. Completed final balancing data.

PART 2: PRODUCTS

2.1 INSTRUMENTATION:

a. Instruments for use in the test and balancing procedures shall be of first quality and be accurately calibrated at the time of use. The following list is provided to indicate the instruments expected, however, other instruments as necessary to properly perform the work will be provided and subject to approval of the Architect.

1. Inclined manometer calibrated in no less than .006-inch divisions.

2. Combination inclined and vertical manometer (0 to 10 inch is generally the most useful).

3. Pitot Tubes. (Usually and 18 and 48 inch tube covers most balance requirements.

4. Tachometer. This instrument should be of the high quality self-timing type.

5. Clamp-on ampere meter with voltage scales.

6. Deflecting vane anemometer.

7. Rotating vane anemometer.

8. Thermal type (hot wire) anemometer.

9. Hook gage.

10. Dial and glass stem thermometers.

11. Sling psychrometer.

b. The accuracy of calibration of the field instruments used is of the utmost importance. All field instruments used in the balance should have been calibrated at least within the previous three months. Naturally, any suspect instruments should be checked more frequently.

PART 3: EXECUTION

3.1 SYSTEM START-UP:

a. Starting date for mechanical system shall be scheduled well in advance of expected completion date and shall be established a minimum of two weeks prior to acceptance date. The system shall be in full operation with all equipment functional prior to acceptance date.

b. Performance readings shall be taken and recorded on all air and water distribution devices and the system shall be balanced out prior to acceptance. Balancing of the system shall be accomplished with duct dampers and only minor adjustments made with grille dampers. Record and submit results in table form along side of scheduled quantities.

c. All controls shall be calibrated by qualified personnel prior to acceptance date. Thermostats shall be in close calibration with one another and shall operate their respective units without interference from adjacent units.

d. All units shall be checked out thoroughly and the following information recorded on each machine which shall include, but not be limited to information listed below. Check sheets shall be included in Operating and Maintenance instructional Manual.

1. Reciprocating Compressor:

- (a) Check General Condition
- (b) Check Sight Glass
- (c) Check Moisture Indicator
- (d) Check Oil Level
- (e) Read Oil Pressure
- (f) Read Head Pressure
- (g) Read Suction Pressure
- (h) Read Ambient Air
- (i) Read Motor Volts Each Phase
- (j) Read Motor Amps Each Phase
- (k) Lubricate Motor Bearing
- (l) Oil Safety Device Op.
- (m) Capacity Control Op.
- (n) Crankcase Heater Op.
- (o) Check Pressure Switch Op.
- (p) Check Superheat: Suction Temperature, Suction Pressure

2. Coils (Each):

- (a) Unit Number and Location
- (b) Manufacturer and Model No.

- (c) Return Air, Supply Air and Outside Air Temperature
- (d) Discharge Temperature, Cooling or Heating
- (e) Air Flow CFM, Entering and Leaving Static Pressure

3. Terminal Units (Each):

- (a) Unit No. and Location
- (b) Supply Air Static Pressure and Temperature
- (c) Maximum and Minimum CFM Settings
- (d) Check Control Sequence

4. Fans and Miscellaneous:

- (a) Unit No. and Use
- (b) Manufacturer and Model
- (c) Motor Nameplate Data
- (d) Motor Amps and Volts
- (e) Entering and Leaving Static Pressure
- (f) Fan RPM
- (g) Damper Operation

e. Contractor shall have in his possession a copy of a letter from the responsible Control Representative stating that the controls have been installed according to the plans; that the control sequence has been checked and that all controls have been calibrated.

f. Each unit shall be marked with 3" high letters in accordance with mechanical plan designation. Each panel and breaker number for all equipment shall be marked. Each control device shall be labeled.

SECTION 15250

INSULATION

PART 1: GENERAL

1.1 DESCRIPTION:

a. This section of specifications and related drawings describe requirements pertaining to insulation.

b. Provide all insulation in conjunction with equipment, piping and ductwork furnished under this division.

c. The provisions of Section 15010 apply to all the work in this section.

1.2 QUALITY ASSURANCE:

a. Products of the manufacturers listed under MATERIALS will be acceptable for use for the specific functions noted. Adhesives, sealers, vapor barriers, and coatings shall be compatible with the materials to which they are applied, and shall not corrode, soften or otherwise attack such material in either the wet or dry state.

b. Materials shall be applied subject to their temperature limits. Any methods of application of insulating materials or finishes not specified in detail herein shall be in accordance with the particular manufacturer's published recommendations.

c. Insulation shall be applied by experienced workers regularly employed for this type of work.

1.3 SUBMITTALS: Submit the following in accordance with Section 15010:

a. Catalog cuts.

b. Materials ratings.

c. Insulation instructions.

1.4 RATING:

a. Insulation and accessories such as adhesives, mastics, cements, tape and jackets, unless specifically expected, shall have a flame spread rating of not more than 25 and a smoke developed rating of not more than 50. Materials that are factory applied shall be tested individually. No fugitive or corrosive treatments shall be employed to impart flame resistance.

b. Flame spread and smoke developed ratings shall be determined by Method of Test of Surface Burning Characteristics of Building Materials, NFPA No. 255, ASTM E-84, UL 723.

c. Products of their shipping cartons shall bear a label indicating that flame and smoke ratings do not exceed above requirements.

d. Treatment of jackets or facings to impart flame and smoke safety shall be permanent. The use of water-soluble treatment is prohibited.

e. Certify in writing, prior to installation, that products to be used will meet RATING criteria.

PART 2: PRODUCTS

2.1 PIPE INSULATION:

a. Materials shall be heavy density fiberglass with an all-service jacket composed of an outer layer of vinyl, fiberglass scrim cloth, aluminum foil, and kraft paper, in that order, from outside to inside of pipe covering. To be used on all lines from -60⁰F. to 450⁰F., (asbestos-free calcium silicate) for temperatures over 450⁰F.

1. Domestic cold water supply and hot water supply and return.

2. Refrigerant Suction Piping - flexible foamed elastomeric plastic tubing with a density of 6 lbs./CF, K of 0.27 @ 70 degrees F., self-extinguishing, and a water vapor transmission of less than 0.05 perm in., flame spread rating 25 or less, smoke developed rating of 50 or less (ASTM E84-75).

b. Thicknesses:

1. Domestic cold water supply, - all pipe sizes 1".

2. Domestic hot water supply and return: Pipe size 2-1/2" and larger - 1-1/2", Pipe size 2" and smaller - 1".

2.3 DUCT INSULATION:

a. Materials. Insulation shall be Owens-Corning as specified hereinafter or products of Certain-Teed/St. Gobain or Manville. Adhesives shall be as manufactured by 3-M Foster or Insulation Manufacturer. Insulation shall have composite (insulation, jacket and adhesive) fire and smoke hazard rating as tested by ASTM E-84, not exceeding Flame Spread -25 and Smoke Developed -50.

PART 3: EXECUTION

3.1 PIPE INSULATION:

a. Application:

1. Insulation and surfaces to be insulated shall be clean and dry when insulation is installed and during the application of any finish.

b. Refrigerant Piping.

1. End joint strips and overlap seams shall be adhered with a vapor barrier mastic. Valves, fittings, and flanges shall be insulated with strips of pipe insulation, and finished with tape and vapor barrier mastic. Seal off vapor barrier to pipe at all fittings, hangers, and every 20 feet on straight runs.

b. Fiberglass Insulation:

1. All fiberglass pipe covering shall be furnished with self-seal lap and 3" wide butt joint strips. The release paper is pulled from adhesive edge, pipe covering closed tightly around pipe and self-seal lap rubbed hard in place with the blunt edge of an insulation knife. This procedure applies to longitudinal as well as circumferential joints. Under no circumstances will staples be allowed. Care shall be taken to keep jacket clean, as it is the finish on all exposed work. All adjoining insulation sections shall be firmly butted together before butt joint strip is applied, and all chilled water and cold water service lines shall have vapor seal mastic thoroughly coated to pipe at butt joints every 21' and at all fittings. All insulation outside shall be protected with aluminum weather-proof jacketing with lap-seal, and factory attached moisture barrier. The aluminum shall be .016 gauge (3303-H14 alloy) of embossed pattern. It shall be applied with a 2" circumferential and 1-1/2" longitudinal lap and be secured with aluminum bands 3/8" wide 8" o.c.. All elbows shall be covered with the same .016 aluminum with factory applied moisture barrier. All fittings, valve bodies, unions, and flanges shall be finished as follows:

(a) Apply molded or segmental insulation to fittings equal in thickness to the insulation on adjoining pipe and wire in place with 2#14 copper wires.

(b) Apply a skim coat of insulating cement to the insulated fitting, if needed, to produce a smooth surface. After cement is dry, apply Owens-Corning Fiberglass Fitting Mastic, Type C, UL labeled.

(c) Wrap the fitting with fiberglass reinforcing cloth overlapping the preceding layer by 1 to 2". Also, overlap mastic and cloth by 2" on adjoining sections of pipe insulation.

(d) Apply a second coat of mastic over cloth, working it well into mesh of cloth and smooth the surface. Mastic to be applied at the rate of 40 square feet per gallon. All flanges and fittings on hot and cold lines in utility tunnels shall be insulated according to above. Omit insulation on flanges and unions over 60 degrees F. If painting is required, no sizing is necessary. To maintain the non-combustibility of the system only Glidden acrylic latex paint (#5370) is to be used.

3.2 DUCT INSULATION:

a. All vapor barriers and joints shall be sealed to prevent condensation. Clean and dry all ductwork before installing insulation. All weld joints shall be wire brushed and give one (1) coat of red primer before insulating. Staples will not be permitted in insulation.

b. Wrapped Duct:

1. All low pressure round ducts and all rectangular supply, return and outside air ducts unless noted otherwise on plans shall be insulated by wrapping with 1-1/2" thick, minimum "R" value = 5, fiberglass with vapor barrier jacket with joints overlapped a minimum of two inches. Insulation shall be adhered to duct with non-combustible insulation bonding adhesive applied in 4" strips, 8" on center. All joints shall be secured with flare

door staples on 3" centers through all laps over duct tape.

c. Ducts Installed In Unconditioned Spaces:

1. All supply and return air ducts that are to be installed in unconditioned spaces shall be wrapped with a layer of duct wrap as specified above if lined and shall have an additional layer of duct wrap if unlined. Minimum "R" value in attics as 8.

SECTION 15410

BASIC MATERIALS AND METHODS (PLUMBING)

PART 1: GENERAL

1.1 DESCRIPTION:

a. The provisions of Section 15010 apply to all the work in this Section.

b. This section of specifications and related drawings describe requirements pertaining to basic materials and methods.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

a. Manufacturer's cuts.

b. Certified capacity ratings.

c. Installation instructions.

d. Operating and Maintenance Instructions.

PART 2: PRODUCTS

2.1 PIPE SPECIALTIES:

a. Pipe specialty equipment shall be provided on all piping on all piping system as specified or as required by code.

b. Provide dielectric unions on the inlet and outlet connection to water heaters storage tanks and at all places where dissimilar metals join in piping and plumbing systems. Use dielectric unions as manufactured by Watts Regulator Inc., Zurn/Wilkins, Victaulic or equal.

c. Vacuum breaker shall be provided on each hose outlet. This includes hose bibbs, service sinks, wall hydrants, etc.

d. A system of pulsation absorbers shall be installed, the system shall be selected in accordance with PDI Standard W-201. Absorbers shall be by JOSAM, ZURN, SMITH or approved equal.

e. Valves and Accessories:

1. Provide valves as indicated and required as scheduled below. Figure numbers are provided to indicate type and quality. Insofar as possible, all valves shall be by a single manufacturer as specified or approved equal.

<u>MANUFACTURER</u>	<u>GATES 125#</u>	<u>GLOBES 150#</u>	<u>CHECK 125#</u>
NIBCO	T134	T235-Y	T413-B
CRANE	428-UB	7	37
STOCKHAM	B-105	B-22	B-319

f. SOLDER ENDS, SCREWED BONNET GATES, UNION BONNET GLOBES, (Globes with

Teflon disc):

<u>MANUFACTURER</u>	<u>GATES 125#</u>	<u>GLOBES 150#</u>	<u>CHECK 125#</u>
NIBCO	S111	S235-Y	S413-B
CRANE	428-UB	-	1342
STOCKHAM	B-109	B-24	B-309

g. Hose end gate valves, 3/4 - 2" shall be JENKINS NO. 372, CRANE 451, POWELL 503 or approved equal.

h. Wall hydrants shall be cast brass non-freeze, heavy duty with polished chrome face, brass operating parts, adjustment locknut, renewable nylon seat, 3/4" standard hose outlet, locking cover.

2.2 HANGERS AND SUPPORTS:

a. Pipe supports shall be provided for all piping. Pipe support components shall conform to accepted standards.

1. Hangers shall adequately support the piping system. On horizontal, hangers shall be located near or at changes in piping direction and concentrated loads. They shall provide vertical adjustment to maintain pitch required for proper drainage. They shall allow for expansion and contraction of the piping.

(a) Horizontal lines of copper tubing shall be supported as below:

<u>Nominal Tubing Size</u>	<u>Rod Diameter</u>	<u>Maximum Spacing</u>
Up to 1 inch	3/8 inch	6 feet
1-1/4" and 1-1/2"	3/8 inch	8 feet
2 inches	3/8 inch	9 feet
2-1/2 inches	1/2 inch	9 feet
3 and 4 inches	1/2 inch	10 feet

(b) Horizontal cast iron soil pipe shall be supported with one hanger for each pipe length and at fittings as required for proper support with hanger located close to hub or joint.

2. Devices for attaching pipe supports to building structure shall be provided as required and shall be as herein specified.

(a) Hangers shall be as manufactured by Grinnell for wood construction. Equals by other manufacturers will be accepted.

3. Intermediate attachments shall be hanger rods of size herein before specified and with vibration control devices as specified in the separate section of the Division. Rods may be continuous threaded or threaded each end as required. No chain, wire or perforated strap hangers shall be used.

4. Pipe attachments and spring hangers shall be as specified in individual section of this Division of the specifications.

2.3 ESCUTCHEON PLATES:

a. Pipes entering finished or occupied areas shall be provided with polished chrome plated escutcheon plates, held in place with set screws. Escutcheon plates shall be Grinnell Figure 20 or approved equal.

PART 3: EXECUTION

3.1 GENERAL:

a. All products shall be installed as per the manufacturer's instructions.

3.2 CLEANING UP:

a. Cleaning up is the responsibility of the Contractor. During construction, the site shall be kept neat so as not to be a safety hazard. Upon completion of the work, all surplus construction materials and debris shall be removed from the property.

3.3 PIPE TEST:

a. All new soil, waste, drainage and vent piping shall be tested before fixtures are installed by capping or plugging the openings, and filling the entire system with water to a minimum height of 10 feet above grade or the highest fixture opening of the section being tested, and allowing it to stand thus filled for a period of four hours.

b. All water supply piping shall be tested before fixtures or faucets are connected by capping or plugging the opening and applying a hydrostatic test pressure of 150 psig.

c. Pipe found defective during tests shall be replaced at no additional cost to the Owner. Pipe joints found defective during tests shall be taken apart and remade.

d. The Contractor shall notify the Architect 72 hours before tests are to be made. Concealed work shall remain uncovered until specified tests are completed. All tests shall be conducted in the presence of the Architect or his representative. Repairs to defects disclosed by the test shall be made with new materials. Caulking of screwed joints, cracks or holes will not be permitted. Test shall be repeated until system is proven tight.

SECTION 15420

DOMESTIC WATER SUPPLY PIPING

PART 1: GENERAL

1.1 SCOPE:

a. The provisions of Section 15010 and 15250 apply to all the work in this Section.

b. Contractor shall furnish and install domestic water systems as shown on the plans complete in all respects.

c. Connect to water main and provide supply lines to all fixtures and equipment requiring water service.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

a. Manufacturer's cuts.

PART 2: PRODUCTS

2.1 WATER PIPING AND FITTINGS:

a. Water Piping:

1. All water piping shall be hard drawn copper tubing ASTM B 88 Type "L" above grade, Type "K" below grade. Fittings for copper tubing shall be ANSI B16.18 or B16.22 solder joint fittings. Ends of pipe shall be reamed, pipe and fittings cleaned. Use only 95-5 (95% tin and 5% antimony) solder with non-corrosive flux on 1-1/4" and smaller and on 1-1/2" and larger use silver solder (Minimum 12% Silver), with a melting point greater than 1000°F. Submit solder for approval.

PART 3: EXECUTION

3.1 INSTALLATION:

a. Piping shall be installed so as to be free floating. 125 pound copper sweat pattern unions shall be provided in the piping as indicated on the drawings. Provide dielectric insulating unions where copper connects to ferrous piping. Use brass nipples or copper adapters at connections to fixtures.

b. Provide isolation valves for each individual riser and toilet group as required to service system.

c. Runouts:

1. Runouts to fixtures shall be held in place in the wall with copper straps at the fixture stop to prevent pipe movement at this point.

2. Runouts to urinal and water closet flush valves in stud walls shall have a piece of 1/2" copper flattened and soldered to the runout and

fastened to studs with 1/4" bolts with nuts and flat washers (two bolts each end).

d. Unions:

1. Unions shall be installed at each piece of equipment.

3.2 STERILIZATION OF WATER PIPING:

a. Sterilization of water piping shall be in accordance with AWWA Specification 0601. After the pressure tests have been made, the system shall be flushed with water. The chlorinating material shall be liquid chlorine-water mixture calcium hypochlorite, sodium hypochlorite, or chlorinated lime-water mixture. The solution shall have not less than 50 PPM available chlorine. The disinfecting solution shall be allowed to remain in the system for a minimum period of 24 hours. After disinfection, the system shall be flushed with clean water until residual chlorine content is not greater than .02 PPM. After the system is flushed, water samples shall be taken and tested at the Contractor's expense by an independent testing lab and reports shall be furnished to the engineer's for approval. If the water is found unsafe for human consumption, the disinfection procedure shall be repeated.

3.3 TESTING OF WATER PIPING:

a. All water supply piping shall be testing before fixtures or faucets are connected by capping or plugging the openings and applying a hydrostatic test pressure of 150 psig. Pressure shall hold constant (exception for temperature variation) for a period of 24 hours or as directed by the Engineer.

SECTION 15440

SOIL, WASTE, VENT AND DRAIN PIPING

PART 1: GENERAL

1.1 SCOPE:

a. The provisions of Section 15010 apply to all the work in this Section.

b. All fixtures and equipment specified as requiring waste shall be connected to the sewer system. The sewer system shall be extended as shown on the drawings.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

a. Manufacturer's cuts.

b. Installation instructions.

PART 2: PRODUCTS

2.1 SOIL, WASTE, VENT AND DRAIN PIPING:

a. Soil, waste, vent and drain piping shall be schedule 40 DWV PVC. Pipe and fittings shall comply with the standards referenced in the Standard Building Code.

b. All condensate drain lines shall be run in schedule 40 weight PVC pipe or Type "L" hard drawn copper. Drains shall be run in a neat manner to the hub drain and turned down at the hub drain, unless otherwise indicated. Minimum of 1-1/4" unless otherwise shown.

2.2 SPECIALTIES:

a. Cleanout Plugs: Cleanouts shall be of the same size as the pipe except that cleanout plugs larger than 4" will not be required. Cleanouts shall consist of long sweep fittings to an easily accessible place.

b. Traps: Each fixture and piece of equipment including floor drains and hub drains, requiring connections to the drainage system shall be equipped with a trap placed as near to the fixture as possible. No fixtures shall be double trapped. Traps for floor drains and hub drains shall be deep seal "P" traps. All other traps shall be supplied under the "Fixture Paragraph".

c. Floor Flanges: Floor flanges shall be provided for connection of all floor outlet water closets. The joint between the closet trap and the floor flange shall be made tight with red or black rubber as made by Grinnell fixture setting gasket.

d. Flashing: Vent pipes shall be flashed and made watertight at the roof. Flashing shall extend not less than 8" from the vent pipes in all directions. Minimum vent through the roof shall be 2" size.

e. Floor Drains: Floor drains shall be sized as indicated on the drawings, and shall be Josam or equal. See plans for model number and size. Drains by Zurn or Wade will be acceptable.

PART 3: EXECUTION

3.1 PIPE INSTALLATION:

a. Horizontal drain and waste piping with the building shall be given a grade of 1/8" per foot below ground and 1/8" per foot above ceilings unless otherwise indicated on the drawings. Piping 3" and smaller shall have minimum grade of 1/4" per foot. Main vertical soil and waste stacks shall be extended full size to the roof line and 12" above as vents, unless otherwise indicated on the drawings. Reduction of the size of drainage piping in the direction of flow is prohibited. Vent or tap tees will not be permitted on waste lines.

3.2 CLEANOUTS:

a. Cleanouts shall be installed where shown on the drawings but in no case shall they be more than 50 feet apart in piping 3" and under and 75 feet apart in piping 4" and larger.

3.3 PIPE TEST:

a. All new soil, waste, drainage and vent piping shall be tested before fixtures are installed by capping or plugging the openings, except for the highest opening, and filling the entire system with water. If the system is tested in sections the minimum acceptable head shall be 10 ft. of water column. In testing successive sections, at least the upper 10 ft. of the preceding section shall be tested so that no joint or pipe within the building (except the uppermost 10 ft. of the system) shall have been submitted to a test of less than 10 ft. head of water. The water column shall be allowed to stand thus filled for a period of four hours.

b. Pipe found defective during test shall be replaced at no additional cost to the Owner. Pipe joints found defective during tests shall be taken apart and remade.

SECTION 15450

PLUMBING FIXTURES AND EQUIPMENT

PART 1: GENERAL

1.1 DESCRIPTION:

a. The provisions of Section 15010 apply to all work in this Section.

b. The Contractor shall furnish and install all plumbing fixtures complete with all equipment, fittings, trimmings and supports as specified.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

a. Manufacturer's cuts.

b. Certified capacity ratings.

c. Installation instructions.

d. Operating and Maintenance Instructions.

PART 2: PRODUCTS

2.1 FIXTURES:

a. All fixtures shall be Grade "A". The name or trademark of the manufacturer shall be printed or pressed on all water closets and lavatories and a label, which cannot be removed without destroying it, containing the manufacturer's name and trademark and the quality of the fixtures, shall be affixed to all fixtures.

b. Exposed metal parts of fixtures shall be chromium plated. Where fixtures are to be hung from the wall, the fixture or fixture hanger shall be supported by concealed 3" steel washers and through bolts. Furnish traps and supply fittings with stops for all fixtures.

c. All faucets and supply fittings shall be of the same manufacturer as the fixture except as noted otherwise. All exposed supply and waste piping shall be chrome plated. Supply piping serving flush valves shall be equipped with chrome plated pipe cover.

d. Fixtures shall be white or stainless steel as indicated on drawings.

e. Direct connections between domestic water system and sanitary waste system will not be permitted.

f. All enameled cast iron fixtures shall be Acid Resisting (AR) and shall bear manufacturer's symbol signifying AR materials.

g. All flush valves shall be quiet acting, non-hold open feature and shall have sweat solder adaptor kit. Escutcheon shall be chrome plated brass with set screws.

h. Threaded adapters serving lavatory supply piping shall be concealed in walls. Runouts to fixture shall be chrome plated brass pipe.

i. All exposed waste piping serving fixtures, except service sinks, shall be 17 gauge chrome plated brass pipe with cast brass P-trap. Under Counters will be considered exposed areas.

j. Cut-Off Stops: All fixtures shall have individual loose key cut-off stops on cold and/or hot water lines except as specified hereinafter or indicated on the drawings.

k. Provide appropriate wall hangers for all wall-hung fixtures.

2.3 ELECTRIC WATER HEATER:

a. Type. The water heaters shall be electric with automatic controls

b. Capacity. The storage capacity and recovery capacity shall be shown on the drawings.

c. Tank. Tank shall be heavy gauge steel with inner lining of glass. Tank shall have insulation completely around tank, top and bottom. There shall be a hose thread drain valve at bottom of tank and any pipe nipples used in water connections shall have interior surface to match interior surface of tank. Dielectric unions shall be used to connect glass coated galvanized pipe nipples to cover water pipe. Unit shall be constructed in accordance with ASME Code Section VIII and shall bear the appropriate symbol and be listed with the National Board as required.

d. Jacket. The water heater shall have a jacket of cold rolled steel with white baked on enamel finish. Jacket shall have provisions for access to all controls and heating elements.

e. Relief Valve. The heater shall be equipped with an ASME approved T & P relief valve pipe to drain.

f. Mounting. The water heater shall be set dead level in both directions.

g. Cleaning. The water heater shall be cleaned and all construction dirt removed at the completion of the project.

h. Insulation shall meet requirements of latest ASHRAE Standard.

i. Units with a storage capacity of 120 gallons or more shall be constructed and stamped pursuant to the ASME Code, Section IV, or Section VIII, Division 1, as applicable.

PART 3: EXECUTION

3.1 GENERAL:

a. Install all fixtures as per manufacturer's requirements and local codes.

3.2 CAULKING:

a. Fixtures, fittings and accessories shall be caulked at floor and wall perimeter and behind flanges and fittings in a fashion that the wall openings are sealed, but no sealant is exposed.

SECTION 15500

FIRE PROTECTION

PART 1: GENERAL

1.1 SCOPE:

a. This specification includes the furnishing of all labor, materials, equipment and service necessary or incidental to the complete installation testing, adjusting and placing into service of the several systems of fire protection, all as shown on the drawings and as hereinafter specified. Drawings and specifications are considered as mutually explanatory and all work called for by one and not the other shall be performed as though called for by both. In cases of conflicting information, the Architect/Engineer shall be notified at once in writing. Where incidental equipment or appurtenances as required, and are not listed as shown, same shall be furnished as required for a complete fire protection system.

b. Work included in this specification shall consist of, but is not necessarily limited to, the following items:

1. Arrange for, obtain and bear the cost of necessary permits, bonds and fees for the automatic sprinkler work.

2. Make the connection to the existing main.

3. Furnish and install sprinkler system to sprinkler the building where shown on the drawings. System to include all pipe, hangers, sprinkler heads, valves, controls, drains, alarms, pumps and starters.

4. Furnish and install a system of standpipes complete with valves, fire hose racks and fog nozzles, and Fire Department valves.

5. Furnish and install Fire Department connections located where shown on the drawings.

6. Furnish and install all alarms, flow switches and alarm bells on the inside and outside of the building.

7. Do the testing of all piping work and necessary cleaning of the fire protection work.

8. Furnish the shop drawings and certificates of inspection.

9. Periodically remove from the job site all rubbish or debris resulting from the fire protection work.

10. Do all cutting and patching.

11. Miscellaneous items as hereinafter specified.

1.2 RELATED DOCUMENTS:

a. The following related document shall apply to and govern the work in

this section of the specifications:

1. General Conditions Section 15010.

1.3 QUALIFICATIONS OF CONTRACTORS:

a. The Contractor for the Fire Protection installation shall be a qualified Fire Protection Contractor, regularly engaged in the installation of automatic fire sprinkler systems and other fire protection equipment.

1.4 WORK BY OTHERS:

a. Electrical Contractor to wire all water flow switches and tamper switches on valves to central alarm panel. He shall also wire alarm bells.

1.5 STANDARDS, CODES AND REGULATIONS:

a. The applicable current standards for the fire protection systems shall be the National Fire Protection Association (N.F.P.A.), N.F.P.A. - 13 International Building Code, and all other applicable state codes and ordinances.

1.6 SUBMITTAL (SHOP) DRAWINGS AND DATA:

a. Before commencing any work or providing materials at the job site for this project, the Fire Protection Contractor shall submit to the Architect, for his approval, eight copies of catalog cuts and descriptive matter regarding materials and equipment which he intends to furnish and install. Shop drawings and data shall be submitted specifically for, but not limited to, the following items:

1. Sprinkler heads, valves, pipe, pipe hangers and couplings, hose valves and accessories, fire department connections, fire pumps and jockey pump.

b. The Fire Protection Contractor shall prepare construction (shop) drawings for automatic sprinkler work showing the arrangement of all automatic sprinkler piping and equipment, spacing of sprinkler heads, elevations of lines and details necessary for the conduct of work. The Contractor shall submit to the Architect, for approval, four (4) sets of his construction drawings which have been examined and approved by the Owners Insurance Underwriter.

c. The Fire Protection Contractor shall not proceed with the installation of the work until he has received the Architect's approval of his shop drawings.

d. The Architect's approval of shop drawings, catalog cuts, etc., shall not relieve the Fire Protection Contractor of the responsibility for any errors or omissions which may exist in the items submitted, nor shall it relieve his from responsibility for deviations for the contract drawings or specifications. The stamped approval of the shop drawings, catalog cuts, etc. shall not be construed as a complete check, but will indicate only that the general design and method of construction is satisfactory.

e. In the event additional clarifying details are required by inspection

authorities, the details shall be prepared and approval of same secured by the Fire Protection Contractor at his expense.

PART 2: PRODUCTS

2.1 GENERAL:

a. All materials and equipment furnished under this Section (15501) shall be new, approved by Underwriters' Laboratories, Inc. (UL), Factory Mutual (F/M), and American Water Works Association (AWWA) where applicable.

2.2 SITE FIRE WATER PIPING:

a. Underground pipe shall be ductile iron, push-on or mechanical joint, thickness Class 50, 350 PSI pressure rating, in accordance with ANSI A21.51, tar coated outside, cement mortar lined inside in accordance with ANSI A21.4. Full lengths of pipe shall be utilized to the greatest extent possible.

b. Underground pipe shall be polyvinyl chloride (PVC) DR 18 pressure pipe, with push-on joint, thickness Class 150 in accordance with AWWA C900. Full lengths of pipe shall be utilized to the greatest possible.

b. Pipe penetrating building floors, building walls, and pit walls shall be ductile iron, thickness Class 50, 350 PSI pressure rating, in accordance with ANSI A21.51, tar coated outside, cement mortar lined inside in accordance with ANSI A21.4. Pipe shall be push-on or mechanical joint on one end and flanged on the other.

2.3 FITTINGS (SITE FIRE WATER):

a. Push-on joints shall be in accordance with ANSI A21.11. Gasket material shall be neoprene.

b. Mechanical joints shall be in accordance with ANSI A21.11. Gasket material shall be neoprene. The standard bolts and nuts of the pipe manufacturer shall be used. These bolts and nuts shall be corrosion-resistant.

c. Flanged joints shall be in accordance with ANSI B16.1. Gaskets shall be full face of 1/8 inch minimum thickness red rubber. All flange bolts shall be hexagon head machine bolts with heavy hexagon nuts, cadmium plated, having dimensions in accordance with ANSI B18.2. A bituminous coating of coal tar or asphalt base shall be applied to flanges, bolts and nuts at the time of installation.

d. Fittings (for ductile iron pipe) shall be push-on or mechanical joint, 250 PSI pressure rating, in accordance with ANSI A21.10, tar coated outside, and cement mortar lined inside in accordance with ANSI A21.4.

e. Fittings in pits shall be flanged, cast iron, or ductile iron, short body, 250 PSI pressure rating, in accordance with ANSI A21.10, tar coated outside, cement mortar lined inside in accordance with ANSI A21.4.

f. Tapping sleeve shall be mechanical joint, Class 125 outlet flange, 200 PSI pressure rating tapping sleeve, flanges, and bolts and nuts shall be coated with a bituminous coating of coal tar or asphalt base.

2.4 VALVES (SITE FIRE WATER):

a. Tapping valve shall be non-rising stem (NRS) gate valve flanged by mechanical joint, iron body, bronze mounted, 175 PSI pressure rating, with indicator post flange, and two inch square wrench nut turning counter-clockwise to open. Valve shall be tested and approved by AWWA, UL, and/or FM.

b. Non-rising stem gate valves shall be flanged or mechanical joint (as noted on plans), iron body, bronze mounted, 175 PSI pressure rating, with indicator post flange, and two inch square wrench nut turning counter-clockwise to open. Valve shall be tested and listed by AWWA, UL, and/or FM.

c. Outside screw and yoke (OS&Y) gate valves shall be flanged, iron body, bronze mounted, and 175 PSI pressure rating, with handwheel turning counter-clockwise to open. Valve shall be tested and listed by AWWA, UL, and/or FM.

d. Check valves, shall be flanged, swing type, iron body, bronze mounted, bronze seat ring and disc ring, and 175 PSI pressure rating. Valve shall be tested and listed by AWWA, UL, and/or FM.

e. Detector check valves shall be flanged, iron body, bronze seat, bronze disc, and 175 PSI pressure rating. Meter shall be 5/8" diameter bronze with gate valve and check valve in by-pass. Valve shall be tested and listed by UL and/or FM.

f. Double check detector shall be a complete unit consisting of the mainline double check assembly and the low flow by-pass double check assembly complete with low flow magnetic drive type meter, 5/8" x 3/4" size, for low flow registration 1/4" GPM to 20 GPM. The main line shall have two poppet-type spring loaded check valves, two gate valves, three test cocks and meter. The by-pass checks and shut-off valves, together with the meter, shall be assembled to the main-line checks as an integral unit. The assembly shall be flanged, 175 PSI pressure rating. A factory representative shall supervise and inspect the installation of the backflow preventer. After the installation has been approved by the factory representative, the factory representative shall send a formal letter of approval to the Architect.

g. Backflow preventer shall be double check type, flanged 150 PSI working pressure, with two OS&Y shut-off valves. The backflow preventer shall meet all requirements of the University of Southern California Foundation for Cross Connection Control and AWWA Standard C506. The backflow preventer shall also be tested and listed by UL and/or FM. A factory representative shall supervise and inspect the installation of the backflow preventer. After the installation has been approved by the factory representative, the factory representative shall send a formal letter of approval to the Architect.

h. Fire hydrant shall be of sufficient length of allow the centerline of the nozzles to be 18 inches above finished grade, with 6" flanged or mechanical joint inlet connection, 5-1/4" valve opening, 4" pumper nozzle, and two 2-1/2" male hose nozzles. The hose nozzles threading shall be National Standard, Pentagon measuring 1-1/2" from point to opposite flat, same as Owner's existing fire hydrants and municipal fire hydrants, with operating wrench, and shall turn counter-clockwise to open. Hydrant shall be tested and listed by AWWA, UL, and/or FM.

i. Indicator posts shall be adjustable type and of sufficient length to allow the target window to be 30 inches above finished grade. Operating nut shall be National Standard Pentagon measuring 1-1/2" from point to opposite flat, with locking type operating wrench and shall turn counter-clockwise to open. Indicator post shall be tested and listed by UL and/or FM.

j. Valve box shall be adjustable sliding type and of sufficient length to allow top to terminate flush with finished grade, with round base and lid marked "WATER" in integrally cast raised letters. Valve box shall be furnished with valve operating wrench of sufficient length to extend 3 feet above finished grade when engaged with valve.

k. Fire department connection shall be 2-way sidewalk, Siamese type, 2-1/2 x 2-1/2 x 4" size, cast brass body, cast brass escutcheon, and brass female hose inlets having individual clapper valves, plugs, and chains. Inlet threading shall be National Standard, same as municipal fire department. Connection shall be lettered "AUTOMATIC SPRINKLER" and/or "STANDPIPE". Fire department connection shall be tested and listed by UL and/or FM.

2.5 AUTOMATIC SPRINKLER AND STANDPIPE SYSTEMS:

a. Pipe shall be new, designed for 175 PSI working pressure, conforming to ASTM specifications, and have the manufacturer's name or brand, along with the applicable ASTM standard, marked on each length of pipe.

b. Pipe shall be steel, Schedule 40, black, and in accordance with specifications ASTM A120 or A53 or Schedule 10, black, and in accordance with specifications ASTM A135.

c. Tubing shall be copper, Type L, suitable to withstand water working pressure not less than 175 PSI, and in accordance with specification ASTM B75 or ASTM B88.

2.6 FITTINGS (AS AND SP):

a. Screwed fittings shall be cast iron, 125 pound Class, black, and in accordance with ANSI B16.4 or malleable iron, 150 pound Class, black, and in accordance with ANSI B16.3.

b. Flanged fittings shall be cast iron, short body, Class 125, black, and in accordance with ANSI B16.1. Gaskets shall be full face of 1/8" minimum thickness red sheet rubber. Flange bolts shall be hexagon head machine bolts with heavy semi-flushed hexagon head nuts, cadmium plated, having dimensions in accordance with ANSI B18.2.

c. Weld fittings shall be steel standard weight, black, and in accordance with ANSI B16.9, ANSI B16.25, ASTM A234, ANSI B16.5 or ANSI B16.11.

d. Grooved couplings and mechanical fittings shall be malleable iron, 500 PSI working pressure, in accordance with ASTM A47. Coupling gasket material shall be butyl rubber. Grooved couplings shall be tested and listed by UL and/or FM. Mechanical locking fittings shall not be used.

e. Fittings for copper piping shall be wrought copper and bronze solder

joint pressure fittings in accordance with ANSI B16.22 and cast bronze solder joint pressure fittings in accordance with ANSI B16.18.

2.7 VALVES (AS AND SP):

a. Outside screw and yoke (OS&Y) gate valves, shall be flanged, iron body, bronze mounted, 175 PSI working pressure, with handwheel turning counter-clockwise to open. Valve shall be tested and listed by UL and/or FM.

b. Check valve (ck.v.) shall be flanged, swing type, iron body, bronze seat ring and disc rings and 175 PSI pressure rating. Valve shall be tested and listed by UL and/or FM.

c. Check valve (ck.v) shall be butterfly wafer style, iron body, rubber seal, and 250 PSI pressure rating. Valve shall be tested and listed by UL and/or FM.

d. Fire department connection shall be 2-1/2" x 2-1/4" x 4" Siamese connection or 2-1/1" x 3" single connection, brass body, brass chain and plugs, and brass escutcheon lettered "AUTOMATIC SPRINKLER" and/or "STANDPIPE". Inlet threading shall be National Standard, same as municipal fire department. Fire department connection shall be tested and listed by UL and/or FM.

d. Valve for main riser drain shall be angle type or globe type, bronze body, screwed, 200 PSI pressure rating, 2" size, and a renewable composition soft disc.

e. Valve for auxiliary drain and inspector's test connection shall be globe type, bronze body, screwed, 200 PSI pressure rating, 1" size and a renewable composition soft disc.

2.8 ACCESSORIES (AS AND SP):

a. Backflow preventer shall be reduced pressure type, flanged, 150 PSI working pressure, with OS&Y shut-off valves. The backflow preventer shall meet all requirements of the University of Southern California Foundation for Cross Connection Control and AWWA Standard C506. The backflow preventer shall also be tested and listed by UL and/or FM. A factory representative shall supervise and inspect the installation of the backflow preventer. After the installation has been approved by the factory representative, the factory representative shall send a formal letter of approval to the Architect.

b. Air compressor for dry pipe system shall be base mounted, tankless single stage, splash lubricated, 110 volt electric driven, enclosed belt guard, and automatic start and stop pressure switch.

c. At each location where called for on plans, or where required by the Fire Department, provide an approved retard-type electric flow alarm switch. Provide alarm bells as required by governing code. Flow alarm switch shall have extra set of contacts for extension by others to central alarm panel.

1. Interior bell or horn shall be 12, 24 or 120 volt, AC or DC. Horn or bell shall be tested and listed by UL and/or FM.

2. Exterior bell or horn shall be weatherproof 12, 24 or 120 volt, AC

or DC. Horn or bell shall be tested and listed by UL and/or FM.

3. Flow switch shall be vane type 12, 24 or 120 volt AC or DC. Flow switch shall be tested and listed by UL and/or FM.

4. OS&Y gate valve supervisory switch shall be 12, 24 or 120 volts, AC or DC. Supervisory switch shall be tested and listed by UL and/or FM.

5. Indicator post supervisory switch shall be weatherproof 12, 24 or 120 volt, AC or DC. Supervisory switch shall be tested and listed by UL and/or FM.

d. Valves for fire department valve stations shall be angle type, 2-1/2" male hose threads, rough brass, polished brass, chromium plated with rough brass, polished brass, chromium plated cap and chain. Valve hose threads shall be National Standard same as municipal fire department. Valve shall be tested and listed by UL and/or FM.

e. Valves for fire hose stations shall be angle type, 1-1/2" female iron pipe threads rough brass, polished brass, chromium plated. Valve shall be tested and listed by UL and/or FM.

f. Valve cabinet for fire department valve shall be recessed, semi-recessed, or surface mounted, 16 gauge steel or aluminum body, door and trim. Valve cabinet finish shall be baked white enamel inside with white prime coat outside. Door shall be full panel plate glass.

g. Cabinets for fire hose station shall be recessed, semi-recessed, or surface mounted, 16 gauge steel or aluminum body, door and trim. Cabinet shall be designed for 100 feet hose pin rack and fire extinguisher. Door shall be full panel plate glass. Cabinet finish shall be baked white enamel inside with prime coat outside. Cabinet shall be approved by UL and/or FM.

h. Pin rack for fire hose station cabinet shall be semi-automatic type, baked red enamel finish, designed for 100 feet of 1-1/2" hose, and furnished with 1-1/2" chrome plated brass rack nipple. Pin rack shall be approved by UL and/or FM.

i. Fire hose for fire hose station shall be 100 feet of 1-1/2" cotton single jacket, rubber lined hose with wax and gum treatment. Hose couplings shall be 1-1/2", chrome plated, male-female National Standard hose threads. Fire hose and couplings shall be approved by UL and/or FM.

j. Nozzle for fire hose station shall be 1-1/2", adjustable, capable of complete shut-off, solid straight stream, or any degree of solid conical fog, with chrome plated, or red lexan finish. Threads shall be National Standard hose threads. Nozzle shall be approved by UL and/or FM.

k. Sprinkler heads shall be upright, pendent, concealed, vertical sidewall, horizontal sidewall, and/or dry pendent type as required, 1/2" and/or 17/32" orifice, 1/2" and/or 3/4" pipe thread, rated 165 degrees F., 212 degrees F., and/or 286 degrees F. Sprinklers in areas with suspended ceilings shall be chrome plated with escutcheons. Sprinklers shall be tested and listed by UL and/or FM. Furnish steel enameled box housing 12 spare heads and a sprinkler wrench.

PART 3: EXECUTION

3.1 PIPE LAYING (SITE FIRE WATER):

a. All pipe, valves, hydrants and fittings shall be thoroughly inspected before use and defective or damaged items rejected. Each pipe, valve, hydrant and fitting shall be cleaned before laying and open ends protected during laying to prevent the entrance of foreign materials. Open ends of work in progress shall be adequately covered by means of wooden plugs or other equally effective means at the end of each work period to prevent entrance of foreign materials as caused by storms, cave-ins, etc., during off-work hours.

b. Trenches shall be free of any standing water when pipe is laid.

c. All pipe lines shall be laid straight and in true alignment to the lines and grades established on the drawings. Pipe shall have not less than 4'6" cover, unless otherwise noted on the drawings.

d. Pipe passing under building grade beams shall have a 6" minimum clearance to prevent possible damage from building settlement.

e. Pipe passing through pit walls, building walls, and building floors below grade shall be provided with sleeves of standard weight galvanized steel pipe. The annular spaces between pipe and sleeves shall be sealed with link seal hydro-static pipe wall seal. Sleeves shall be sized as follows:

3" pipe - 8" ID sleeve
4" pipe - 10" ID sleeve
6" pipe - 12" ID sleeve
8" pipe - 14" ID sleeve
10" pipe - 16" ID sleeve

f. All temporary blocking of bricks, timbers, or other objects used by Contractor when laying pipe shall be removed and the voids filled with compacted bedding material prior to backfilling.

g. Bends, tees, plugs and fire hydrants installed underground shall be anchored by rodding or concrete thrust blocks. Rodding or concrete thrust block shall be in accordance with National Fire Protection Association Standard No. 24 "Outside Protection". A bituminous coating of coal tar or asphalt base shall be applied to pipe clamps, straps, rods, bolts, washers, nuts and couplings at time of installation.

h. Trenches shall not be backfilled until all inspections and tests, as specified herein, have been made and successfully concluded.

3.2 PIPE BEDDING (SITE FIRE WATER):

a. Pipe laid in open trenches shall be bedded in clean sand conforming to the following graduation:

<u>Sieve Size</u> <u>U.S. Standard Square Mesh</u>	<u>Percent by Weight</u> <u>Passing Sieve</u>
3/8 inch	100
No. 4	85-100

No. 100
No. 200

0-30
0-10

Initial pipe bedding shall be placed and compacted from at least 6 inches below the bottom of pipe to the centerline of pipe, except at pipe joints. No bedding material shall be placed and compacted at pipe joints until the piping has been tested and backfilling has been authorized at the Owner's representative. Final pipe bedding shall be placed and compacted from centerline of pipe to at least 6" above the top of pipe. Bedding shall be compacted to a minimum density of 95% of maximum compaction as determined by ASTM D1557, "Moisture Density Relations of Soils Using 10 pound Rammer and 18 inch Drop".

3.3 FLUSHING:

a. Before permanently filling the site fire water system with water and before connections are made to the automatic sprinkler risers, all parts of the system shall be thoroughly flushed until water runs clear. Minimum flow during flushing shall be as follows:

<u>PIPE SIZE</u>	<u>FLOW, GPM</u>
3	300
4	400
6	750
8	1000
10	1500
12	200

3.4 AS BUILT DRAWINGS:

a. Contractor shall keep an accurate record of the location of all site firewater lines and site potable water lines installed by him and shall provide Owner upon completion of the work with a drawing showing all location dimensions and elevations.

3.5 AUTOMATIC SPRINKLER AND STANDPIPE SYSTEMS:

a. Schedule 40 black steel pipe shall be joined by screwed joints in accordance with specification ANSI B2.1, by welded joints in accordance with specifications ANSI B31.10, ANSI B31.1.0a and ANSI B31.1.0b, and by mechanical grooved couplings or push-on couplings, joined by a UL and FM approved combination of couplings, gaskets and grooves. Grooves may be rolled or cut and they shall be dimensionally compatible with the couplings.

b. Schedule 10 black steel ASTM A135 sprinkler pipe shall be joined by welded joints in accordance with specifications ANSI B31.1.0, ANSI couplings. Couplings may be of the rolled groove type or the mechanical locking type (push-on). Grooves for the rolled groove type shall be dimensionally compatible with the coupling. Pipe end preparation for the mechanical locking type couplings will be in according with the manufacturer's recommendations.

c. Copper tubing shall be joined by brazed joints except solder joints may be permitted for wet-pipe systems in light hazard occupancies where the temperature classification of the installed sprinklers is ordinary or inter-

mediate. Solder joints may also be permitted for ordinary or intermediate. Solder joints may also be permitted for wet-pipe systems in ordinary hazard - Group 1 occupancies where the piping is concealed. Brazing shall be done in accordance with specifications ANSI B31.1.0, ANSI B31.1.0a, and ANSI B31.1.0b.

Brazing filler metal shall be classification BCUP-3 or BCUP-4 in accordance with AWS A5.8. Solder metal shall be 95-5 (tin-antimony - Grade 95 TA) in accordance with ASTM B32.

d. The interior surfaces of all piping and equipment shall be clean and free of all dirt, loose scale, rust, and other foreign material before installation.

e. Pipe ends shall be reamed to remove all burrs, and pipe sections shall be cleaned inside to remove all chips and foreign material prior to making up joints. Approved joint compound shall be applied to the threads of the pipe and not in the fitting when making up joints. Pipe shall not extend into the waterway of the fitting.

f. Sprinkler heads installed where they may be exposed or subjected to mechanical damage shall be furnished complete with head guards.

g. When welding pipe on job site, the fire hazard of the welding process shall be suitably safeguarded.

h. Pipe passing through building walls and floors above grade shall be provided with sleeves of standard weight galvanized steel pipe. The annular spaces between pipe and sleeves shall be packed tight with link seal hydrostatic pipe wall sleeve. Provide chrome plated escutcheon plates large enough to cover the pipe sleeve. Sleeves shall be sized in accordance with NFPA 13.

3.6 PIPE SUPPORTS:

a. All piping shall be supported by means of hangers tested and listed as approved by UL and/or FM. Sizing, spacing and installation shall be in accordance with National Fire Protection Association Standard No. 13 "Sprinkler Systems", except as otherwise shown on drawings or specified herein.

b. No cutting, drilling, welding or burning of any structural steel member shall be allowed. Power driven studs and welding studs shall not be allowed.

c. All bolts and threaded rods shall be used with double nut washer, or single nut, washer and lock washer wherever a single unsecured nut could work loose and allow either threaded rod or supported piping to drop.

d. Starting length, end length and alternate lengths of main piping with grooved joint couplings shall be provided with two supports.

3.7 TESTS AND INSPECTION:

a. The Fire Protection Contractor shall conduct and bear the costs of all necessary tests of the fire protection work, furnishing all labor power and equipment. All piping shall be tested with water, the tests witnessed by representatives of the Architect.

b. The fire protection piping shall be tested under a hydrostatic pressure of not less than 200 pounds PSIG, for a duration of not less than two (2) hours.

c. The piping subjected to the hydrostatic test shall be filled with water and thoroughly checked for the elimination of all air. The control valves of existing risers shall be closed during pressure testing of the new connection to the main. All joints shall be proven tight or acceptable by the test. Defective work or materials shall be corrected or replaced in an approved manner. If necessary, piping shall be dismantled and reassembled with the use of new pipe or fittings, as no caulking or makeshift method of temporary repair of defective work will be permitted. Tests shall be repeated until the particular line or system receives the approval of the representatives of the Architect.

d. Acceptance of the automatic sprinkler work shall be based upon the inspection and tests of the completed installation by representative of the local Fire Department and Architect.

3.8 WATER DAMAGE:

a. The Fire Protection Contractor shall be responsible for any damage to the work of others, to building and property/materials of others caused by leaks in automatic sprinkler equipment, unplugged or disconnected pipes or fittings, and shall pay for necessary replacement or repair of work or items so damaged during the installation and testing periods of the automatic sprinkler work.

3.9 HYDRAULIC CALCULATIONS:

a. The fire protection system is based on a combination of standpipe, sprinkler risers and sprinkler system. The Fire Protection Contractor shall prepare hydraulic calculations for the design of the system and submit for approval to the Engineer and Insurance Underwriters.

3.10 IDENTIFICATION SIGNS AND CHARTS:

a. The drain, alarm test valves, etc., shall have standard identification signs, painted fire red with white lettering. The signs shall be attached to the valve in a conspicuous position.

SECTION 15620

PIPING (HVAC)

PART 1: GENERAL

1.1 SCOPE:

a. The provisions of Section 15010 apply to all work in this Section.

b. Furnish and install all refrigerant, and condensate drain piping as shall be required in order to provide a complete and satisfactory system.

PART 2: PRODUCTS

2.1 REFRIGERANT PIPING:

a. All refrigerant piping shall be Type "K" hard drawn copper of "ACR" tubing with wrought copper sweat fittings. All joints are to be made with hard solder such as "Sil-Fos" or "Silver Solder."

b. All joints in refrigeration pipe work shall be soldered with the use of nitrogen gas. Refrigerant piping shall be tested, evacuated, charged with nitrogen and completely dried before charging with freon.

c. Refrigerant piping shall include best grade brass refrigerant fittings, consisting of expansion valve, solenoid valve, sight glass with moisture indicator, filter dryer, check valves and/or specialties as may be recommended or required by the manufacturer or as shown on the drawings.

2.2 DRAIN PIPING:

a. All drain lines shall be run in schedule 40 weight PVC pipe or Type "L" hard drawn copper. Drains shall be run in a neat manner to the hub drain and turned down at the hub drain, unless otherwise indicated. Minimum of 1-1/4" unless otherwise shown.

PART 3: EXECUTION

3.1 PIPE AND PIPE FITTINGS:

a. Provide all piping and connections to all items of equipment as shown and/or required to fully complete the system indicated, including drains and other connections. The drawings show the arrangement desired and the Contractor shall follow the drawings as accurately as possible. If conflict should arise, the Contractor shall verify all measurements on the job and cut pipe unless specifically noted for expansion loops. All piping shall be reamed or filed and cleaned to remove burrs and other obstructions.

b. The Contractor shall be responsible for installing all piping work in a neat workmanlike manner. This shall be interpreted to mean that all piping shall be neatly aligned, installed and supported in equally spaced parallel runs using trapeze hangers where applicable, install square, true and plumb with walls, equipment or other related surfaces using standard fittings. Any pipe work installed in a disorderly or unworkmanlike manner as adjudged by the

Architect shall be corrected by the Contractor at the Contractor's expense.

3.2 BLOWING-OUT SYSTEM:

a. All piping and equipment shall be thoroughly blown-out under pressure and clean of all foreign matter wasting condensate through temporary connections so long as necessary to thoroughly clean before system is placed in operation. Use every precaution to prevent pipe compound, scale, dirt, welding and other objectionable matter getting into piping system and equipment.

3.3 HANGERS:

a. All piping shall be supported on not less than 10' centers and within 30" of each change of direction except that piping 1-1/4" size and smaller shall be supported on 8'-0" centers.

b. All piping shall be hung by means of split type wrought iron hanger rings similar to Grinnell Figure 104 except as otherwise noted. Copper piping not insulated shall be hung from copper plated hangers similar to Figure CT-97.

All insulated piping shall be hung by means of clevis type hangers sized to fit outside of insulation, Grinnell Figure 260.

c. Pipe hangers shall be supported by means of iron hanger rods from the building construction or from structural steel members, and in an approved manner. Where required, piping shall be hung from angle iron slips or suitable brackets attached to sides of masonry construction.

d. All insulated piping shall be provided with insulating protection sheet metal saddles. These shall be 20 gauge galvanized iron. Saddles shall be of a length equal to two times the outside diameter of the insulation and shall extend to above the center line of the pipe.

e. Where piping passes through walls or floors, steel pipe sleeves shall be provided, sized to allow at least 1/2" clearance around pipe or insulation where pipe is insulated. Sleeves shall be flush with finished walls and extend 1/2" above finish floors. A watertight seal shall be provided between floor and sleeve and space between pipe and sleeve shall be caulked with lead wool.

SECTION 15665

SPLIT SYSTEM HEAT PUMP

PART 1: GENERAL

1.1 SCOPE:

- a. The provisions of Section 15010 apply to all the work in this Section.
- b. Furnish and install split system heat pump required to provide a complete and satisfactory job.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

- a. Manufacturer's cuts.
- b. Certified capacity ratings.
- c. Installation instructions.
- d. Operating and Maintenance Instructions.

PART 2: PRODUCTS

2.1 SPLIT SYSTEM HEAT PUMP:

a. Furnish and install an air-to-air electric heat pump (outdoor unit) in combination with a direct expansion fan-coil heat pump (indoor unit) in the location and manner shown on the plans.

b. Coils shall be constructed with aluminum plate fins mechanically bonded to non-ferrous tubing with all joints brazed.

c. Outdoor unit shall contain hermetically sealed compressor with automatically reversible oil pump, internal and external motor protection. Outdoor fan shall be propeller type, arranged for vertical discharge, and direct driven by a factory lubricated motor.

d. Indoor unit shall operate properly in either vertical upflow or horizontal position with or without ductwork. Unit may be installed vertically or horizontally with electric resistance heater and shall contain refrigerant metering device and indoor fan relay. Fan shall be centrifugal type, direct driven.

e. Controls and protective devices shall include a high pressurestat, 2 low pressurestats, crankcase heater, suction line accumulator and pressure relief device. Motor compressor shall have both thermal and current sensitive overload devices. Outdoor unit wiring shall incorporate a positive acting timer to prevent compressor short cycling if power is interrupted. Device shall prevent compressor from restarting for a five minute period. An automatic defrost control shall be included to accomplish defrosting (only if required) every 90 minutes for a period of not more than 10 minutes. A 24 volt transformer shall be factory installed and wired on outdoor units for external control circuit.

- f. Provide low ambient to 10°F.
- g. Provide programmable thermostats with the following features:
 - 1. Temperature setpoints 40°F - 90°F.
 - 2. Separate heating cooling setpoints.
 - 3. Automatic changeover from heat to cool.
 - 4. Minimum 4 hour override feature.
 - 5. Programmable fan (fan shall run continuously during occupied mode and off during unoccupied mode).
 - 6. 7 day programming.

PART 3: EXECUTION

3.1 INSTALLATION:

a. Fan coil and heat pump shall be installed in accordance with the manufacturer's recommendations.

b. Fan coil and heat pump shall be installed in fully accessible locations.

SECTION 15671

PACKAGED HEAT PUMP

PART 1: GENERAL

1.1 SCOPE:

a. The provisions of Section 15010 apply to all the work of this Section.

b. Furnish and install packaged air conditioning unit as required to provide a complete and satisfactory job.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010

a. Manufacturer's cuts.

b. Certified capacity ratings.

c. Installation instructions.

d. Operating and Maintenance Instructions.

PART 2: PRODUCTS

2.1 BASE UNIT:

a. Furnish and install a one piece air-to-air electric heat pump to function as a year round air conditioning system. Unit shall be factory assembled, tested, have complete refrigerant charge and be ready to operate.

b. Compressor shall be a welded hermetic type with internal vibration isolation. Motor compressor shall have a 5 year protection plan. Compressor shall have an internal pressure relief valve.

c. Coils shall be of non-ferrous construction with mechanically bonded aluminum plate fins. Factory installed refrigerant control shall be provided.

d. Fans. Indoor fan shall be a centrifugal, forward curved type direct driven by a 3 speed. Indoor fan shall discharge horizontally. Propeller type outdoor fan shall discharge vertically and be direct driven.

e. Controls shall be factory wired and located in a readily accessible location. Compressor shall be equipped with crankcase heater and suction line accumulator. Compressor and fan motors shall have both thermal and current sensitive overload devices. An automatic defrost control shall be included to accomplish defrosting every 90 minutes for a period of not more than 10 minutes. A low voltage transformer (24V) shall be factory installed on unit for external control circuit.

f. Cabinet shall be a single, enclosed, weatherproof casing constructed of galvanized steel and finished with baked enamel. Indoor air section of unit shall be fully insulated to prevent sweating and muffle sounds. A side condensate drain fitting shall be provided. Openings shall be provided for power connections. Side panels and top cover shall be removable for service access.

g. Accessories shall include electric heater, thermostat and switch base, supplemental heat relay, outdoor thermostat package and down turn supply and return plenum with full perimeter roof curb as manufactured by Plenums, Inc. or Stiles.

SECTION 15723

EXHAUST FANS

PART 1: GENERAL

1.1 SCOPE:

a. Furnish and install in-line fans as shown or required to provide a complete and satisfactory job.

b. The provisions of Section 15010 apply to all the work in this Section.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

a. Manufacturer's Cuts.

b. Certified Capacity Ratings.

c. Installation Instructions.

d. Operating and Maintenance Instructions.

PART 2: PRODUCTS

2.1 CEILING EXHAUST FANS - DIRECT DRIVE:

a. Type: The fan shall have a forward curved centrifugal wheel.

b. Housing: The fan housing shall be constructed of heavy gauge galvanized steel. The housing interior shall be acoustically lined with ½" thick insulation. The discharge outlet shall be adaptable for horizontal or vertical mounting.

c. Motor: The motor shall be mounted on resilient elastic grommets.

d. Control: The fan shall be controlled as shown on the plans.

PART 3: EXECUTION

3.1 INSTALLATION:

a. Fan shall be installed in accordance with the manufacturers recommendations.

b. Fan shall be installed in fully accessible locations.

SECTION 15810

AIR DISTRIBUTION

PART 1: GENERAL

1.1 SCOPE:

a. Furnish and install all sheet metal work shown or called for including ductwork and connections to fans and equipment.

b. Ductwork shall be provided and installed as shown on the drawings. All details of ductwork are not indicated, and necessary bends, offsets and transformation must be furnished whether shown or not.

c. The provisions of Section 15010 apply to all the work in this Section.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

a. Manufacturer's cuts.

b. Certified capacity ratings.

c. Installation instructions.

1.3 RELATED DOCUMENTS:

a. Section 15250 - Insulation.

PART 2: PRODUCTS

2.1 GENERAL:

a. All ductwork, plenums and casings shall be constructed of sheet metal, as herein specified. All sheet metal construction shall conform to the pressure classification shown on the contract drawings, or herein specified and shall be in accordance with the construction and installation details in Chapter 16 of the 1992 ASHRAE Systems and Equipment Handbook or the appropriate SMACNA Standards.

b. Duct sizes on drawings represent gross sheet metal dimensions. Allowance has been made, where applicable, for duct liner.

2.2 LOW PRESSURE DUCTWORK:

a. Low pressure ductwork shall be constructed of zinc coated sheet steel and shall conform to the 1st Edition of SMACNA HVAC Duct Construction Standards -Metal and Flexible, 1985, as follows:

1. Rectangular Duct:

(a) 1" w.g. pressure class - Table 1-4.

(b) 2" w.g. pressure class - Table 1-5.

Unless otherwise noted, all low pressure rectangular ductwork shall be constructed according to the 1" w.g. pressure class.

2. Round Duct:

(a) 2" w.g. pressure class - Table 3-2.

2.3 GENERAL EXHAUST DUCTWORK:

a. Unless otherwise noted, all exhaust ductwork shall be constructed the same as specified for low pressure ductwork.

2.4 FLEXIBLE DUCTWORK:

a. Flexible air duct for connections between medium pressure duct and terminals units and between low pressure duct to diffusers shall be equal to Thermaflex M-KE. Duct shall be listed by Underwriter's Laboratories under UL 181 standards as Class 1 flexible air duct material and shall comply with NFPA Standards 90A and 90B. Duct shall be rated to operate at pressures up to 6" w.g. for sizes 10" and 4" w.g. for sizes 12" and above. Maximum length of flexible air duct shall be 6 feet.

b. Duct shall be a factory fabricated assembly composed of a polymeric liner duct bonded permanently to a coated spring steel wire helix and supporting a fiberglass insulating blanket. Outer vapor barrier shall be of fiberglass reinforced film laminate. Connections shall be made with Thermaflex, or equal, duct straps.

2.5 FIRE DAMPERS:

a. Furnish and install, at locations shown on plans, or where required by code, fire dampers constructed and tested in accordance with UL Safety Standard 555. Each fire damper shall have 1-1/2 hour fire protection rating. In addition each fire damper shall include a 212°F fusible link, and shall include a UL label in accordance with established UL labeling procedures. Damper manufacturer's literature submitted for approval prior to installation shall include comprehensive performance data developed from testing in accordance with AMCA Standard 500 and shall illustrate pressure drops for all sizes of dampers required at all anticipated airflow rates. Fire dampers shall be equipped for vertical or horizontal installation as required by the location shown. Fire dampers required by the location shown. Fire dampers shall be installed in wall and floor openings utilizing steel sleeves, angles, other materials and practices required to provide an installation equivalent to that utilized by the manufacturer when dampers were tested at UL. Installation shall be in accordance with the damper manufacturer's instructions. Fire dampers shall be style "A", "B" or "C" as required.

2.6 ACCESS DOORS:

a. Ventifabrics, Krueger or Duro-Dyne, (Min. 12" x 10" - use 16" x 12" where size permits) insulated doors shall be provided for fire dampers, control dampers, smoke dampers, smoke detectors, and other locations where shown. Door shall be minimum 24 gauge galvanized, double construction with 1" insulation complete collar mounting frame, steel butt hinges, felt gaskets, fasteners and handles.

2.7 INSTRUMENT TEST HOLES:

a. Ventlock No. 699 with gasket. Provide a minimum of one in each zone supply duct.

2.8 TURNING VANES:

a. Turning vanes and Deflector Controls, Barber-Colman, Carnes Corporation, Kruger or Titus in length up to 18"; Aero-Dyne Duro-Dyne, or Airsan double thickness about 24" in length, installed in rails.

2.9 FLEXIBLE CONNECTIONS:

a. Flexible duct connections shall be provided where ductwork connects to equipment; ventifabrics or Duro-Dyne 28 ounce minimum waterproof and fire retardant woven glass fabric double coated with neoprene, approved by UL. Maximum length of flexible connections shall be 10 inches.

2.10 MANUAL AND MOTOR OPERATED DAMPERS:

a. American Warming and Ventilating Company Type DAA-P-50, opposed blade, constructed with 15 gauge steel blades. Manual dampers shall be provided with Ventlock No. 637 hand operated locking quadrants located outside of ducts. Locking quadrants shall be elevated 1-1/2" for insulation. Manual dampers 18" x 10" or smaller may be single blade type construction of 16 gauge galvanized sheet metal. Dampers of Ruskin, Krueger, Louvers and Dampers, or Advanced Air, Inc. will be acceptable.

2.11 SPLITTER DAMPERS:

a. Install where shown and at duct splits; provide with Ventlock No. 690 self-locking device; constructed of 16 gauge galvanized steel with hemmed leading edge and reinforced at hinged side.

2.12 GRILLES, REGISTERS AND DIFFUSERS:

a. Grilles, registers and diffusers shall be of the type, size and design as shown on the drawings and/or as specified below. Grilles within the same room or areas shall be of the same type and style to provide architectural uniformity.

b. Each supply, return and exhaust device shall be of the proper design as indicated to handle quantities of air within the space with maximum diffusion and without objectionable air movement or noise level.

c. Each supply outlet and resister shall have a volume damper control operable from the front of the device with removable key. Where indicated on the drawings, all side wall registers shall be equipped with deflectors.

PART 3: EXECUTION

3.1 DUCTWORK:

a. All ductwork shall be provided in a neat workmanlike manner. The

ducts shall be properly braced and reinforced. All slip joints shall be made in the direction of flow. All ducts shall be true to the dimension indicated and shall be straight and smooth on the inside with neatly finished airtight joints. The ducts shall be securely anchored into the building construction in an approved manner and shall be completely free from vibration under all conditions of operation. All supply, return fresh-air and exhaust systems shall be completely balanced.

b. No duct transformation shall be of a ratio less than four to one and where possible, shall be of a ratio of six to one. No less than three vertical splitters shall be provided where these ratios cannot be met. No elbow shall have a throat center line radius of less than one and one-half times the duct width at the turn. All turns of less than this amount in rectangular duct shall be provided with duct turning vanes of standard design. Splitters or multi-blade volume dampers, where indicated, shall be provided in all branch.

c. Turning vanes shall be provided at all tees and square elbows. Turning vanes shall be factory fabricated and designed in accordance with the SMACNA or ASHRAE Guide for formed vanes. The first set of turning vanes on the leaving side of fans shall be of the acoustical type to aid in the elimination of unit noise with the exception of room fan coil units.

d. Splitter dampers and volume extractors shall be provided in all low velocity ductwork for proper air distribution. Each damper shall be provided, lubricated bearings at both ends of the shafts, adjustments quadrant, and locking devices and shall be constructed of galvanized iron or steel sheet one gauge heavier than the duct in which they are installed. Access doors shall be located at all splitter dampers.

e. Handholes of not less than 6" x 6" shall be provided at all points where access is required. Manholes of not less than 18" x 24" shall be provided at all points where it is necessary to clean or remove parts of equipment. All access doors and handholes shall be rubber gasketed insulated type with frame and latches.

f. Install access doors at each fire damper, and smoke detector.

g. All ductwork must be sealed in accordance with Seal Class C as defined in SMACNA HVAC Duct Construction Standards - Metal and Flexible, 1985.

h. All joints and seams in ductwork exposed to weather shall be sealed watertight with a suitable non-aging sealer.

3.2 DUCT HANGERS AND SUPPORTS:

a. Duct hangers and supports shall conform to those shown in Tables 4-1 and 4-2 of SMACNA HVAC Ductwork 1985, 1st Edition.

3.4 WALL PENETRATIONS:

a. Where ducts pass through non-rated walls and is exposed to view the duct shall be finished with suitable metal collar.

b. Where fire dampers are shown or required, dampers shall be installed

per manufacturer's UL listing.

3.3 CLEANING DUCT SYSTEMS:

a. Before fan systems are put in operation, vacuum clean inside of air units, plenums and apparatus housing. Filters are to be installed before moving air through duct systems.

SECTION 15900

AUTOMATIC TEMPERATURE CONTROLS

PART 1: GENERAL

1.1 SCOPE:

a. The provisions of section 15010 apply to all work in this section.

b. A complete system of automatic temperature controls shall be furnished by the temperature control manufacturer in conjunction with controls furnished by unit manufacturers. It shall be an electric system and shall be complete in every respect as hereinafter specified and as shown on the control diagrams. The control equipment shall adapt readily to all equipment furnished in the mechanical system so as to provide the sequence necessary for proper operation of all equipment herein specified. The control system shall be installed, checked out, and guaranteed by the control manufacturer.

c. The control manufacturer shall guarantee the control system to be free defects in workmanship and material under normal use and provide service for a period of one year after acceptance by the Engineer or beneficial occupancy of the building. Any defects in workmanship or material during this time shall be corrected by the control manufacturer at no charge to the Owner.

d. The control system shall consist of all thermostats, temperature transmitters, controllers, automatic dampers, damper operators, control panels, and accessory control equipment to fill the intent of the specifications and provide for a complete and operable system.

e. All wiring associated with the temperature control system (line voltage or low voltage) shall be installed by the Temperature Control Contractor or by an Electrical Subcontractor whose principal business is control and interlock wiring. If the wiring is performed by an Electrical Subcontractor, the Temperature Contractor will supervise the wiring installation and be responsible for the performance of the system. Wiring shall be in accordance with the electrical specifications.

f. Upon completion of the work and acceptance by the Owner, provide a 4 hour period of instruction to the Owner's operating personnel who have responsibility for the mechanical system. An additional 4 hour instruction period shall be given at the beginning of the next heating and cooling season.

1.2 SUBMITTALS:

a. The Temperature Control Manufacturer shall submit copies of complete temperature control diagrams with written "sequence of control" and factory printed specification data sheets, covering each control device proposed to be used, for the Engineer's approval, prior to installation of any equipment.

b. After approval and installation provide sets of complete operating and maintenance instructions with "as-built" drawings, typewritten instructions and operating sequences, and descriptive data sheets. Assemble each set in a hard cover binder with "temperature control" title placed on front cover and binding. Frame an auto-positive copy of the control drawings and mount in the

equipment room.

PART 2: PRODUCTS

2.1 SENSORS:

a. Outside Air Temperature Sensor

1. Sensor shall be mounted in the outdoors where natural air flow occurs, away from any artificial affect from mechanical sources - Example: Windows, doors, exhaust fans, etc. The temperature range shall be -40 to 220 degrees F. Provide a sun shield and weatherproof assembly for mounting ½ inch rigid conduit.

2.2 THERMOSTATS/CONTROLLERS:

a. Programmable Room Thermostats (provided by equipment manufacturer).

1. 1H/1C, 2H/1C or 3H/2C stage heatpump thermostat.
2. Seven-day with copy or 24 hour programmable.
3. Outdoor temperature display (field selectable - on/off).
4. Adaptive Intelligent or Conventional Recovery. Assure that desired temperature is achieved at programmed time & maintained regardless of weather conditions; optimizes energy savings, field activated.
5. Minimum compressor run time (Factory set to 10 minutes, field adjustable).
6. Comfort enhancing droop.
7. Backlight display.
8. Filter clean/replacement key (field adjustable).
9. No Batteries required. Continue clock for 15 minutes.
10. Programming and other functions stored in permanent "E-Prom" memory.
11. Manual or auto change over (field selectable).
12. 3-10 degree F dead band between heating and cooling setpoints in the "auto" changeover mode (field adjustable).
13. Conventional or adaptive intelligent recovery.
14. Adjustable heating range (55 - 85 degree setpoint range) (highest heating setpoint field adjustable downward).
15. Adjustable cooling range (65 - 99 degree setpoint range) (lowest cooling setpoint field adjustable upward from 65 degree F).

16. Daylight savings time key.

17. Fan can be programmed in the "on" or "auto" mode for each period.

18. Vacation/Leave program, will hold vacation/Leave temperature for up to 256 days.

19. Field temperature re-calibration offset (field adjustable). Allows installer to set thermostat to customer's wall mounted thermostat setting.

20. Finish: White

b. Programmable time clock (Paragon 7000 series or equal) with the following functions:

1. Each day shall be subdivided into light (day) and dark (night) portions with 30 minute increments.
2. Scheduling for up to 28 events for the week.
3. Scheduling for up to 4 on/off operation per day.
4. Any day may be omitted.
5. On event marker shall be light color, off events shall be dark color.
6. Three Hour Minimum time between events
7. Independent four pole switching that shall allow for SPST, DPST, SPDT switching.
8. Manual ON/OFF lever transfer switch operation.

2.3 AUTOMATIC CONTROL DAMPERS:

a. The Control Subcontractor will provide control dampers as specified and as shown on the plans of the types indicated on the plans. Frames shall not be less than 16 gauge galvanized steel. Blades must not be over 8 inches wide nor less than 16 gauge galvanized steel roll formed. Bearings shall be iolite, ball bearing or nylon with ½" shafts.

b. All two position control dampers shall be parallel blade type; all modulating dampers shall be opposed blade.

c. Dampers shall be minimum leakage type to conserve energy and the manufacturer shall submit leakage and flow characteristic data for all control dampers with the temperature control submittal. Maximum leakage shall be less than 1% at static pressure of 5 inches W.C. approach velocity of 2000 FPM.

d. Where low leakage dampers are required, the blade edges shall be fitted with replaceable, snap-on, inflatable seals to limit damper leakage to ½ percent at applied static pressure. Airfoil blades required. Low leak dampers are required on all outside air applications.

PART 3: EXECUTION

3.1 SEQUENCE OF OPERATION:

a. Split system heat pump.

1. Programmable thermostat by unit manufacturer shall index unit to cooling or heating mode as dictated by space temperature.

2. When the unit control is in the occupied mode the indoor fans shall operate continuously to provide ventilation.

3. Outside air dampers shall open/close in response to time clock. Dampers shall be closed whenever the outside air temperature is above 90 deg. F or below 35 deg. F.

b. Fans

1. See plans for control.

c. Time Clock Zones

1. Outside air dampers.

SECTION 16010

ELECTRICAL GENERAL REQUIREMENTS

PART 1: GENERAL

1.1 SCOPE:

a. Applicable requirements of the General Conditions of the Contract, Amendments, Supplementary General Conditions, and Special Conditions govern work under this Division.

b. Work covered by this Division consists of providing all labor, equipment, supplies, and materials; and performing all operations, including trenching, backfilling, cutting, patching, and chasing necessary for the installation of complete electrical systems in strict accordance with these specifications and the applicable drawings.

c. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work, the same as if herein specified or shown.

d. This Contractor is referred to the General and Special Conditions of the contract which shall form a part and be included in this section of the specification and shall be binding on this Contractor.

e. Some items of equipment are specified in the singular; however, the Contractor shall provide and install the number of items or equipment as indicated on the drawings, and as required for complete systems.

1.2 DEFINITION:

a. The word "Contractor" as used in this section of the specification refers to the Electrical Contractor unless specifically noted otherwise. The word "provide" means furnish, fabricated, complete, install, erect, including labor and incidental materials necessary to complete in place and ready for operation or use the item referred to or described herein and/or referred to on the Contract Drawings.

1.3 CONTRACTOR'S QUALIFICATIONS:

a. It is assumed that the Contractor has had sufficient general knowledge and experience to anticipate the needs of a construction of this nature. The Contractor shall furnish all items required to complete the construction with reasonable interpretation of the intent of the Drawings and Specifications. Any minor items required by code, law or regulations shall be provided even if not specified or specifically shown, where it is part of a major system.

1.4 CONTRACT DOCUMENTS:

a. The contract drawings are diagrammatic and are not intended to indicate every detail of construction, or every item of material or equipment required, or exact locations. Indicated locations of outlets, equipment, and connections are approximate and shall be verified by reference to related documents.

b. The Contractor shall procure complete drawings and specifications on all coincident construction and fit the Electrical work in with it. He shall cooperate with other trades to achieve well coordinated progress and final result; and avoid conflicts with other trades. He shall make minor moves and changes necessary to accommodate other equipment and/or preserve symmetry without claim for extra payment. Should there be any doubt as to the spacing intent, or location of equipment, the Contractor shall have the point clarified by the Architect/Engineer before proceeding with the installation.

1.5 RECORD DRAWINGS:

a. During construction of this project, the Contractor shall maintain one complete set of electrical contract drawings, on which shall be recorded all significant changes. This set of drawings shall be used for no other purpose. Upon completion of the work, the Contractor shall submit these drawings to the Architect/Engineer for approval and presentation to the Owner.

1.6 REGULATIONS AND COMPLIANCE:

a. The requirements of the International Building Code, the National Electrical Code, and of all other State and Local codes, ordinances, regulations and interpretations by authorities having jurisdiction are binding upon this Contractor, and nothing contained in, or inferred by, these specifications or the applicable drawings may be construed as waiving those requirements. The latest edition of the National Electrical Code, referred to herein and on the drawings as "N.E.C.", forms a part of these specifications; and under no circumstances may the installation fail to meet the minimum requirements therein.

b. This Contractor shall secure and pay for all permits, fees, inspections and licenses required. Upon completion of the project and prior to his request for final payment he shall present to the Architect/Engineer a certificate of inspection and approval from the inspection authorities.

c. The Contractor shall include in his work, without extra cost to the Owner, any labor, materials, service, apparatus, drawings, in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on drawings and/or specified.

d. All materials furnished and all work installed shall comply with the National Fire Codes of the National Fire Protection Association, and with the requirements of all governmental departments having jurisdiction.

e. All materials and equipment shall bear the approval label, and shall be listed by the Underwriters' Laboratories, Inc.

1.7 ELECTRICAL TESTING:

a. Conduct full scale tests with all lights, equipment and appliances in operation and prove the electrical system satisfactory for operation and free from defects. Pay particular attention to the balancing of the single-phase loads on the three-phase system. Promptly remedy all defects.

b. All current 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:

1. Minimum readings shall be one million 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.

2. 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 until 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.

3. At final inspection, the contractor shall furnish a megger and show that the panels comply with the above requirements. He shall also furnish a hook-on type ammeter and voltmeter to take current and voltage readings as directed.

c. 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).

d. All tests specified shall be completely documented indicating time of day, date, temperature and all pertinent test information.

e. All required documentation of readings indicated above shall be submitted to Engineer prior to, and as one of the prerequisites for, final acceptance of the project.

1.8 GUARANTEE:

a. The Contractor shall guarantee that the work done has been done in accordance with the Contract Documents, free of imperfect materials and defective workmanship. For a period of one year after acceptance by the Owner, the Contractor shall repair or replace, at no additional expense to the Owner, any imperfect materials or defective workmanship.

1.9 OPERATING AND MAINTENANCE INSTRUCTIONS:

a. At the completion of the project, submit 3 sets of complete operating and maintenance instructions.

b. Organize material in the following format:

1. Section I:

- (a) Name of Project
- (b) Address

- (c) Owner's Name
- (d) Electrical Contractor's Name and Address
- (e) Warranty Dates

2. Section II:

- (a) Description of System

3. Section III:

- (a) Major Equipment List (name, manufacturer)
- (b) Routine Maintenance Instructions in Step-by-Step form

4. Section IV:

- (a) Operating and Maintenance Instructions by Manufacturer
- (b) Shop Drawings
- (c) Wiring Diagrams
- (d) Warranty Information

PART 2: PRODUCTS

2.1 GENERAL:

a. Except where reuse of existing items are specifically indicated or permitted, all materials and equipment shall be new and shall conform with the standards of the National Electrical Manufacturer's Association and Underwriter's Laboratories, Inc. in every instance where such a standard has been established for the item involved.

b. Catalog numbers and trade names in these specifications and drawings are intended only to set forth and convey to bidders the general style, type, character and quality of product desired. Similar products of other manufacturers; of equal quality, size, capacity, character, and appearance may be substituted on the written approval of the Architect/Engineer. Requests for approval of substitutions shall be made after the award of the contract in accordance with the bidding requirements of these specifications.

c. It is the intent of the drawings and specifications that the installation be complete, of finished appearance, and ready for operation. Manufacturers' catalog numbers as used herein and on the drawings are indicative of the type of product to be installed, and do not necessarily identify all parts and accessories required for the proper assembly, installation, and utilization of the product. All required parts and accessories shall be provided.

d. Materials shall be inspected by the Contractor upon their arrival at the site to be sure they are correct. Material and equipment stored on the site shall be protected against physical damage, dirt and damage caused by precipitation, wind, condensation, excessive humidity, and extremes of temperature. Materials shall be stored in their original cartons within substantial, clean and dry storage facilities provided under this Contract. Conduit, large galvanized boxes, and lighting poles may be stored outdoors on suitable blocks or racks clear of the earth and undergrowth, and pitched to drain. Large electrical equipment intended for ultimate installation outdoors

may be stored in the weather on suitable blocks or platforms clear of the earth and undergrowth, and with interior lamps or space heaters continuously energized to prevent condensation. Alternate storage provisions may be submitted to the Architect/Engineer for approval prior to the arrival of the material. Under no circumstances shall equipment be stored in the weather under a cover of polyethylene or tarpaulin. The Architect/Engineer will be the sole judge as to the acceptability of storage facilities, and when directed by the Architect/Engineer, improperly stored or damaged material shall be removed from the site and replaced with new material.

2.2 SUBMITTALS:

a. Within 30 days after the date of award of contract, submit a complete list, in quadruplicate, of materials proposed for installation including requests for approval of substitutions and names of specialty sub-contractors to the Architect/Engineer for approval. Upon approval of the list, the Architect/Engineer will indicate those items for which submittal of shop drawings, cuts, descriptive literature and/or samples are required; and these items will not be considered to be approved until such supplementary data is approved. Any items which fail to comply with specification requirements will be rejected. Intent to use exact material specified does not relieve the Contractor of responsibility for submitting a list. Mention of several manufacturers for any item will not be acceptable.

b. Prior to delivery of any material to the job site, and sufficiently in advance of requirements to allow the Architect ample time for checking, submit for approval detailed, dimensioned drawings or cuts, showing construction, size, arrangement, operating clearances, performance, characteristics and capacity. Each item of equipment proposed shall be standard catalog product of an established manufacturer and of equal quality, finish, performance, and durability to that specified.

c. Submittal of shop drawings, cuts, and descriptive literature shall be made in sufficient quantity to permit the retention by the Architect/Engineer of two copies. Submittal data will not be checked prior to the Approval of the Contractor's material list. In addition to the submittal data requested by the Architect/Engineer, the Contractor may, at his option, submit additional shop drawings and/or descriptive data for approval, provided the manufacturer of the additional items has previously been listed on the Contractor's approved Material List.

d. Submittal data shall be thoroughly reviewed and approved by the Contractor prior to being forwarded to the Architect/Engineer. Submittal data received from the Contractor will be considered to have been reviewed and approved by the Contractor as suitable for the application and for installation in the space allotted.

e. The submittal of shop drawings shall be with the Contractor stamp affixed. This stamp indicates that the Contractor, by approving and submitting shop drawings, represents that he has determined and verified all field measurements and quantities, field construction criteria, material, catalog material, and similar data that he has reviewed and coordinated information in the shop drawings with the requirements of the work and the Contract Documents. It, also, indicates that any deviation from the Contract Documents has been shown on the submittal and clearly defines the deviations from the

specifications.

f. Approval rendered on shop drawings shall not be considered as a guarantee of quantities, measurements, or building conditions. Where drawings are approved, said approval does not mean that drawings have been checked in detail. Said approval does not in any way relieve the Contractor from his responsibilities or necessity of furnishing material or performing work as required by the contract drawings and specifications.

g. Failure of the Contractor to submit shop drawings in ample time for checking shall not entitle him to an extension of Contract time, and no claim for extension by reason of default will be allowed.

h. All shop drawings and submittals are to be in the office of the Architect within 30 days after the Contracts have been awarded. Contractor shall be financially responsible for any price increase of shop drawing items from the time these drawings are issued until they are returned to the Contractor for purchase of items.

i. Contractor shall keep on the job at all times copies of all approved shop drawings.

2.3 EQUIPMENT DEVIATIONS:

a. Where the Contractor proposes to use an item of equipment other than that specified or detailed on the drawings, which requires any redesign of the structure, partitions, foundations, piping, wiring or any other part of the mechanical, electrical, or architectural layout, all such redesign, and all new drawings and detailing required therefore, shall be prepared by the Contractor at his own expense and submitted for approval by the Architect/Engineer.

b. Where such approved deviation requires a different quantity and arrangement of wiring, conduit, and equipment from that specified or indicated on the drawings, the Contractor shall furnish and install any such structural supports, electrical wiring and conduit, and any other additional equipment required by the system, at no additional cost to the Owner.

PART 3: EXECUTION

3.1 GENERAL:

a. The Contractor shall coordinate the work and equipment of this Division with the work and equipment specified elsewhere in order to assure a complete and satisfactory installation. Work such as excavation, backfill, concrete, flashing, wiring, etc., which is required by the work of this section shall be performed in accordance with the requirements of the applicable section of the specifications.

b. It is the intention of these specifications and drawings to call for finished work, tested and ready for operation. Whenever the work "provide" is used, it shall mean "furnish and install complete and ready for use".

3.2 DUTIES OF CONTRACTOR:

a. Contractor shall furnish and install all materials called for in these

Specifications and accompanying drawings, and must furnish the apparatus complete in every respect. Anything called for in the specifications and not shown on the drawings or shown on the drawings and not called for in the specifications must be furnished by the Contractor.

b. Contractor is responsible for familiarizing himself with the details of the construction of the building. Work under these specifications installed improperly or which requires changing due to improper reading or interpretation of building plans shall be corrected and changed as directed by the Architect/Engineer without additional cost to the Owner.

c. The Contractor shall follow drawings in laying out work and check drawings or other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space conditions appear inadequate, Architect/Engineer shall be notified before proceeding with installation.

d. While every effort has been made to accommodate the equipment necessary for the work of this contract, it is the responsibility of the Contractor to ensure that equipment supplied as a part of this contract will fit in the spaces provided for by the drawings. Any concern by the contractor regarding the adequacy of a space for the equipment supplied, shall be brought to the attention of the Architect/Engineer in a written form prior to the approval of the related equipment submittals and prior to any rough-in associated with this equipment.

e. The plans are diagrammatic and are not intended to show each and every fitting or a complete detail of all the work to be done; but are for the purpose of illustrating the type of system, etc., and special conditions considered necessary for the experienced mechanic to take off his materials and lay out his work. This Contractor shall be responsible for taking such measurements as may be necessary at the job and adapting his work to local conditions.

f. Conditions sometimes occur which require certain changes in drawings and specifications. In the event that such changes in drawing and specifications are necessary, the same are to be made by the Contractor without expense to the Owner, providing such changes do not require furnishing more materials, or performing more labor than the true intent of the drawings and specifications demands. It is understood that while the drawings are to be followed as closely as circumstances will permit, the Contractor is held responsible for the installation of the system according to the true intent and meaning of the drawings. Anything not entirely clear in the drawings and specification will be fully explained if application is made to the Architect/Engineer. Should, however, conditions arise where in the judgment of the Contractor certain changes will be advisable, the Contractor will communicate with the Architect/Engineer and secure his approval of these changes before going ahead with the work.

g. The right to make any responsible change in location of apparatus, equipment, routing of conduit up to the time of roughing in, is reserved by the Architect without involving any additional expense to the Owner.

h. It shall be the duty of prospective Contractors to visit the job site and familiarize themselves with job conditions. No extras will be allowed

because of additional work necessitated by, or changes in plans required because of evident job conditions, that are not indicated on the drawings.

i. Contractor shall leave the premises in a clean and orderly manner upon completion of the work, and shall remove from the premises all debris that has accumulated during the progress of the work.

3.3 COORDINATION:

a. This Contractor shall coordinate the work of all subs and shall furnish any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

b. Where the work will be installed in close proximity to, or may interfere with the work of other trades, the Contractor shall assist in working out space conditions to make a satisfactory adjustment. If so directed by the Engineer, the Contractor shall prepare composite working drawings and sections at a suitable scale not less than $3/8" = 1'-0"$, clearly showing how his work is to be installed in relation to the work of other trades. If the Contractor installs his work before coordination, or so as to cause any interference with work of any subs, he shall make the necessary changes in his work to correct the condition without extra charge.

c. The Contractor shall furnish to other trades, as required, all necessary templates, patterns, setting plans, and shop details for the proper installation of work and for the purpose of coordinating adjacent work.

3.4 EXCAVATION:

a. Required excavation for installation of all electrical work shall be provided by the Electrical Contractor. Particular care shall be taken not to disturb or damage work of other trades.

b. Trenching and shoring shall comply with requirements of the State of South Carolina.

c. In backfilling pipe trenches, approved fill shall first be compacted firmly and evenly on both sides of pipe in 6" layers to a depth of 12" over the top of the pipe. Remainder of trench shall be backfilled to established grade in 6" layers. The Contractor shall compact between each layer with a high-frequency vibrator tamper such as Dart Soil Compactor (as manufactured by Dart Manufacturing Company, Denver, Colorado). Fill shall be compacted to density specified in Earthwork Section for the area through which trench is cut. Where compaction requirements are not established for an area, the Contractor shall compact fill to 95% maximum density at optimum moisture content.

d. Excess earth shall be deposited on the site as directed by the Architect/Engineer.

e. Where ditches occur outside of building, the surface shall be finished to match existing surfaces. Any existing work, or work of other trades, which is damaged or disturbed shall be repaired or replaced, and left in good order.

3.5 SLEEVES, CUTTING, AND PATCHING:

a. Contractor shall place his own sleeves and advise other trades of required chases and openings so they can be properly built in. Sleeves provided under this division shall be formed out of no less than schedule 40 galvanized rigid steel conduits. Where any raceway supports installed under this Contract pierce the roof, suitable pitch pockets shall be provided and coordinated with the roofing contractor as necessary to be acceptable to the Architect/Engineer.

Provide suitable fittings where any raceways or equipment cross expansion joints.

b. Permitted cutting or patching necessary shall be done by Contractor. Structural members shall not be cut except by written permission of Architect/Engineer.

3.6 PROTECTION AND CLEAN-UP:

a. Protect all material and work from damage during construction. Equipment installed in the building prior to its being closed in and dried out shall be protected from the elements in the same manner as previously specified for stored materials. Protect finished surfaces from splattering of mortar, paint, dirt, plaster, etc.. Do not install device plates, face plates, canopies, flush cabinet trims, or fixtures on walls or ceilings until after painting or cleaning of the surface has been completed, and arrange for such items that are required to be field painted to be painted before being mounted. Repair, clean and touch-up or replace all damaged material. At the completion of the project, remove all dust from finished surfaces, including lighting fixtures, lenses and lamps.

b. The Contractor shall keep premises free of debris resulting from his work.

3.7 PAINTING AND FINISHING:

a. Suitable finishes shall be provided on all items of electrical equipment and materials which are exposed. This shall consist of either an acceptable finish as manufactured and supplied to the job or application of suitable finishes after installation.

b. Where installed in finished areas, exposed equipment and materials shall be supplied with prime coat, and shall be professionally painted or enameled as directed to match or blend with adjacent surfaces.

c. In unfinished areas such as equipment rooms, exposed equipment shall be furnished with suitable factory applied finishes (e.g. standard gray enamel finish for panelboards, etc.).

d. Equipment furnished in finishes such as stainless steel and brushed aluminum shall not be painted.

e. All finishing shall be as directed by, and shall be satisfactory to, the Architect/Engineer.

f. Paint material shall be selected from the products listed below and, insofar as practical, products of only one manufacturer shall be used. Contractor shall submit to the Architect/Engineer the listed manufacturer he proposes to use in the work. Should the Contractor desire to use products of a

manufacturer not listed below, or products made by a listed manufacturer but not scheduled herein, Contractor shall submit complete technical information on the proposed products to the Architect/Engineer for approval. Only products approved by the Architect/Engineer shall be used.

1. Rust Inhibitive Primer:

- (a) Devoe: Bar-Ox Quick Dry Metal Primer, Red.
- (b) Duron: Deluxe Red Primer.
- (c) Glidden: Rustmaster Tank and Structure Primer.
- (d) Pittsburgh: Inhibitive Red Primer.

2. Galvanized Metal Primer:

- (a) Devoe: Mirrolac Galvanized Metal Primer.
- (b) Duron: Duron Deluxe Galvanized Metal Primer.
- (c) Glidden: Rustmaster Galvanized Iron Metal Primer.
- (d) Pittsburgh: Speedhigh Galvanized Steel Primer.

3.8 OBSERVATION:

a. The project will be observed periodically as construction progresses. The Contractor will be responsible for notifying the Architect/Engineer at least 72 hours in advance when any work to be covered up is ready for inspection. No work shall be covered up until after observation has been completed.

SECTION 16030

EQUIPMENT CONNECTIONS AND COORDINATION

PART 1: GENERAL

1.1 SCOPE:

a. The connection of all equipment provided under any Division of these specifications or by the owner requiring electrical connection shall be provided as part of this Division, unless otherwise indicated or specified. Special outlets, where indicated, are considered to be electrical connection to the equipment.

b. Drawings indicate approximate equipment capacity (including motor horsepower) and approximate location of connection. It is the responsibility of this Contractor to determine the exact characteristics of equipment actually being supplied; and to provide proper branch circuit connections, conductor protection and grounding.

PART 2: EXECUTION

2.1 GENERAL:

a. Heating, Ventilating, Air Conditioning and Plumbing Equipment: Unless otherwise indicated, provide all power wiring, including feeders and branch circuits, to the terminals of the equipment and mounting of motor starters; feeder and branch circuit over-current protection; disconnecting means within sight of each motor and each starter, whether or not specifically indicated on drawings.

b. Individually mounted motor starters: Unless otherwise indicated, individually mounted motor starters will be furnished as part of the Division furnishing the driven equipment. Unless otherwise indicated, remote control wiring for Heating, Ventilating, Air Conditioning and Plumbing equipment will be provided as part of those respective Divisions.

SECTION 16100

BASIC MATERIALS AND METHODS

PART 1: GENERAL

1.1 WIRING METHODS:

a. Unless otherwise indicated or specified, the Wiring Method for this project shall consist of copper conductors with 600 volt insulation installed in metal raceways.

b. The word "Raceway" and the word "Conduit" (or abbreviation "C") used herein or on the drawings indicate Rigid Metal Conduit, and where permitted, Intermediate Metal Conduit, Electrical Metallic Tubing, Rigid Nonmetallic Conduit, Flexible Metal Conduit, or Liquidtight Flexible Metal Conduit.

c. Reference to "Rigid Conduit" or "RMC" indicates heavy-wall Rigid Metal Conduit only.

d. Reference to "IMC" indicates Intermediate Metal Conduit.

e. Reference to "PVC" indicates Rigid Nonmetallic Conduit.

f. Reference to "EMT" or "Tubing" indicates Electrical Metallic Tubing.

g. Reference to "Flex" or "Flexible Conduit" indicates Flexible Metal Conduit, or, where required, Liquidtight Flexible Metal Conduit.

h. Other wiring methods, such as Metal-Clad Cable, shall be provided to the extent indicated on the drawings and/or hereinafter specified.

i. Aluminum conductors may be used only where specifically indicated on the drawings; however, aluminum shall not be used for grounding.

1.2 FASTENING METHODS:

a. Acceptable fastening methods include wood screws and nails on wood construction, toggle bolts on hollow masonry, expansion bolts and lead anchors on brick and concrete, and machine screws on metal surfaces.

b. Explosive fasteners may be used in steel and concrete in accordance with the manufacturer's recommendations.

c. Wire, perforated metal strap, and wooden plugs are not acceptable as fastening material.

d. Materials used shall be good quality, made of zinc or cadmium coated steel or other non-corroding material.

e. Materials, whether exposed or concealed, shall be firmly and adequately held in place. Fastening and support shall afford safety factor of three or higher, and shall be in full compliance with the seismic protection requirements of the International Building Code.

f. Fixtures, raceways, and equipment shall be supported from the structure. Nothing may be supported on suspended ceiling unless definitely noted so on the Drawings or specifically permitted by the Architect/Engineer.

g. Equipment and raceways attached to outside walls, or interior walls subject to permanent moisture, shall be shimmed out with non-corrodible material so as to provide 1/4" air space between wall and equipment or raceway.

1.3 EQUIPMENT IDENTIFICATION:

a. Suitable nameplates shall be provided for the identification of electrical equipment including Panelboards, Motor Starters, Safety Switches, and Circuit Breakers.

b. Nameplates shall be of engraved white core plastic laminate, not less than 1/16" thick. For 120/208 volt systems, nameplates shall have white letters on black backgrounds.

c. Engraving shall be of professional quality, with block style letters, minimum 1/4" high.

d. Nameplates shall be attached with sheet metal screws. They shall be sized to allow for installation of screws without obscuring text.

1.4 SLEEVES AND PENETRATIONS:

a. The Electrical Contractor shall provide sleeves and openings for his penetrations through exterior walls, interior walls and partitions, floors, and roofs. Provisions for all such penetrations shall be as approved by the Architect/Engineer.

b. For any raceway passing through an exterior wall, above or below grade, provide appropriate sleeve and water proofing. Center the conduit in the sleeve and fill the space between conduit and sleeve with appropriate compound such as lead and oakum, and then apply caulking compound - Thiocaulk or approved equal - flush with the wall surfaces.

c. For raceways penetrating floor slabs, smoke partitions, and fire-rated walls, provide steel pipe sleeves and seal with high-temperature non-shrink grout or other material as approved by the Architect/Engineer. Materials and installation methods shall be UL listed as a Through-Penetration Firestop System suitable for use with the UL Fire Resistance Design encountered. Refer to the UL fire protection details shown on the drawings. Refer to the UL fire penetration details shown on the drawings.

d. Conduits penetrating roof surfaces for purpose of connecting to roof-top mechanical equipment shall utilize openings and curbs provided for the equipment where possible.

e. For other raceway penetrations through the roof the Contractor shall provide appropriate prefabricated roof curb assemblies - "Pipe Portal System" as manufactured by Roof Products and System Corp., Addison, Illinois or equal method as approved by Architect/Engineer and Roofing Subcontractor.

SECTION 16110

RACEWAYS AND FITTINGS

PART 1: GENERAL

1.1 SCOPE:

a. Provide complete raceway systems as indicated on the drawings, as herein specified, and as required by applicable codes. Comply with Section 16100 Basic Materials and Methods.

b. All wiring shall be installed in raceways unless specifically noted otherwise.

1.2 SUBMITTALS:

a. Submit for approval manufacturer's data sheets for all raceway system components.

PART 2: PRODUCTS

2.1 MANUFACTURERS:

a. Metal raceway and components shall be as manufactured by Allied, Triangle, Wheatland, Thomas & Betts, or other approved manufacturers.

b. Non-metallic raceway system components shall be as manufactured by Carlon, Queen City Plastics, Ipex, or other approved manufacturers.

2.2 MATERIALS AND APPLICATIONS:

a. Rigid Metal Conduit shall be zinc coated Schedule 40 steel or alloy 6063-T42 aluminum with threaded couplings and fittings. Termination at sheet metal enclosures shall consist of double locknuts and insulating bushings. Rigid Steel conduit shall be used for all exposed and concealed work except where other raceways are indicated or permitted. Aluminum conduit complete with aluminum fittings may be used in lieu of steel conduit except in wet locations, underground, or in poured concrete. Steel and aluminum shall not be mixed in the same run of conduit.

b. Intermediate Metal Conduit (IMC) with threaded couplings and fittings may be used for exposed and concealed work in lieu of rigid metal conduit except underground outside the building foundation, or where supporting light fixtures, or in hazardous locations, or where exposed to severe impact or injury. Termination at sheet metal enclosures shall consist of double locknuts and insulating bushings.

c. Electrical Metallic Tubing (EMT) of 4" maximum size may be used for concealed work in lieu of Rigid Metal Conduit except underground or in poured concrete. EMT of 2" maximum size may be used for exposed work in lieu of Rigid Metal Conduit except outdoors, or above a roof, or where supporting lighting fixtures, or where exposed to severe impact or injury, or in hazardous locations, or less than 10 feet above a floor or platform in other than in

electrical, mechanical, or communications closets or equipment rooms.

d. Rigid PVC Conduit shall be Schedule 40, UL listed for use with 90°C. Conduit run underground or run in or under a poured concrete slab shall be rigid PVC. Vertical elbows and vertical extensions from underground or concrete embedded PVC conduits smaller than 3" trade size may also be of PVC provided that they remain concealed or otherwise protected, but shall be of Rigid Steel Conduit (or IMC where permitted) where they stub up into exposed locations or trade size is 3" or larger. An insulating bushing or end bell shall be provided at each termination. Conduit run underground and not under a poured concrete slab shall have installed continuously above it a warning tape. Tape shall be 12 inches wide, centered on conduit and located 12 inches below finished grade.

e. Flexible Metal Conduit shall be of zinc coated steel of minimum length, and shall be used in lieu of Rigid Metal Conduit for connections to moving or vibrating apparatus, recessed lighting fixtures, dry-type transformers, and motors. Flexible Metal Conduit may be used where rigid connections are impractical due to obstructions or space limitations. Flexible Metal Conduit used in wet, damp, or corrosive location shall be PVC jacketed liquid-tight complete with liquid-tight connectors.

f. Fittings for steel conduit and tubing shall be of zinc coated steel or malleable iron. Insulating bushings of plastic provided for Rigid and Intermediate Metal Conduits shall be rated for 150°C. Bonding bushings shall be steel or malleable iron with non-removable plastic throats rated 150°C. EMT fittings shall be of the compression type. Set-screw, indenter, pressure cast, and die cast fittings are not acceptable. Connectors for EMT, Flexible Metal Conduit and Liquid-tight Flexible Metal Conduit shall be the insulated throat type. Connectors for Flexible Metal Conduits shall be of the "Tite-Bite" design.

g. Conduit expansion fittings shall be of zinc coated cast or malleable iron and steel conduit, complete with flexible bonding straps. Expansion fittings shall allow longitudinal conduit movement of 4 inches.

h. Minimum raceway size shall be 1/2", except Flexible Metal Conduit connections to individual lighting fixtures may be 3/8". Other raceway sizes, unless indicated on the drawings, shall be determined by the Contractor in accordance with NEC requirements for type THW insulated conductors, or the actual insulation used if it is thicker than type THW.

PART 3: EXECUTION

3.1 INSTALLATION:

a. Rigid and Intermediate Metal Conduits shall be made up with full threads, to which a conductive pipe compound (T & B Kopr-Shield or equal) has been applied, and butted in coupling. Terminations at sheet metal enclosures in indoor dry locations shall be made with double locknuts and an insulating bushing. Terminations at sheet metal enclosures in outdoor, damp, and wet locations shall be made with threaded conduit hubs of zinc coated malleable iron.

b. Except where run under a concrete slab on grade, underground conduits

shall be installed a minimum of 30" below grade. Trenching and backfilling shall comply with Section 16010 Electrical General Requirements.

c. All underground conduits shall have metalized warning tape installed above the conduit that identifies the specific system buried below. The warning tape shall consist of a minimum 3.5 mil solid foil core encased in a protective plastic jacket (total thickness 5.5 mils). Tape shall be 6 inches wide with black lettering imprinted on a color coded background that conforms to APWA color code specifications. Tape shall be installed 18 inches above the conduit and in no case less than 6 inches below grade.

d. Installation of PVC conduit shall be in accordance with the manufacturer's recommendations using solvent welded couplings and fittings. Field bends shall be made with approved heating equipment. Open flames are not permitted. An insulating bushing or end-bell shall be provided at each termination.

e. Conduits shall be rigidly supported not more than 8 feet on center and shall be concealed within walls, ceilings, and floors, except as indicated or specifically approved by the Architect/Engineer; kept at least 6" from flues and steam or hot water pipes; and protected against the entry of dirt, plaster, or trash. Raceways shall be supported independently of suspended ceiling members and suspension wires.

f. Suspended EMT shall be provided with additional hangers at elbows and bends, and where necessary to avoid strain at couplings and connectors.

g. Exposed conduits, where permitted, shall be run parallel or perpendicular to walls, structural members and ceilings; with right-angle turns consisting of symmetrical bends or cast metal fittings with threaded hubs. Offsets may be used where necessary provided that they are of minimum length.

h. Conduits crossing expansion and contraction joints shall cross perpendicular to the joint and shall be provided with expansion fittings. Conduits shall not be embedded in the concrete slabs at the expansion and contraction joints.

i. Conduit may not be installed laterally in any concrete slab where the outside diameter of the conduit, measured at a coupling, exceeds one-third the thickness of the concrete. Conduits shall occupy the middle third of the slab when practical and leave at least 3/4 inch concrete cover. Where reinforcing bars occur at the 3/4 inch level the conduit shall be run inside them toward the center of the slab. Conduits may cross each other within the slab provided the 3/4 inch concrete cover is maintained. Conduits shall be tied to the reinforcing rods or otherwise supported when necessary to prevent sagging when concrete is poured. They shall be laterally spaced not closer than three diameters on centers to allow complete coverage.

SECTION 16120

CONDUCTORS

PART 1: GENERAL

1.1 SCOPE:

a. Furnish and install a complete system of wire and cable in compliance with Section 16100 Basic Materials and Methods.

1.2 SUBMITTALS:

a. Submit for approval manufacturer's data sheets for all conductor types.

PART 2: PRODUCTS

2.1 MATERIALS:

a. Insulated conductors shall be as manufactured by Rome, Triangle, Southwire, or approved equal.

b. Unless otherwise indicated, all wire and cable conductors shall be copper.

c. Conductors shall be not smaller than #12 AWG except that #10 AWG minimum is required for the entire length of 120 volt branch circuits whose distance to the center of the load exceeds 75 feet. #14 AWG may be used for signal and remote control circuits. #16 AWG may be used for taps to individual recessed lighting fixtures on circuits protected by over-current devices rated at 20 amperes or less and contained within flexible metal conduits that do not exceed 6 feet in length. Other conductors that are smaller than #14 AWG may be used only where specifically indicated on the drawings or specified herein.

d. Conductors #10 AWG and smaller shall be solid, dual rated type THWN/THHN.

e. Conductors #8 AWG and larger shall be stranded, dual rated type THWN/THHN.

f. Each conductor shall bear easily readable markings along entire length, indicating size and insulation type.

g. Insulation on conductors #10 AWG and smaller shall be suitably colored in manufacture.

h. Conductors in any location subject to abnormal temperature shall be furnished with an insulation type suitable for temperature encountered.

i. Where no indication is made of wire size, the conductor shall be of N.E.C. size to match its over-current protective device, but in no case smaller than #12 AWG.

PART 3: EXECUTION

3.1 SPLICES, TAPS, AND CONNECTIONS:

a. Splices in conductors #10 AWG and smaller shall be made with twist-on spring steel devices UL listed as Pressure Cable Connectors, with integral insulating covers rated 75°C at 600 volts, except that those used for connections to lighting fixtures and other heat-producing equipment shall comply with temperature ratings marked on the equipment but not less than 90°C.

b. Splices in copper conductors #8 AWG and larger shall be made with mechanical devices UL listed as Pressure Cable Connectors and insulated with thermoplastic tape UL listed for use as sole insulation. Tape may be omitted from connectors supplied with securely fastened insulating covers which completely enclose the connector and the conductors. Insulating covers shall be rated 75°C at 600 volts.

c. Connect solid wires to equipment, switches, and devices equipped with binding screw terminals by looping the wire under the screw head in such a manner that the loop is tightened as the screw is tightened. Straight-in wiring under screw terminals is not acceptable.

d. Stranded wires shall not be inserted into back-wiring holes on devices, nor shall they be directly connected to screw head terminals. They shall be fitted with insulated crimp-on type spade terminals for connection under the screw head.

3.2 COLOR-CODING:

a. All wiring shall be color-coded.

b. On 208Y/120V, 3 phase, 4 wire power systems, conductor insulation shall be color-coded Black (Phase A), Red (Phase B), Blue (Phase C), and White (Neutral).

c. Insulation for grounding conductors on all systems shall be Green.

d. Conductors #8 AWG and larger may be identified with two or more bands of proper color plastic tape applied near each splice and termination. Painting of wire will not be acceptable.

e. Phase sequence shall be "A", "B" and "C" from left to right, top to bottom or front to back when facing equipment.

f. Control and signal wiring shall not use the above-named colors except green for grounding. Any other colors or striping may be used but the coding shall provide same color or striping between any two terminals being joined.

g. Switch legs, including "Travelers", shall be the same color as phase circuit conductors.

3.3 BRANCH CIRCUIT RACEWAY WIRING:

a. Three-phase circuits shall be limited to one such circuit per raceway. They shall consist of three different phase wires, and a neutral where required.

b. A neutral shall not serve more than one circuit.

c. The neutral carrying all or any part of the current of any specific load shall be contained in the same raceway or enclosure with the phase wire or wires also carrying that current.

d. Circuits shall be connected to panels as shown in the panel schedules.

3.4 SERVICE & FEEDER CONDUCTORS:

a. Unless specifically shown otherwise, each feeder and each set of service conductors shall be installed in a separate raceway.

b. Where paralleling of conductors is shown for feeders or service entrance, it is absolutely required they be exactly the same length between terminations.

c. Where service or feeder conductors are so installed that the conductor markings cannot be read without moving or twisting conductors, they shall be provided with suitable tags indicating the conductor size and insulation.

SECTION 16122

METAL-CLAD CABLE SYSTEMS

PART 1: GENERAL

1.1 SCOPE:

a. Furnish and install a complete system of Metal-Clad Cable for branch circuit, signal, and remote control wiring as specified herein. Comply with Section 16100 BASIC MATERIALS AND METHODS.

b. Other branch circuit cable systems such as Types AC, NM, and NMC are not permitted.

1.2 APPLICATIONS:

a. Metal-clad cables may be used in lieu of wire in metal raceway only for concealed work in dry locations above suspended ceilings and within stud partitions.

b. Cables may not be run in, or through, concrete or masonry, fire-rated partitions, smoke partitions, or floors.

1.3 SUBMITTALS:

a. Submit for approval manufacturer's data sheets for metal-clad cable systems.

PART 2: PRODUCTS

2.1 MATERIALS:

a. Metal-clad cables shall be UL listed as type MC with copper conductors, THHN insulated; with full size green insulated grounding conductors. Minimum sizes shall be #12 AWG for branch circuits, #14 AWG for signal and remote control. Maximum size shall be #10 AWG.

b. Cable connectors shall be UL listed for grounding the metal sheath. Connectors shall be of steel or malleable iron with insulated throats.

c. Cables shall be color-coded in manufacture. Color-code shall comply with Section 16120 CONDUCTORS where feasible.

PART 3: EXECUTION

3.1 INSTALLATION:

a. Cables shall not be run exposed. Conduit skirts may be provided on surface mounted panelboards to conceal cables between panel tops and ceilings.

b. Except where installed in continuous rows, lighting fixtures shall be individually connected to a concealed outlet box. Cables may not be looped from fixture to fixture.

c. Cables above ceilings shall be supported from overhead structure clear of ductwork, suspended ceilings, and ceiling hanger wires.

SECTION 16130

GROUNDING AND BONDING

PART 1: GENERAL

1.1 SCOPE:

a. The electrical system neutral and all non-current-carrying metal parts, raceways, and enclosures shall be permanently and effectively grounded.

b. Grounding and bonding shall be provided in strict accordance with the National Electrical Code, and as specified herein and on the drawings.

c. The Contractor shall note that required grounding conductors and connections are not all shown on the drawings. NEC requirements apply.

PART 2: PRODUCTS

2.1 MATERIALS AND APPLICATIONS:

a. Grounding conductors shall be of THWN insulated copper, unless otherwise indicated.

b. Grounding bus bars in distribution equipment shall be bare copper.

c. Aluminum and aluminum alloys are not acceptable as grounding materials.

d. Clamps for attaching conductors to water pipes and ground rods shall be of bronze. Ground rod clamps shall be U.L. listed for direct burial.

e. Clamps for attaching conductors to building steel shall be of steel, bronze, or malleable iron.

f. Threaded hubs for bonding metal raceways to the contained grounding electrode conductors and to the water pipe clamps shall be of bronze or malleable iron. Similar hubs shall be used to bond the same raceways to the conductors and to sheet metal equipment enclosures.

g. Driven grounding electrodes shall consist of copper clad steel rods. Rods shall be 10 feet long and 3/4" diameter unless otherwise indicated.

h. Bonding bushings shall be of steel or malleable iron with non-removable plastic throats rated 150°C.

i. Bonding locknuts and wedges for service conduits shall be of zinc coated steel.

j. Grounding type insulated bonding bushings and jumpers shall be provided where conduits terminate in service entrance equipment and where concentric, eccentric or over-sized knockouts are encountered. The jumpers shall be sized per NEC Table 250-66 for services and per Table 250-122 for

branch circuits.

PART 3: EXECUTION

3.1 EQUIPMENT GROUNDING:

a. All non-current-carrying metal parts, raceways, and enclosures of the electrical system and of equipment supplied through the electrical system shall be permanently and effectively grounded.

b. Equipment grounding conductors shall be provided for each feeder and for each branch circuit and shall be contained within the same raceways as the feeder and branch circuit conductors. The equipment grounding conductor shall be THWN insulated copper, not smaller than #12 AWG.

c. Copper bonding strips normally included in small sizes of liquid-tight flexible metal conduit and dependent upon the terminal connectors for bonding continuity will not be accepted in lieu of the equipment grounding conductors specified herein.

d. Grounding terminals on wiring devices, including switches, shall be connected to the equipment grounding conductor included in the branch circuit raceway, and to the device box with suitable jumpers and lugs bolted to the box, not the plaster ring. "G" clips are not acceptable, and "self-grounding" type device mounting screws will not be accepted as the device grounding method.

e. Where metal raceways enter sheet metal enclosures through knockouts provide bonding bushings and jumpers to the enclosure under any of the following conditions:

1. Branch circuit conduit exceeds 1" in size.
2. Feeder conduit regardless of size.

3.2 GROUNDING OF OTHER SYSTEMS:

a. All metal piping systems including water piping, gas piping and sprinkler piping shall be permanently and effectively bonded to the electrical equipment ground system as required by N.E.C. 250.

b. Structural metal systems shall be permanently and effectively bonded to the electrical grounding electrode system as required by N.E.C. 250.

3.3 GROUNDING ELECTRODE SYSTEM:

a. The grounding electrode system for the service neutral and service equipment shall include connections to the following:

1. The water main at the nearest accessible point to where it enters the building and on the street side of the main valve. This connection shall remain accessible after construction is complete.

2. A ground rod using #4 AWG copper conductor. Ground rods shall be driven to a depth equal to their length plus six inches. Provide additional ground rods not less than 10 feet apart where needed to comply with NEC ground resistance limitations, and resistance limitations specified herein.

3. Structural metal building frame, where applicable.

b. Grounding electrode conductors shall be without splice and shall be contained within steel raceways and bonded to the raceway at both ends. Raceway may be omitted only where specifically indicated on the drawings.

c. A mechanical clamp type ground conductor connection is acceptable only if the connection is readily accessible for inspection and tightening. Any connection point not readily accessible shall be made by the thermal welding process.

d. The Contractor shall test the ground resistance of the completed grounding electrode system. If test indicates a resistance to ground in excess of 25 ohms it shall be reduced to 25 ohms or less by providing additional ground rods.

e. Prior to making the final main bond jumper connection from the grounding electrode conductor to the system neutral, the contractor shall demonstrate by megger test adequate isolation from ground of the system neutral. This test will require that the system neutral be suitably isolated from service neutral if it has been grounded in any way.

SECTION 16140

BOXES

PART 1: GENERAL

1.1 SCOPE:

a. Furnish and install outlet boxes, switch boxes, pull boxes, terminal boxes, junction boxes and floor boxes complete as shown and specified.

1.2 SUBMITTALS:

a. Submit for approval manufacturer's data sheets for all box types.

PART 2: PRODUCTS

2.1 MATERIALS AND APPLICATIONS:

a. Unless specifically noted or approved otherwise, boxes shall be of zinc coated steel or cast ferrous alloy as manufactured by Steel City, Raco, Crouse-Hinds, Appleton, or approved equal.

b. For exposed work on the exterior of the building, and in damp or wet interior locations, boxes shall be of cast metal with threaded conduit hubs and gasketed covers; or of zinc coated sheet steel of NEC gauge and size with screw fastened gasketed covers and threaded conduits hubs of zinc coated malleable iron and no knockouts or extraneous openings. Cover screws shall be stainless steel.

c. For exposed work in interior dry locations less than 8 feet above a floor or platform in other than Electrical, Mechanical or Communications Closets or Equipment Rooms, boxes shall be of cast metal with threaded conduit hubs and matching covers; or of zinc coated sheet steel of NEC gauge and size with screw fastened covers and no knockouts or extraneous openings. Cover screws shall be steel.

d. For exposed work in interior dry locations in Electrical, Mechanical, or Communications Closets or Equipment Rooms; or, in other dry areas, 8 feet or more above a floor or platform, boxes 5" square and larger shall be NEC gauge and size of zinc coated sheet steel. 4" octagonal, 4" square and 4-11/16" square "knockout" boxes shall be of zinc coated steel, NEC gauge and size. Box extensions are not permitted on exposed "knockout" boxes, and covers shall be of the raised surface type. "Handy" boxes are not permitted.

e. For concealed work, fixture outlet boxes shall be 4" octagonal minimum, provided with plaster rings in plastered surfaces. Concrete ring boxes shall be used in poured concrete. Switch and outlet boxes in plastered and dry walls shall be 4" square minimum or one-piece multi-gang with appropriate plaster rings. Switch and outlet boxes in exposed brick, block or tile walls shall be single or multi-gang one-piece boxes not less than 3-1/2" deep with square corners and with internal device mounting holes, equal to Steel City Type GW. Boxes in walls finished with ceramic tile or wood paneling shall be 4" square minimum or one-piece multi-gang boxes, fitted with appropriate tile rings having square corners and internal device mounting holes. Gangable boxes

are not permitted.

PART 3: EXECUTION

3.1 INSTALLATION:

a. Set recessed boxes with edges flush with finished surfaces.

b. Immediately after installation cover boxes to prevent entrance of foreign matter.

c. Scaling of plans for outlet locations is not necessarily accurate enough for the intent of these specifications. It is the Contractor's responsibility to comply with the evident intent for centering or symmetric arrangement in ceiling and wall spaces. Special attention is also directed to the location of any outlets which are built into, or located in relation to, other features such as shelving, work counters, and equipment. The Contractor shall consult plans and shop drawings on such features and locate outlets as thereby indicated.

d. Mounting heights indicated herein and on the drawings are approximate dimensions of the center of the box to the floor, and may vary slightly in order to clear obstructions and match joints in masonry. References to "Horizontal" and "Vertical" apply to the orientation of the long dimension of a single-gang plate and of the device mounting strap. Alignment tolerance shall be 1/16 inch.

1. Wall receptacle, data, and telephone outlets shall, unless otherwise indicated, be installed vertical, 18" up.

2. Outlets indicated as "counter height," as well as boxes for wall switches and wall telephones shall be installed vertical, 46" up, clear of wall cabinets, back-splashes, and wainscot interferences.

e. Switch boxes beside doors shall be on the strike side, with edge approximately 2" from door jamb or trim.

f. Junction and pull boxes may be used as necessary to facilitate wiring provided they are hidden from sight (but accessible), or installed in locations where exposed wiring is permitted, or flush mounted at locations approved by the Architect/Engineer.

SECTION 16150

WIRING DEVICES

PART 1: GENERAL

1.1 SCOPE:

a. The Contractor shall furnish and completely install lighting switches, convenience outlets, and special purpose receptacles along with appropriate outlet boxes and device plates as indicated on the drawings and as herein specified.

b. Where connection to an item of equipment is required under this contract, and where such equipment requires a receptacle for connection, the Contractor shall furnish and install the appropriate device, whether or not the device is specifically shown or specified.

1.2 SUBMITTALS:

a. Submit for approval catalog data sheets for all wiring devices.

PART 2: PRODUCTS

2.1 MANUFACTURERS:

a. Wiring devices and device plates shall be manufactured by Hubbell, Bryant, Arrow Hart, Pass and Seymour, Leviton, or Eagle.

b. Catalog numbers of one or more of the manufacturers are used herein and on the drawings to set a standard of quality and capacity. Equivalent products of the other named manufacturers are also acceptable, provided they are submitted and approved in accordance with Section 16010, Electrical General Requirements.

c. All wiring devices of any one general type (e.g. all duplex receptacles or all light switches) shall be of the same manufacturer, and shall match throughout.

2.2 WIRING DEVICES AND PLATES - GENERAL:

a. Wiring devices shall be specification grade unless otherwise indicated.

b. Unless otherwise indicated or directed, wiring devices shall be gray in color.

c. Unless otherwise indicated, plates for flush outlets shall be the type 302 stainless steel and shall be standard size. Those for surface cast boxes shall be of steel, of shape and finish to match the box. Screws shall be steel to match the plate.

d. Each wiring device (including each switch) shall be equipped with a Hex-Head green grounding screw for grounding the device and plate to the outlet

box and to the equipment grounding conductor run with the circuit conductors. "Self-Grounding" type mounting screws will not be accepted as the device grounding method.

2.3 SWITCHES:

a. Switches used for lighting control shall be listed to Fed Spec W-S-896E and rated 20 amps, 120-277 VAC, side wired, Hubbell 1221 series.

b. Switches used for disconnecting small single-phase motors and appliances shall be listed to Fed Spec W-S-896E and rated 20 or 30 amps to match the branch circuit rating and comply with their horsepower ratings, 120-277 VAC, side wired, Hubbell 1221 and 3031 series.

c. Switches with collars around the operating toggle will not be accepted.

2.4 RECEPTACLES:

a. Receptacles shall be listed to UL498 and Fed Spec W-C-596. Unless otherwise indicated or required, receptacles shall be the duplex type, side and back wired, with nylon face. On circuits supplying two or more such receptacles, they shall be rated 15 amps, 125 volts, NEMA 5-15R. Duplex receptacles on individual circuits shall be rated 20 amps, 125 volts, NEMA 5-20R.

b. Where no other features are indicated on the drawings provide Hubbell 5262 and 5362 series for 5-15R and 5-20R respectively.

c. Where indicated on the drawings provide Ground Fault Circuit Interrupter receptacles, Hubbell GF5262 and GF5362 series for 5-15R and 5-20R respectively. GFCI receptacles shall be Class A, listed to UL standard 943.

d. Where indicated on the drawings, weather-resistant receptacles shall consist of Ground Fault Circuit Interrupter receptacles as specified above with a weather-resistant "WR" rating. Provide with aluminum covers UL listed for wet locations while in use, Pass and Seymour WIUCAST1.

PART 3: EXECUTION

3.1 INSTALLATION:

a. Devices shall be mounted tightly to boxes and be adjusted plumb and level. Devices shall be mounted flush with its associated coverplate. Ears on flush devices shall be in uniform contact with wall surfaces, or the devices shall be fitted with Caddy RLC device levelers. Device plates shall not be used for support of flush devices.

b. Where two or more devices are indicated for gang installation, they shall be trimmed with gang type plates.

c. Grounding type receptacles shall be grounded with insulated copper grounding conductors routed with the circuit conductors.

d. The Contractor shall provide suitable testers, and demonstrate, when directed, that receptacles are operational and correctly wired; and that ground fault circuit interrupter type receptacles will trip when current to ground has a value in the range of 4 through 6 milliamperes.

SECTION 16160

RACEWAY AND OUTLET SYSTEMS

PART 1: GENERAL

1.1 SCOPE:

a. Contractor shall furnish and install systems of raceways, outlet boxes, equipment boards, and cabinets, as indicated on the drawings and as herein specified to accommodate the installation by others of wiring and equipment.

PART 2: PRODUCTS

2.1 MATERIALS:

a. Raceways, and boxes, shall be in compliance with the relevant sections of these specifications.

b. Wall outlets shall consist of standard 4" x 4" x 2-1/2" outlet boxes with single device rings. Trim plates shall be blank to match wiring device trim plates, unless otherwise indicated.

c. Equipment boards shall be of size noted or shown on the drawings, and shall be constructed of 3/4" plywood, with finish grade on front. Paint board with gray fire-retardant paint.

PART 3: EXECUTION

3.1 COORDINATION:

a. Contractor shall fully coordinate with the telephone and system installer, and shall install service entrance raceways, backboards, and grounding conductors in accordance with their requirements.

b. Contractor shall fully coordinate with other installers of wiring and equipment and shall install raceways, outlets, cabinets and backboards in accordance with their requirements.

3.2 INSTALLATION:

a. Install pull boxes as necessary to limit runs between pull points to two 90 degree bends (or equivalent) and to 100 feet in length, unless other arrangements are approved by the wiring installers.

b. Leave all raceways with 100 lb. test nylon pull cord.

c. Install raceways and boxes in accordance with relevant sections of these specifications.

d. Unless specifically noted otherwise, provide an individual 1" conduit from each indicated outlet to the nearest terminal board for the system involved.

- e. Provide all conduits not terminating on boxes with plastic bushings.
- f. At the equipment terminal board, terminate all conduits with plastic bushings.

SECTION 16190

MISCELLANEOUS MATERIALS

PART 1: GENERAL

1.1 SCOPE:

a. Contractor shall furnish and install miscellaneous materials as indicated on the drawings and as herein specified.

1.2 SUBMITTALS:

a. Submit for approval manufacturer's data sheets on each device specified by this section.

PART 2: PRODUCTS

2.1 CONTROL RELAYS:

a. The relay coil shall operate satisfactorily with coil voltages within 85% to 110% of its voltage rating. Unless otherwise noted, contact rating shall be 10 amps, continuous for the applied voltage level.

b. Time delay relays shall be provided with on-delay or off-delay as required, and repetitive accuracy of plus or minus 0.2%.

c. Relays shall be installed in a suitable enclosure to fit the environment of their location.

d. Relays shall be manufactured by GE, Square D, Cutler-Hammer or approved equal.

2.2 CONTACTORS:

a. Contactors shall be "electrically held" or "mechanically held" type, as indicated on drawings.

b. Electrically held contactors shall include auxiliary contacts as indicated and line and load terminal connectors.

c. Mechanically held contactors shall be industrial type, single or dual solenoid operator, with mechanism capable of withstanding reduction or loss of control voltage without change of position. Contactor shall incorporate control power cut-out contacts so that the magnetic solenoid operator is only momentarily energized during the instant the switch changes position.

d. Contactor core and coil assembly, or operators, shall operate satisfactorily with coil voltage within 85% or 110% of its voltage rating.

e. All contacts shall be of non-welding, non-corroding silver alloy.

f. Rating of contactors shall be as indicated on drawings. Auxiliary relays shall be provided as applicable. Contactors shall be contained in a

suitable enclosure for the environment of their location. Contactors shall be suitable for a continuous load not less than 100% of their electrical rating.

g. Contactors shall be manufactured by GE, Square D, Cutler-Hammer or approved equal.

2.3 INDIVIDUAL PUSHBUTTONS, SELECTOR SWITCHES AND INDICATING LIGHTS:

a. Pushbuttons shall be heavy-duty, oil-tight, momentary or maintained contact, as applicable, devices rated 600 volts with the number of buttons and the marking of nameplates in accordance with NEMA Publication ICS.

b. Pushbuttons shall be designed with the indicated number of normally open circuit closing contacts, normally closed circuit opening contacts, or combination thereof. Pushbuttons shall have positive make and break non-welding, non-corroding silver alloy contacts.

c. Selector switches for control circuits shall be heavy-duty, oil-tight maintained contact devices with the number of positions and the marking of nameplates as indicated on drawings or otherwise specified.

d. Indicating lights for control circuits shall be oil-tight, instrument type devices with threaded base and collar for flush mounting and translucent convex lens. Indicating lights shall be long life type, rated 7500 hours, minimum. Provide Owner with two spare indicating lights of each size and type used.

e. Pushbuttons, selector switches and indicating lights shall be contained in an enclosure suitable for the environment of their location, and shall be Square D Class 9001, Type T Series, or equivalent as accepted by the A-E, and shall be Square D Class 9001, Type T Series, or approved equal.

2.4 CONTROL CIRCUIT TRANSFORMERS:

a. Control circuit transformers shall be provided within the enclosure of magnetic contactors when indicated on drawings or specified otherwise and the line voltage is in excess of 120 volts. The transformer shall be dry type single phase, 60 hertz alternating current with a 120 volt isolated secondary winding in accordance with NEMA Publication STL "Specialty Transformers".

b. The rated primary voltage of the transformer shall be not less than the rated voltage of the controller. The rated secondary current of the transformer shall be not less than continuous duty current of the control circuit.

c. The voltage regulation of the transformer shall be such that with rated primary voltage and frequency the secondary voltage will not be less than 95% or more than 105% of rated secondary voltage.

d. The source of supply for control circuit transformers shall be taken from the load side of the main disconnecting device. The primary and secondary windings of the transformer and control circuit wiring shall be protected against overloads and short circuits with properly selected fuses. The secondary winding of the control circuit transformer shall be grounded.

2.5 TIME SWITCHES:

a. Time switches for the control of tungsten-lamps loads, fluorescent - lamp loads, resistive heating loads, motors and magnetically operated devices shall consist of a digital programmable timer and switch assembly in a suitable enclosure, as indicated and herein specified.

b. Timer shall operate from 120, 208, 240 or 277V.

c. Battery reserve power shall be provided which will automatically operate the timer in case of electric power failure for a period of not less than 30 days.

d. The switch mechanism shall include a heavy-duty, general purpose, precision snap-action switch. Provision shall be made for manual "OFF" and "ON" operation of the switch.

e. Time switches shall be manufactured by Tork, Sangamo, General Electric, or approved equal.

2.6 PHOTOCELL CONTROL DEVICES:

a. Photocell control devices for control of outdoor fixtures and natural daylight utilization for indoor spaces shall be fixture mounted or individually mounted as indicated on drawings, or otherwise specified.

b. Fixture mounted photocell control devices shall include a snap-action switch with a rating of not less than 1000 watts incandescent load and 1200 volt-amp reactive or HID load at rated voltage and frequency. Device also shall have an inherent time delay in excess of 5 seconds, built-in surge protection, and the appropriate lock type receptacle base. The device shall be enclosed in a weatherproof enclosure. Device rating shall be 120 or 277 volts, as applicable, 60 hertz. The device shall be factory preset to turn "ON" lights at approximately 3 foot-candles with a ratio of "ON" to "OFF" of about 1 to 2.

c. Individually mounted photo control devices shall have the same characteristics as fixture mounted devices, except that they shall be field adjustable for "ON" "OFF" operation from 2 to 50 foot-candles, have a capacity of up to 2000 watts of incandescent load, be outlet box mounted, and not require surge protection.

d. Photo control devices shall be as manufactured by Tork, Sangamo, General Electric, or approved equal.

2.7 PROGRAMMABLE LIGHT SWITCHES:

a. The digital time switch shall be programmable to turn lights off after a preset time.

b. Time switch shall be a completely self-contained control system. It shall have a ground wire and ground strap for safety. Switching mechanism shall be a latching air gap relay.

c. Time switch shall be compatible with all LED, electronic ballasts,

motor loads, compact fluorescent and inductive loads.

d. Time switch shall operate at universal voltages of 100-300 VAC; 50/60 Hz.

e. Time switch shall have no minimum load requirement and shall be capable of controlling 0 to 800 watt incandescent, fluorescent @ 100/120 VAC, 50/60 Hz; 0 to 1200 watts fluorescent @ 230/277 VAC, 50/60 Hz; 1/6 hp @ 125 VAC.

f. Time scroll feature shall allow manual overriding of the preset time-out period.

g. Time switch shall have the option for a one second light flash warning at five minutes before the timer runs out and twice when the countdown reaches one minute (when used to control lighting loads).

h. Time switch shall have the option for a beep warning that shall sound every five seconds once the time switch countdown reaches one minute.

i. Time switch shall have manual feature for timer reset where pressing the ON/OFF switch for more than 2 seconds resets the timer to the programmed time-out period.

j. Time switch shall have an electroluminescent backlit Liquid Crystal Display that shows the timer's countdown.

k. Time-out period shall be adjustable increments of 5 minutes from 5 minutes to 1 hour, and in increments of 15 minutes from 1 hour to 12 hours.

l. Time switch shall be capable of operating as an ON/OFF switch.

m. The time switch shall have a 100% OFF override switch with no leakage current to the load.

n. In the event there is an open circuit in the AC line such as a ballast or lamp failure, the time switch shall automatically switch to OFF mode.

o. Time switch shall have 5 year warranty and shall be UL and CUL listed.

2.8 SPECIAL ENCLOSURES:

a. Special enclosures designed in accordance with UL and NEMA Standards shall be provided as required to protect devices and equipment from wet, dusty, corrosive, hazardous or flammable atmospheres. Enclosures shall be NEMA Type 3R, 3S, 4X, 7, 9, 12, or 13 in accordance with the environment present in the specific location.

b. Enclosures shall be made of metal unless otherwise specifically noted.

c. NEMA Type 4X enclosure shall be made of corrosion-resistant, chromium nickel stainless steel conforming with UL Standard No. 50 "Cabinet and Boxes".

d. NEMA Type 7 and 9 enclosures shall be made of cast iron, bolted-type UL listed for the use intended. Cast metal enclosures shall be not less than 1/8"

thick at every point, except that it shall be not less than 1/4" thick at tapped holes for conduits.

2.9 OCCUPANCY SENSORS:

a. Occupancy sensors shall be provided where indicated on the drawings. Sensors shall be the dual technology type suitable for sensing both passive infrared and ultrasonic wave type, complete with a self-contained power/switch unit to avoid the need for low-voltage wiring to a remote sensor. Each sensor shall have a time delay circuit adjustable from 6 - 15 minutes with a shortened 30 second time delay feature for set-up purposes and a manual time delay bypass feature. In addition, each sensor shall have a LED walk test indicator for set-up purposes.

b. The power/switch pack shall consist of a control transformer and rectifier circuit and a relay with contacts rated 277 VAC, 20 Amp, 4800 Watts.

c. The sensor shall be sensitive to 9 - 10 micron/meter wave length infrared heat waves.

d. Upon detection of the heat waves or motion, the relay contacts shall instantly close to activate the room lighting. The contacts shall remain closed until no motion or presence of waves is sensed for the full length of time set by the adjustable time delay circuit.

e. The sensor shall be ceiling mounted and located as recommended by the manufacturer. The sensor shall be provided complete with all necessary hardware, brackets, special boxes and covers.

f. Unless otherwise indicated, all fluorescent lighting within the room where the occupancy sensor is located shall be controlled by the occupancy sensor.

g. Occupancy sensors shall provide 95% coverage of space where shown. Provide additional sensors as required to achieve this coverage.

h. Submit layout of all occupancy sensors specific for this project as developed by the sensor manufacturer prior to installation of sensors.

PART 3: EXECUTION

3.1 INSTALLATION:

a. Devices specified by this section shall be installed such that only one wire is terminated on any given screw.

3.2 COMMISSIONING:

a. For all lighting control devices specified in this section, provide a factory-certified field service engineer to make a site visit to ensure proper system installation and operation under following parameters:

1. Qualifications for factory-certified field service engineer:

(a) Minimum experience of 2 years training in the electrical/electronic field.

(b) Certified by the equipment manufacturer on the system installed.

2. Make a visit upon completion of installation of lighting control device:

(a) Verify connection of power feeds and load circuits.

(b) Verify connection and location of controls.

(c) Program system data.

(d) Verify proper operation of manufacturers interfacing equipment.

(e) Obtain sign-off on system functions.

(f) User to be trained on system operation.

SECTION 16400

SECONDARY DISTRIBUTION EQUIPMENT

PART 1: GENERAL

1.1 SCOPE:

a. Provide equipment for over-current protection, switching, disconnecting, transformation, control of services, separately derived systems, feeders, and branch circuits as indicated on the drawings and as herein specified.

PART 2: PRODUCTS

2.1 MANUFACTURERS:

a. Distribution equipment, other than fuses, shall be manufactured by Square D, General Electric, Siemens, or Cutler-Hammer. Equipment design features and components indicated on the drawings are those of Cutler-Hammer, and the standard construction features of that manufacturer shall be considered as minimum requirements, with additional requirements as specified herein and on the drawings.

b. Fuses shall be manufactured by Bussmann, Gould Shawmut, or Littelfuse.

2.2 OVERCURRENT PROTECTION DEVICES:

a. Unless otherwise indicated, circuit breakers shall be provided as the over-current protection devices for services, separately derived systems, feeders, and branch circuits. Fuses may be used only where indicated on the drawings, or required by the nameplate for equipment connected, or specified herein.

b. Molded-case and insulated-case circuit breakers shall be the static or thermal-magnetic type, quick-make and quick-break for manual and automatic operation. Multi-pole breakers shall be common trip. Circuit breakers shall be bolted in place where possible. Thermal-magnetic breakers shall be calibrated at 40°C or ambient compensated. Ampere ratings, frame sizes, and short circuit ratings shall be as indicated on the drawings. Series ratings may be applied only where specifically indicated on the drawings. Individual enclosures shall be NEMA 1 indoors, 3R outdoors, unless otherwise indicated. Other circuit breakers shall be suitable for installation in Panelboards as hereinafter specified.

c. Single-pole 15 and 20 amp circuit breakers shall be SWD rated.

d. Fuses shall be the non-renewable, time delay, cartridge type, UL Class RK5 unless otherwise indicated; for installation in Safety Switches, as hereinafter specified.

2.3 SWITCHING EQUIPMENT:

a. Fusible switches shall be incorporated into Safety Switches, as

hereinafter specified. Manual operation shall be quick-make and quick-break. Fuse holders shall be the Class R rejection type unless otherwise indicated.

b. Safety Switches shall be the NEMA heavy duty type, horsepower rated, with interlocked covers, non-fusible except where fused switches are indicated or fuses are required. Switch mechanisms shall be quick-make and quick-break. Enclosures shall be NEMA 1 indoors, NEMA 3R outdoors unless otherwise indicated. Fuse holders, where required, shall be as specified above for fusible switches.

c. Switches for disconnecting small single-phase motors and appliances shall comply with SECTION 16150 WIRING DEVICES.

2.4 APPLICATION:

a. Distribution Equipment shall be sized for installation with required clearances at the locations shown on the drawings. Alternative arrangements may be submitted to the Architect/Engineer by the Contractor for approval, in the form of shop drawings, drawn to scale and showing actual dimensions of proposed equipment and required clearances.

b. Unless otherwise indicated, Distribution Equipment shall be connected with wire and cable as specified in SECTION 16120 CONDUCTORS. In general, these specified conductors are rated for a maximum operating temperature of 75°C, and are sized for that temperature rating in an ambient of 30°C. Distribution equipment, including terminal lugs, temperature sensitive devices, and enclosures shall be designed, sized, and labeled for field connection with conductors as specified.

c. Power conductors shall be properly tightened and/or torqued as recommended by the equipment manufacturer supplying the lugs/terminals used for terminating the conductors.

d. Lugs/terminals shall comply with UL standards UL486A and UL486B.

2.5 IDENTIFICATION:

a. Equipment nameplates; and nameplates for individually mounted switches, circuit breakers, shall comply with SECTION 16100 BASIC MATERIALS AND METHODS.

b. Group-mounted circuit breakers in Panelboards shall be provided with nameplates as described above; or they shall be identified with numerals and cardboard directories in metal or heavy polycarbonate, directory frames. Directories in metal frames shall be protected with rigid plastic covers. Directories shall be sized to permit all circuit designations to be read without removing the card from the frame.

c. Manufacturer's nameplates or labels on custom fabricated or factory assembled custom equipment shall contain sufficient identification to expedite the future procurement of parts, additions, and shop drawings.

d. Service equipment shall be UL labeled as "Suitable for use as Service Equipment." Service disconnects shall be clearly identified.

PART 3: EXECUTION

3.1 INSTALLATION:

a. Distribution Equipment shall be installed in strict accordance with the manufacturer's instructions for handling, support, connections, assembly, protection, energizing, adjustment and similar procedures.

b. Fastening methods shall comply with SECTION 16100 BASIC MATERIALS AND METHODS.

c. Equipment interiors shall be thoroughly cleaned of dust, dirt, trash, and other foreign material prior to energizing of the equipment.

d. Exterior Safety Switches that are readily accessible to unauthorized persons shall have their covers padlocked closed by the Contractor. Keys shall be identified and delivered to the Owner.

e. Upon completion of the project, furnish to the Owner one complete set of replacement fuses, consisting of three fuses of each type and rating used.

f. Directory cards for Panelboards shall be neatly filled-in with a typewriter to indicate the type and location of the load on each circuit or feeder.

SECTION 16420

PANELBOARDS

PART 1: GENERAL

1.1 SCOPE:

a. Furnish and install Lighting, Power, and Distribution Panelboards as indicated on the drawings and as herein specified.

b. Panelboards and their installation shall comply with applicable requirements of SECTION 16400 - DISTRIBUTION EQUIPMENT.

1.2 SUBMITTALS:

a. Submit for approval panelboard shop drawings which include as a minimum the following information:

1. Cabinet dimensions.
2. Mounting requirements.
3. Bussing arrangement.
4. Circuit breaker arrangement.
5. Accessories.

PART 2: PRODUCTS

2.1 BRANCH CIRCUIT PANELBOARDS:

a. Panelboard types, ratings, and contents shall be as shown on the Drawings.

b. Equipment shall be built to NEMA Standard PB-1, UL Standards UL50 and UL67, and NEC requirements.

c. Panelboard back boxes shall be constructed of galvanized sheet steel and shall be securely fabricated with screws, bolts, rivets or by welding. Back boxes shall be a minimum 20" wide and 5-3/4" deep, unless noted otherwise, and heights shall not exceed 72" overall. Top or bottom gutter space shall be increased 6" where feeder loops through panel. End plates shall be provided without knockouts.

d. Covers shall be constructed of high grade flat sheet steel with:

1. Single hinged door as standard. Door shall close flush with cover and against a full inside trim stop. Hinges shall be inside type. Door-in-door construction shall be provided. The inside hinge door shall allow access to device handles only. The outer hinged door shall allow access to wiring gutter.

2. A flush latch and tumbler type lock, so panel door may be held closed without being locked. All such locks shall be keyed alike. Furnish to the Owner two keys with each lock, or a total of 10 keys for the project.

3. Four or more cover fasteners of a type which will permit mounting plumb on box. Cover shall also have inside support studs to rest on lower edge of back box while being fastened. For flush mounted panelboards, cover fastening hardware shall be concealed behind the hinged door.

e. A means shall be provided for readily adjusting projection of panel interior assembly with all connections in place. A method requiring stacking of washers is not acceptable. Interior trim shall fit neatly between interior assemblies and cover leaving no gaps between the two.

f. Panelboard phase and neutral bus work shall be of copper. A copper ground bus shall be provided in each panel.

g. Minimum short circuit rating of any panelboard assembly shall be 10,000A. Furnish panelboards with higher rating where so noted or where evidently intended by specification of circuit breakers with higher interrupting capacity.

h. Ampacity of mains shall be equal to, or greater than, the ampacity of the feeder unless otherwise indicated.

i. Where drawings schedules indicate spaces for addition of future circuit breakers, furnish all necessary bus work, strap, brackets, hardware, and removable blank covers.

j. Breakers in panelboards shall be physically arranged in locations shown in panel schedules on the drawings where possible. They shall be connected to the phases as shown.

k. Unless otherwise indicated and where available for the panelboard type specified, circuit breakers shall be of the bolt-on type.

l. Provide surge suppressors at panelboard as indicated on the drawings and by Section 16401 of the specifications for limiting surge voltages and to prevent continued flow of follow current while remaining capable of repeating these functions.

2.2 DISTRIBUTION PANELBOARDS

a. Panelboards requiring two or more sub-feed breakers rated 100 amperes or greater shall be Distribution Type.

b. Description: NEMA PB 1, circuit breaker type.

c. Panelboard Bus: Copper. One continuous fully rated bus bar per phase with ratings as indicated. Provide copper ground bus and copper neutral in each panelboard equipped with lugs to accommodate all conductors to be connected. Neutral bus shall be sized 50% and the ground bus shall be sized a minimum of 25% of panelboard bussing. Where more than one ground bar is furnished, each ground bar will be interconnected with a conductor sized not

less than the panelboard feeder ground conductor. Ground bar shall be bonded to enclosure.

d. Interior trim shall be dead front construction. Main lugs shall be mounted in the mains compartment.

e. Main circuit breaker and main lug interiors shall be field convertible for top or bottom incoming feed.

f. Enclosure: NEMA PB 1, Type 1 unless otherwise indicated on drawings in compliance with UL 50.

1. The operating handle of the top most mounted device shall be no higher than 6 feet 6 inches above the finished floor.

2. Panelboard back box shall be constructed without pre-punched knockouts.

3. Door shall close flush with cover and against a full inside trim stop. Hinges shall be inside type. Door-in-door construction shall be provided. The inner hinged door shall allow access to the device handles only and the outer hinged door shall allow access to wiring gutter.

4. Enclosure and front shall be either galvanized steel or stainless steel and shall be finished in manufacturer's standard gray enamel.

5. The enclosure shall be minimum 26 inches wide.

g. Minimum fully rated short circuit rating: RMS symmetrical amperage shall be minimum 22,000 amperes unless otherwise indicated on drawings.

h. Molded Case Circuit Breakers: NEMA AB 1, UL 489 listed circuit breakers.

1. Manufactured by the same company manufacturing the panelboard.

2. Circuit breakers used in service entrance equipment should be listed for such use.

3. Include shunt trip where required or as indicated on the contract documents.

4. Rating plugs, where used, shall be front accessible.

5. Breakers shall have minimum interrupting capacity, as indicated for the panelboard on the contract documents.

6. Breaker frame sizes and trips shall be as indicated on the drawings.

7. Circuit breakers shall provide positive indication of ON, OFF, and tripped conditions.

8. All breakers shall be quick-make, quick-break.

9. Multi-pole breakers shall be common-trip, resulting in all poles opening simultaneously under trip conditions.

PART 3: EXECUTION

3.1 INSTALLATION:

a. Equipment shall be perfectly plumb and level.

b. Openings in back boxes shall be cut or sawed with tools made for that purpose. Burning of openings is absolutely unacceptable.

c. Unused openings shall be closed.

d. Only one solid wire is allowable under a screw. Provide approved lugs for connecting stranded wire or more than one solid conductor.

e. Centered above the breakers in each panelboard attach a nameplate indicating panel designation - for example "PANEL A", or "PANEL MDP". Nameplates shall comply with SECTION 16100 BASIC MATERIALS AND METHODS.

f. Panelboard back boxes shall be mounted with their tops 6'-8" above the floor.

SECTION 16500

LIGHTING FIXTURES AND ACCESSORIES

PART 1: GENERAL

1.1 SCOPE:

a. The Contractor shall furnish and completely install Lighting Fixtures and Accessories as indicated on the drawings and as herein specified.

b. All fixtures shall be equipped with lamps.

c. A lighting fixture shall be provided for each lighting outlet indicated. Outlets lacking fixture designations shall be brought to the attention of the Architect/Engineer before submitting proposal; otherwise units selected by the Architect/Engineer shall be furnished and installed at no additional charge.

1.2 SUBMITTALS:

a. Submit for approval complete manufacturer's data sheets for all fixtures. Indicate all components, characteristics, and options.

b. Submit for approval manufacturer's data sheets for all lamps to be furnished.

c. Submit for approval Lighting Fixture samples as requested by the Architect/Engineer. Samples shall be equipped with lamps, cords, plugs, and ballasts for 120 volt operation.

PART 2: PRODUCTS

2.1 LIGHTING FIXTURES:

a. All fixtures shall be labeled by Underwriters' Laboratories, Inc.

b. Fixture designations on the drawings generally consist of a letter indicating the fixture type. Fixture types are identified in the Lighting Fixture Schedule or Symbol Schedule, however, the Schedule does not necessarily list all accessories and hardware necessary for the complete installation, nor does it detail the construction to be encountered at the fixture locations. It is the Contractor's responsibility to properly determine and provide correct components, accessories, and hardware required for the installation.

c. Pendant Fixtures shall be equipped with swivel hangers.

d. Recessed fixtures in plaster and gypsum board ceilings shall be equipped with plaster frames. In other ceilings they shall be equipped with plaster frames and/or other devices as approved by the Architect/Engineer, to facilitate removal of fixture and access to the concealed junction box.

e. Plastic materials indicated to be "acrylic" shall be of 100% virgin

methyl methacrylate produced by Rohm and Haas, Dupont, or Cyanamid.

f. Recessed troffers shall conform to the following minimum requirements unless modified by notes and schedules on the Drawings:

1. Housings shall be of 3" minimum, 5" maximum depth, and of 22 gauge minimum steel, with deeply formed transverse ribs for rigidity, primed, and finished in baked white enamel. The use of pre-painted steel is acceptable.

2. Lenses shall be of flat clear K-12 type acrylic of .125" nominal (.115" minimum) thickness in rigid hinged steel or extruded aluminum door frames finished in baked white enamel and secured with inconspicuous spring-loaded or rotary cam type steel latches. Lenses shall be maintained in a flat position with invisible clips, and shall be removable from the door frames using a screwdriver without damaging the lens or the frame.

3. Joints between housings and door frames shall be totally free of light leaks. Gaskets, if used, shall be invisible and in compression when the door is closed. Gasket material subjected to rubbing when the door is opened or closed will not be accepted. Flexible and/or removable black baffles will not be accepted.

4. Top access plates to facilitate wiring are optional with the Contractor. Each fixture shall be individually connected to a concealed junction box with #16 TFN conductors in 6 feet of 3/8" flexible metal conduit.

5. Troffers for inverted tee exposed grid ceilings shall be designed to be raised through the ceiling opening, and be supported and framed by the ceiling tees. They shall be secured to the ceiling grid with four "earthquake clips" furnished by the fixture manufacturer.

6. Troffers for plaster and gypsum board ceilings shall be furnished with plaster frames.

7. Troffers for ceilings with concealed suspension systems including plaster, gypsum board, and acoustical tile shall be equipped with suitable adjustable yokes or brackets designed to hook onto the plaster frame or ceiling channels, prevent the channels from spreading, and support the fixture.

8. Fixtures shall be a regularly cataloged and commonly manufactured product of an established, recognized lighting fixture manufacturer, with published photometric data and Zonal Cavity Coefficients of Utilization based on tests conducted by an independent photometric testing laboratory. Tests and calculations shall be in accordance with current IES standards.

2.2 LED DRIVERS:

a. General

1. Provide a ten-year operational life while operating at

maximum case temperature and 90 percent non-condensing relative humidity.

2. Driver shall be designed and tested to withstand electrostatic discharges up to 15,000 V without impairment per IEC801-2.

3. Electrolytic capacitors to operate at least 20 degrees C below the capacitor's maximum temperature rating when the driver is under fully-loaded conditions and under maximum case temperature.

4. Maximum inrush current of 2 amperes for 120V and 277V drives.

5. Withstand up to a 4,000 volt surge without impairment of performance as defined by ANSI C62.41 Category A.

6. Manufactured in a facility that employ ESD reduction practices in compliance with ANSI/ESD S20.20.

7. Class A Sound Rating - Inaudible in a 27 dBA ambient.

8. No visible change in light output with a variation of plus/minus 10 percent line voltage input.

9. Total Harmonic Distortion less than 20 percent and meet ANSI C82.11 maximum allowable THD requirements.

10. Drives to track evenly across:

a. Multiple fixtures.

b. All light levels.

11. Constant current drives must provide models to:

a. Support from 200mA to 2.1 Amps (in 10mA steps) to ensure a compatible driver exists.

b. Support LED arrays up to 40W or 50W (710mA to 1.05A in 10mA steps).

12. Constant voltage drives must provide models to:

a. Support from 10V to 40V (in 0.5V steps) to ensure a compatible driver exists.

b. Support LED arrays up to 40W.

13. Configuration tool must be available to optimize the following for LED fixtures:

a. Light level.

b. Efficacy.

c. Thermal performance.

14. Driver must be capable of operating from a supply voltage of 120 through 277VAC at 60Hz for digitally addressable and 3-wire models.

b. Three-Wire Control

1. Continuous dimming from 100 percent to 1 percent relative light output.

2. Provide integral fault protection to prevent driver failure in the event of an input mis-wire.

c. Digitally Addressable Control

1. Continuous dimming from 100 percent to 1 percent relative light output.

2. Ability to operate with installed or specified building control system.

3. Lights automatically return to the setting prior to power interruption.

4. Each driver responds independently to:

a. Up to 32 occupant sensors.

- b. Up to 16 daylight sensors.
 - 5. Responds to digital load shed command.
 - a. Sets high end trim.
 - b. Automatically scales light output proportional to load shed command.
 - d. Forward Phase Control (Neutral Wire Required)
 - 1. Continuous dimming from 100 percent to 1 percent relative light output.
 - e. LED 0-10V Dimming Drivers
 - 1. LED Driver shall be installed inside an electrical enclosure.
 - 2. Wiring inside electrical enclosure shall comply with 600V/105°C rating or higher.
 - 3. LED Driver is certified by UL Class 2 for use in a dry or damp location.
 - 4. Led Driver has Class A sound rating.
 - 5. LED Driver has a minimum operating ambient temperature of -40°C.
 - 6. LED Driver has a life expectancy of 50,000 hours at Tcase of 70°C.
 - 7. LED Driver has a life expectancy of 100,000 hours at Tcase of 62°C.
 - 8. LED Driver has a maximum self rise of 25°C in open air without heat sink.
 - 9. LED Driver maximum allowable case temperature is 75°C.
 - 10. LED Driver reduces output power to LEDs if maximum allowable case temperature is exceeded.
 - 11. LED Driver has a failure rate of 0.01% per 1,000 hours at Tcase 70°C.
 - 12. LED Driver has a failure rate of 0.01% - 0.02% per 1,000 hours at Tcase of 70°C - 80°C.
 - 13. LED Driver tolerates sustained open circuit and short circuit output conditions without damage.
 - 14. LED Driver complies with FCC rules and regulations, as per Title 47 CFR Part 15 Non-Consumer (Class A).
 - 15. The maximum available output parameters of the driver met the Class 2 Inherently limited parameters.
 - 16. The Driver is suitable for use in Dry and Damp locations.
 - 17. When the driver is installed in the end-use application, the measured case temperature at the (Tc) location specified on the marking label must not exceed 77.6°C.
 - 18. The driver shall be installed in compliance with the requirements of the end-product standard.
 - 19. The case of the driver must be connected to Earth ground when installed in the end-use application.

2.3 EMERGENCY EXIT LUMINARE:

- a. It shall be completely self-contained, provided with maintenance-free battery, automatic charger, and other features. Luminaire must be third-

party listed as emergency lighting equipment, and meet or exceed the following standards; NEC, N.C. Building Code, Volume X Energy Code, NFPA-101, and NEMA Standards.

b. Battery shall be sealed, maintenance-free type, with minimum of 90 minutes operating endurance. Battery shall have a normal life expectancy of 10 years. Batteries shall be high temperature type with an operating range of 0 degree C to 60 degrees C and contain a re-sealable pressure vent, a sintered + positive terminal and - negative terminal.

c. Charger shall be fully automatic solid state type, full wave rectifying, with current limiting. Charger shall restore the battery to its full charge within 24 hours after a discharge of 90 minutes under full rated load. The unit shall be activated with the voltage drops below 80 percent. A low voltage disconnect switch shall be included if LEAD Battery is used, to disconnect the battery from the load and prevent damage from a deep discharge during extended power outage.

d. Pilot light shall indicate the unit is connected to AC power. The battery shall have high rate charge pilot light, unless self-diagnostic type. Tests switch shall simulate the operation of the unit upon loss of A.C. power by energizing the lamps from the battery. This simulation must also exercise the transfer relay.

e. The entire unit shall be warranted for three years. The battery must have an additional two more years' pro-rated warranty. Warranty shall start from the date of project final acceptance. Warranty shall be included in the contract document.

f. The use of LED is required due to their reliable performance, low power consumption, and limited maintenance requirements. Maximum LED failure rate shall be 25% within a seven (7) year period; otherwise, if exceeded, manufacturer shall replace the complete unit at no charge to the owner.

g. Contractor shall perform a test on each unit after it is permanently installed and charged for a minimum of 24 hours. Battery shall be tested for 90 minutes. The battery test shall be done 10 days prior to final inspection. Any unit which fails the test must be repaired or replaced, and tested again. The test shall demonstrate that the batteries conform to the requirements of NEC 700.12 (F).

2.4 EMERGENCY EGRESS LUMINARE:

a. Shall be completely self-contained, provided with maintenance-free 12 volt battery, automatic charger, two lamps, and other features. Luminaire shall be third-party listed as emergency lighting equipment, and meet or exceed the following standards: NEC, International Building Code, NFPA-101, and NEMA Standards.

b. Pilot light shall indicate the unit is connected to A.C. power. The battery shall have high rate charge pilot light, unless self-diagnostic type. A test switch shall simulate the operation of the unit upon loss of A.C. power by energizing the lamps from the battery. This simulation must also exercise the

transfer relay. If fluorescent emergency unit is used, an LED charging indicator light must be easily visible after installation and a remote test switch shall be installed adjacent to the fixture.

c. Battery shall be sealed, maintenance free type, with minimum of 90 minutes operating endurance. Battery shall have a normal life expectancy of 10 years. Batteries shall be a high temperature type with an operating range of 0 degree C to 60 degrees C and contain a re-sealable pressure vent, a sintered + positive terminal and - negative terminal.

d. Charges shall be fully automatic solid state type, full wave rectifying, with current limiting. Charger shall restore the battery to its full charge within 24 hours after a discharge of 90 minutes under full rated load. The unit shall be activated when the voltage drops below 80%. A low voltage disconnect switch shall be included if LEAD battery is used, to disconnect the battery from the load and prevent damage from a deep discharge during extended power outage.

e. The entire unit shall be warranted for three years. The battery must have an additional two more years' pro-rated warranty. Warranty shall start from the date of project final acceptance. Warranty shall be included in the contract document.

f. Contractor shall perform a test on each unit after it is permanently installed and charged for a minimum of 24 hours. Battery shall be tested for 90 minutes. The battery test shall be done 10 days prior to final inspection. Any unit which fails the test must be repaired or replaced, and tested again. The test shall demonstrate that the batteries conform to the requirements of NEC 700.12 (F).

PART 3: EXECUTION

3.1 COORDINATION:

a. Contractor shall verify ceiling or wall type in or on which each fixture is to be mounted, and shall furnish unit with appropriate trim type, mounting hardware, and accessories to fit the construction; and feed through junction boxes as required to maintain proper access to system wiring.

3.2 INSTALLATION:

a. Lighting fixtures shall be installed in accordance with the manufacturer's instructions.

b. Lighting fixtures shall be supported from the building structure using corrosion resistant steel hardware in compliance with Section 16100, Basic Materials and Methods.

c. A minimum of two No. 12 gauge wire supports attached to the structure shall be provided for each lighting fixture unless otherwise indicated or approved by the Architect/Engineer. The supports shall be located at diagonal corners of rectangular fixtures and angled away from fixture. A minimum of three full twists shall be made at each end to secure wire.

d. In addition to the supports from the structure, fixtures shall also be secured to suspended ceilings on which they are mounted, or in which they are recessed. Where fixtures are secured to suspended ceilings, the primary supports from the building structure shall be slack.

e. Where installed recessed in grid type ceilings, the fixtures shall be attached to the main runners of the suspended ceiling at all four corners using sheet metal screws.

f. Conductors in fixture taps shall be #16 AWG minimum, type TFN, in 3/8" flexible metal conduit of 72" maximum length. A green insulated equipment grounding conductor shall be included.

g. Mount fixtures plumb and square. Keep rows in perfect line.

h. At time of project completion, fixtures shall be clean and fully operational.

SECTION 16525

AUDITORIUM DIMMING SYSTEM

PART 1: GENERAL

1.1 SUMMARY:

a. Section Includes:

1. Central dimming control systems.

1.2 REFERENCES:

American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE)

C62.41-1991 - Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.

Astm International (ASTM)

D4674-02a Standard Test Method for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Fluorescent Lighting and Window-Filtered Daylight.

International Organization For Standardization (ISO)

9001 - Quality Management Systems.

National Electrical Manufacturers Association (NEMA)

WD1 (R2005) - General Color Requirements for Wiring Devices.

Underwriters Laboratories, Inc. (UL)

489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.

508 - Standard for Industrial Control Equipment.

1472 - Solid-State Dimming Controls.

924 - Emergency Lighting and Power Equipment

1.3 SYSTEM DESCRIPTION:

a. Central dimming control system.

1. Factory assembled dimming and switching panels and interfaces and modules.

2. Low voltage wall stations and control interfaces.

1.4 SUBMITTALS:

- a. Indicate whether the submitted equipment:
 - 1. Meets specification exactly as stated.
 - 2. Meets specification via an alternate means and indicate the specific methodology used.
- b. Shop Drawings Include:
 - 1. Load schedule indicating actual connected load, load type, and voltage per circuit, circuits and their respective control zones, circuits that are on emergency, and capacity, phase, and corresponding circuit numbers. Schematic of system.
- c. Product Data: Catalog cut sheets with performance specifications demonstrating compliance with specified requirements.

1.5 CLOSEOUT SUBMITTALS:

- a. Sustainable Design Closeout Documentation (LSC-LEED-DOC)
 - 1. Lighting Control System Manufacturer to provide Enhanced Startup documentation that details the start-up procedure being performed including a process to follow, details on tests performed and an area that documents any test results.

1.6 QUALITY ASSURANCE:

- a. Manufacturer: Minimum 10 years experience in manufacture of architectural lighting controls.
- b. Manufacturer's Quality System: Registered to ISO 9001:2000 Quality Standard, including in-house engineering for product design activities.
- c. Central dimming control system:
 - 1. Listed by UL specifically for the required loads. Provide evidence of compliance upon request.

1.7 PROJECT CONDITIONS:

- a. Do not install equipment until following conditions can be maintained in spaces to receive equipment:
 - 1. Ambient temperature: 0 degrees to 40 degrees C (32 degrees to 104 degrees F).
 - 2. Relative humidity: Maximum 90 percent, non-condensing.
 - 3. Lighting control system must be protected from dust during installation.

1.8 WARRANTY:

- a. Provide Manufacturer's Warranty:

- b. Standard 2-year warranty, Includes:
 - 1. 100 Percent Replacement Parts for Manufacturer Lighting System Components
 - 2. 100 Percent Manufacturer Labor Coverage to Troubleshoot and Diagnose a Lighting Issue
 - 3. First-Available Onsite or Remote Response Time
 - 4. 24 Hours Per Day, 7 Days Per Week Telephone Technical Support, Excluding Manufacturer Holidays
 - 5. Remote Diagnostics for Applicable Systems

PART 2: PRODUCTS

2.1 MANUFACTURERS:

- a. Basis of design product: Lutron GRAFIK Eye 4000.
- b. Substitutions:
 - 1. All proposed substitutions (clearly delineated as such) must be submitted in writing for approval by the design professional a minimum of 10 working days prior to the bid date and must be made available to all bidders.
 - 2. Proposed substitutes must be accompanied by a review of the specification noting compliance on a line-by-line basis.
 - 3. Any substitutions provided by the contractor shall be reviewed at the contractor's expense by the electrical engineer at a rate of [\$200.00] per hour.
 - 4. By using pre-approved substitutions, the contractor accepts responsibility and associated costs for all required modifications to circuitry, devices, and wiring.
 - 5. Provide complete engineered shop drawings (including power wiring) with deviations for the original design highlighted in an alternate color to the engineer for review and approval prior to rough-in.

2.2 GENERAL OPERATION:

- a. Provide system hardware that is designed, tested, manufactured, and warranted by a single manufacturer.
- b. Architectural lighting controls: ten-year operational life while operating continually at any temperature in an ambient temperature range of 0 degrees c (32 degrees f) to 40 degrees c (104 degrees f) and 90 percent non-condensing relative humidity.
- c. Designed and tested to withstand discharges without impairment of performance when subjected to discharges of 15,000 volts per IEC 801-2.

2.3 DIMMING/RELAY PERFORMANCE REQUIREMENTS

a. Electrolytic capacitors to operate at least 20 degrees C below the component manufacturer's maximum temperature rating when device is under fully-loaded conditions in 40 degrees C (104 degrees F) ambient temperature.

b. Load Handling Thyristors (SCRs and triacs), Field Effect Transistors (FETs), and Isolated Gate Bipolar Transistors (IGBTs): Manufacturer's maximum current rating minimum two times control's rated operating current.

c. Capable of withstanding repetitive inrush current of 50 times operating current without impacting lifetime of dimmer/relay.

d. Design and test dimmers/relays to withstand line-side surges without impairment to performance.

e. Panels: Withstand surges without impairment of performance when subjected to surges of 6,000 volts, 3,000 amps per ANSI/IEEE C62.41 and per IEC 61000-4-5 surge requirements.

f. Other power handling devices: Withstand surges without impairment of performance when subjected to surges of 6,000 volts, 200 amps per ANSI/IEEE C62.41.

g. Utilize air gap off, activated when user selects "off" at any control to disconnect the load from line supply.

h. Power failure memory and dimmer/relay recovery:

1. When power is interrupted and subsequently returned, within 3 seconds lights will automatically return to same levels (dimmed setting, full on, or off) prior to power interruption.

i. Dimmers:

1. Provide real-time cycle-by-cycle compensation for incoming line voltage variations including changes in RMS voltage (plus or minus 2 percent change in RMS voltage/cycle), frequency shifts (plus or minus 2 Hz change in frequency/second), dynamic harmonics, and line noise.

2. Systems not providing cycle-by-cycle compensation to include external power conditioning equipment as part of dimming system.

3. Each dimmer to incorporate electronic "soft-start" default at initial turn-on that smoothly ramps lights up to the appropriate levels within 0.5 seconds.

4. Control all light sources in smooth and continuous manor. Dimmers with visible steps are not acceptable.

5. Each dimmer to be assigned a load type that will provide a proper dimming curve for the specific light source.

6. Possess ability to have load types assigned per circuit, configured in field.

7. Minimum and maximum light levels user adjustable on circuit-by-

circuit basis.

8. Line Voltage Dimmers; Meet following load-specific requirements:
 - (a) Magnetic Low Voltage (MLV) transformer:
Contain circuitry designed to control and provide a symmetrical AC waveform to input of magnetic low voltage transformers per UL 1472, Section 5.11.
Dimmers using unipolar load current devices (such as FETs or SCRs) to include DC current protection in the event of a single device failure.
 - (b) Electronic Low Voltage (ELV) transformer:
Dimmer to operate electronic low voltage transformers via reverse phase control. Alternately, forward phase control dimming may be used if dimming equipment manufacturer has recommended specific ELV transformers being provided.
 - (c) Neon and cold cathode transformers:
Magnetic transformers: UL listed for use with normal (low) power factor magnetic transformers. Electronic transformers: Must be supported by the ballast equipment manufacturer for control of specific ballasts being provided.

9. Low Voltage Dimming Modules; Meet following requirements:
Coordination between low voltage dimming module and line voltage relay: Capable of being electronically linked to single zone.
Single low voltage dimming module; capable of controlling following light sources:
 - (a) 0-10V analog voltage signal.
Provide Class 2 isolated 0-10V output signal conforming to IEC 60929.
Sink current via IEC 60929.
Source current.
 - (b) 10-0V reverse analog voltage signal.
 - (c) DSI digital communication.
 - (d) DALI broadcast communication IEC 60929:
Logarithmic intensity values in compliance with IEC 60929.
Linear intensity values for use with LED color intensity control.
 - (e) PWM IEC 60929.

- j. Non-dim circuits to meet the following requirements:
 1. Rated life of relay at full load: Minimum 1,000,000 cycles.
 2. Load switched in manner that prevents arcing at mechanical contacts when power is applied to and removed from load circuits.
 3. Fully rated output continuous duty for inductive, capacitive, and resistive loads.

2.4 POWER PANELS:

- a. Product: Lutron GP Series.
- b. Mechanical:

1. Listed to UL 508as industrial control equipment.
2. Delivered and installed as a UL listed factory assembled panel.
3. Field wiring accessible from front of panel without need to remove dimmer assemblies or other components.
4. Panels passively cooled via free-convection, unaided by fans or other means.
5. Ship panels with each dimmer in mechanical bypass position by means of jumper bar inserted between input and load terminals. Jumpers to carry full rated load current and be reusable at any time. Mechanical bypass device to allow for switching operation of connected load with dimmer removed by means of circuit breaker.

c. Electrical:

1. Panels contain branch circuit protection for each input circuit unless the panel is a dedicated feed-through type panel or otherwise indicated on the drawings.

2. Branch circuit breakers; meet following performance requirements:

(a) Listed to UL 489 as molded case circuit breaker for use on lighting circuits.

(b) Contain visual trip indicator; rated at 10,000 AIC, 120 V Dimming.

(c) Thermal-magnetic construction for overload, short-circuit, and over-temperature protection. Use of breakers without thermal protection requires dimmers/relays to have integral thermal protection to prevent failures when overloaded or ambient temperature is above rating of panel.

(d) Accept tag-out/lock-out devices to secure circuit breakers in off position when servicing loads.

(e) Replaceable without moving or replacing dimmer/relay assemblies or other components in panel. UL listed as switch duty (SWD) so that loads can be switched on and off by breakers.

3. Minimum UL listed Short Circuit Current Rating (SCCR) of 25,000A.

d. Lutron GP Series Grafik Panel:

1. Dimmers designed and tested to specifically control incandescent/tungsten, magnetic low voltage, electronic low voltage, neon/cold cathode, fluorescent dimming ballasts, and non-dim loads.

2. Utilize universal 16A continuous-use UL listed dimmer.

3. Utilize multiple load type low voltage dimming module.

4. Limit current rise time to minimum 350 μ sec as measured from 10-90 percent of load current waveform and minimum 525 μ sec as measured from 0-100 percent of load current waveform at 50 percent rated dimmer capacity at a 90 degree conduction angle. Current rise to be minimum 400 μ sec as measured from

10-90 percent of load current waveform and minimum 600 μ sec as measured from 0-100 percent of load current waveform at 100 percent rated dimmer capacity at a 90 degree conduction angle.

5. Load faults only affect the given circuit.

e. Diagnostics and Service:

1. Replacing dimmer/relay does not require re-programming of system or processor.

2. Dimmers/relays: Include diagnostic LED's to verify proper operation and assist in system troubleshooting.

3. Dimming/relay panels: Include tiered control scheme for dealing with component failure that minimizes loss of control for occupant.

(a) If lighting control system fails, lights to remain at current level. Panel processor provides local control of lights until system is repaired.

(b) If panel processor fails, lights to remain at current level. Circuit breakers can be used to turn lights off or to full light output, allowing non-dim control of lights until panel processor is repaired.

(c) If dimmer fails, factory-installed mechanical bypass jumpers to allow each dimmer to be mechanically bypassed. Mechanical bypass device to allow for switching operation of connected load with dimmer removed by means of circuit breaker.

2.5 ACCESSORIES:

a. Emergency Lighting Interface; Lutron LUT-ELI

1. Provides total system listing to UL924 when used with Lutron GRAFIK Eye 4000 system.

2. Senses all three phases of building power.

3. Provides an output to power panels if power on any phase fails.

4. Accepts a contact closure input from a fire alarm control panel.

b. Tamper Proof Covers:

1. Locking covers for preset control units and wall stations: Reversible to allow lock to be located on either side of control.

2. Compatible with IR controls.

3. Does not reduce specified IR range by more than 50 percent of its original specification.

2.6 SOURCE QUALITY CONTROL:

a. Perform full-function testing on 100 percent of all system components and panel assemblies at the factory.

b. Sample burn-in at 40 degrees C (104 degrees F) ambient temperature of dimming assemblies and panels at full load for 2 hours.

PART 3: EXECUTION

3.1 INSTALLATION:

a. Install equipment in accordance with manufacturer's installation instructions.

b. Provide complete installation of system in accordance with Contract Documents.

c. Define each dimmer's/relay's load type, assign each load to a zone, and set control functions.

d. Provide equipment at locations and in quantities indicated on Drawings. Provide any additional equipment required to provide control intent.

3.2 SERVICE AND SUPPORT:

a. Startup and Programming

1. Provide factory-certified field service engineer to a site visit to ensure proper system installation and operation under following parameters:

2. Qualifications for factory-certified field service engineer:

Minimum experience of 2 years training in the electrical/electronic field.

Certified by the equipment manufacturer on the system installed.

3. Make a visit upon completion of installation of central dimming control system:

Verify connection of power feeds and load circuits.

Verify connection and location of controls.

Verify proper connection of panel links (low voltage/data) and address panel.

Check dimming/switching panel load types and currents and remove by-pass jumpers.

Verify system operation control by control, circuit by circuit.

Verify proper operation of supplied interfacing equipment to other devices.

Obtain sign-off on system functions.

User to be trained on system operation.

b. Tech Support

1. Provide factory direct technical support hotline 24 hours per day, 7 days per week.

3.3 CLOSEOUT ACTIVITIES:

a. Training Visit. Lighting Control System Manufacturer to provide 1 day additional on-site system training to site personnel.

3.4 MAINTENANCE:

a. Capable of providing on-site service support within 24 hours anywhere in continental United States and within 72 hours worldwide except where special visas are required.

b. Offer renewable service contract on yearly basis, to include parts, factory labor, and annual training visits. Make service contracts available up to ten years after date of system startup.

SECTION 16730

EXTENSION OF EXISTING FIRE ALARM SYSTEM, ADDRESSABLE

PART 1: GENERAL

1.1 SCOPE:

a. Contractor shall extend the existing Fire Detection and Alarm System as indicated on the drawings and as specified herein.

b. Extension shall include all devices, wiring, equipment, raceways, and connections required for a complete and satisfactorily operating system, whether or not every such item is specifically shown or mentioned.

c. All initiation devices shall be analog addressable devices. The notification devices shall be installed where required to meet ADA, NFPA 72 and the International Building Code.

d. All devices and installation methods used shall match that of the existing system.

1.2 STANDARDS AND CODES:

a. The equipment and installation shall comply with the current provisions of the following standards and codes:

1. The latest edition of the International Building Code.

2. National Fire Protection Association Standards:

NFPA 70	National Electric Code
NFPA 72	National Fire Alarm Code
NFPA 90A	Air Conditioning Systems
NFPA 101	Life Safety Code

3. Underwriters Laboratories Inc. Standards:

(a) Underwriters Laboratories Inc. for use in fire protective signaling systems shall list the system and all components. The UL Label shall be considered as evidence of compliance with this requirement. The equipment shall be listed by UL under the following standards as applicable:

UL 864/UOJZ, APOU	Control Units for Fire Protective Signaling Systems.
UL 1076/APOU	Proprietary Burglar Alarm Units and Systems.
UL 268	Smoke Detectors for Fire Protective Signaling Systems.
UL 268A	Smoke Detectors for Duct Applications.
UL 217	Smoke Detectors Single Station.
UL 521	Heat Detectors for Fire Protective Signaling Systems.
UL 228	Door Holders for Fire Protective Signaling Systems.
UL 464	Audible Signaling Appliances.

UL 1638	Visual Signaling Appliances.
UL 38	Manually Activated Signaling Boxes.
UL 346	Water flow Indicators for Fire Protective Signaling systems.
UL 1971	Visual Signaling Appliances.
UL 1481	Power Supplies for Fire Protective Signaling Systems.

4. Americans with Disabilities Act (ADA).

1.3 CONTRACTOR QUALIFICATIONS:

a. Equipment and materials shall be provided by a factory-authorized distributor to ensure proper specification adherence, final connection, test, turnover, warranty compliance, and service. The factory-authorized distributor is required to have been in the fire alarm industry (service and installation) for a minimum of 5 years.

1.4 SUBMITTALS:

a. Shop drawings shall be submitted for each item of equipment to be furnished.

b. Submittal shall include a complete wiring and conduit diagram overlaid on a building floor plan system battery calculations and notification circuits voltage drop calculations, prepared by an authorized representative of the system manufacturer. Diagram shall indicate conductor sizes, quantities, and color coding for each conduit run, as well as required conduit sizes.

c. Hourly, Non-Standard, Holiday, and Overtime Service Rates, Semi-Annual inspection rates. These services are to be performed by factory trained and certified personnel, for the installed Life Safety System. These hourly service rates shall be guaranteed for a three-year period unless otherwise specified. The Contractor shall also provide Annual Inspection Rates for System Testing in compliance with NFPA 72 requirements for three years of system operation. Proof of the level of factory training and authorization of the servicing Contractor shall be included in the submittal.

d. Evidence of listing by Underwriters' Laboratories for all proposed equipment for use as Fire Alarm equipment. (Ref.: Underwriters' Laboratories, Section UOJZ).

e. A copy of the Contractors Training Certification, issued by the manufacturer of the Fire Alarm Control Equipment, shall be provided. These qualification credentials shall not be more than two years old, to ensure up-to-date product and application knowledge on the part of the installing contractor.

f. Proof shall be furnished that the manufacturer of the Fire Alarm System Components is certified as an ISO 9001 company in each of the following disciplines: Design Engineering, Manufacturing, Technical Support, Documentation, Training, and Marketing. In lieu of such proof, the manufacturer must be able to show that the method that they employ in those disciplines is equivalent to ISO 9001 requirements.

1.5 CLOSEOUT DOCUMENTS:

a. complete set of record wiring schematics, drawn to scale; showing all device locations, wire routing and connections, etc. shall be provided prior to final inspection.

b. Warranty Statement from the manufacturer: Warranty statement will state the period of warranty for all of the products proposed for the project, and shall include the name and address of the authorized manufacturers' agent who will honor any and all warranty claims.

c. Written Certification by the Fire Alarm Contractor that no power supply or circuit in the system has an electrical load greater than 80% of its rated capacity.

d. A scaled plan of the building showing the placement of each individual item of fire alarm equipment as well as raceway size and routing, junction boxes, and conductor size, quantity, and color in each raceway.

e. A Single Line System Block Diagram and written System Operational Overview.

f. Complete battery and voltage drop which include loads for all system components:

g. Field Connection Drawings: A complete set of drawings, one for each Fire Alarm Control Panel module which has any external (field) wiring connected to it, and one for each system detector, module or signaling appliance, shall be supplied.

h. Print-out report detailing the sensitivity of each smoke detector installed in the system. Include date on report.

1.6 SYSTEM FUNCTION:

a. In general, system function shall be as evidently intended by selection of equipment indicated herein.

b. Activation of any manual station, smoke detector, sprinkler system flow switch, or other alarm initiating device shall cause:

1. The sounding of audible signals throughout the facility.
2. The flashing of alarm indicating signal lights.
3. Indication of the alarm condition at the control panel indicating type of alarm (e.g. whether manual station, smoke detector, etc.) as well as location of initiating device.
4. Release of magnetic door holders, shut-down of air handling systems, closing of smoke dampers and other control functions as indicated or required.
5. A local sounding device in the panel shall be activated.
6. Activation (Alarm, Trouble, Supervisory) of the existing Fire Alarm System remaining for the existing building.

7. All automatic programs assigned to the alarm point shall be executed and the associated notification appliance circuits and control relays addressed and activated.

8. Other functions as noted on the drawings or as evidently intended or required.

c. All strobes shall be synchronized in common spaces.

d. Provide a horn silence function with an adjustable delay of 2 minutes to 15 minutes. Delay shall prevent silence function from engaging. Silence function shall be manually activated only and shall not prevent visual alarm from flushing.

PART 2: PRODUCTS - NOT USED

PART 3: EXECUTION

3.1 INSTALLATION:

a. Wiring shall be in accordance with manufacturer's recommendations for proper system operation.

b. Cable for monitoring and control of addressable devices shall be not less than a #18 AWG twisted shielded pair. Unless specifically noted or approved otherwise, other conductors shall be of stranded copper not smaller than #14 AWG, with THWN/THHN insulation.

c. All wiring shall be in metal raceway, unless specifically shown otherwise. Raceways shall be sized for the wiring requirements of the system proposed, with maximum conduit fill of 40%.

d. Wall-mounted system devices shall be flush mounted where construction permits. Where necessary and approved by the Architect/Engineer, surface mounting enclosures may be utilized. Contractor shall coordinate trim types.

e. Automatic detectors shall be located at least three feet from any HVAC diffuser.

f. An identification map showing all initiating devices and their address numbers shall be provided and mounted beside the main panel for quick and easy location of alarmed or troubled devices. System map shall be mounted under plexiglas.

g. All junction and connection boxes shall be painted red for easy identification.

h. Field Connected Devices must be installed and wired by a Factory Trained and Authorized Fire Alarm System Sub-Contractor or a licensed electrical contractor under direct supervision of a Factory Trained and Authorized Fire Alarm System Sub-Contractor.

i. All auxiliary Power Supplies or other Fire Panels shall be located in electrical or mechanical rooms. They shall be mounted at a height between 48 to 60 inches from floor level. All such panels shall be "supervised" by the main

Fire Alarm Panel.

j. All communications with remote fire alarm system monitoring shall continue to be performed by the existing fire alarm system. The new fire alarm system shall notify the existing system with all alarm, trouble and supervisory signals. In addition, the existing fire alarm system shall notify the new fire alarm system with all alarm trouble and supervisory signals.

3.2 MANUFACTURER'S RESPONSIBILITIES:

a. Final system connections shall be made by or under the direct supervision of an authorized representative of the manufacturer, who shall verify to the Architect/Engineer that the system has been left in full and proper operating condition.

b. Manufacturer's representative and a Record of Completion presented upon completion shall verify system installation and operations. The manufacturer's representative shall be responsible for an on-site demonstration of the operation of the system and initial staff training.

c. Manufacturer shall supply a 2 year warranty from date of manufactured Control System and Field Devices and appliances.

d. System shall be maintained in perfect operating condition for a period of two years following completion of the project, at no additional cost to the Owner.

e. Manufacturer shall maintain a service organization with adequate spare parts stock within 50 miles of the installation. Any defects that render the system inoperative shall be repaired within 24 hours of the owner notifying the contractor. Other defects shall be repaired within 48 hours of the owner notifying the contractor.

3.3 SPARE COMPONENTS:

a. Furnish spare components to the Owner in the following quantities, but not less than one of each type of device used on the project.

1. Fuses - 2 of each type and size
2. Manual Stations - 2% of installed quantity
3. Signal Devices - 4% of installed quantity of each type.
4. Automatic Detectors with Bases - 6% of intalled quantity of each type.

3.4 SURGE PROTECTION AND GROUNDING:

a. All equipment shall be properly grounded. Main panel shall be grounded directly to 'earth ground'. Surge protection and lightning arrestors shall be installed on the AC supply and all initiating, notification and monitoring circuits. All surge protection shall be Ditek or equivalent.

1. Ditek DTK-LVLP Series for low voltage data and signal line protection.

2. Ditek DTK-HW Series for hard wire AC protection for 120 VAC.

3.5 SYSTEM TEST AND CERTIFICATION/DEMONSTRATION:

a. The completely installed fire alarm system shall be fully tested in compliance with Testing Procedures for Signaling Systems (NFPA 72) under the supervision of a trained manufacturer's representative. The system shall be demonstrated to perform all the functions as specified.

b. The Fire Alarm System Sub-Contractor shall test:

1. Every alarm initiating device for proper response and program execution.

2. Every notification appliance for proper operation and audible/visual output.

3. All auxiliary control functions such as elevator capture, smoke door and damper release, and functional override of HVAC, ventilation, and pressurization controls.

c. The Engineer and Owner must be notified at least 10 working days prior to the scheduled testing so that he may be present for such testing.

d. After the system has been completely tested to the satisfaction of the Engineer and Owner, the Fire Alarm System Sub-Contractor shall complete the Fire Alarm System Certification of Completion form published by the NFPA.

e. The completed form signed by a principal of the Fire Alarm System Sub-Contractor and shall be delivered to the Architect/Engineer with the other system documentation required by these specifications.