PROJECT MANUAL FOR:

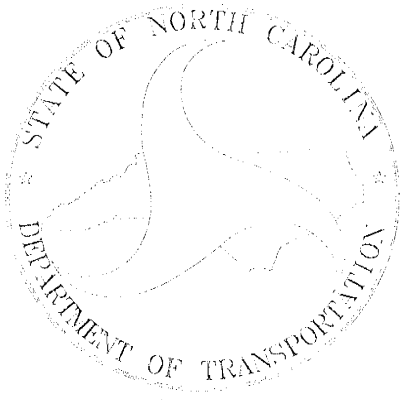
NEW FOUR-BAY SALT STORAGE BUILDING

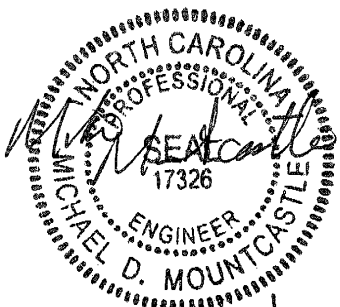
REIDSVILLE, NORTH CAROLINA

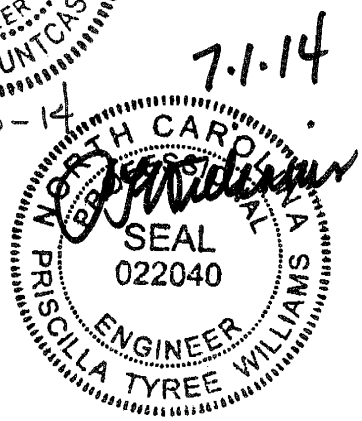
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

HIGHWAY DIVISION 7

SCO ID# 09-07377-01I





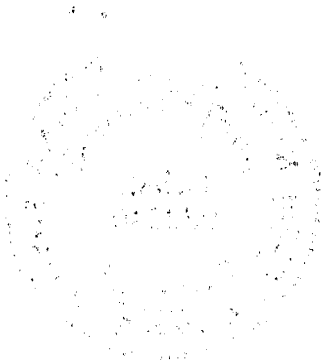


Architect :

FACILITIES DESIGN
GENERAL SERVICES DIVISION, NCDOT
1 SOUTH WILMINGTON STREET
RALEIGH, NORTH CAROLINA 27601

June 30, 2014

SET NO._____



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INFORMAL CONTRACT

FOR

North Carolina Department of Transportation, Division of Highways
Four-Bay Salt Storage Building, Rockingham County
SCO ID# - 09-07377-01I

SCOPE OF WORK

The successful bidder will be responsible for construction of a four-bay bulk salt storage facility. The building is constructed of cast in place concrete walls bearing on a shallow concrete foundation, with wood truss roof. There is no plumbing or mechanical work included in this project. Electrical work is provided by the contractor.

NOTICE TO BIDDERS

Sealed proposals for this work will be received by Carolyn Huskins, up to **11:00 AM**, on **Thursday, August 7th, 2014** and immediately thereafter publicly opened and read aloud. A **MANDATORY** pre-bid meeting will be held for all interested bidders at **10:00 AM**, on **Thursday, July 24th, 2014**. The address of each is as follows:

Pre-bid Meeting
County Maintenance Yard
191 NC 65
Reidsville, NC 27320
336-634-5642

Bid Opening
NCDOT, Highway Division 7
1584 Yanceyville Street
Greensboro, NC 27415
336-334-3637

PLANS AND PROJECT MANUAL WILL NOT BE DISTRIBUTED IN PAPER FORMAT. Complete plans and project manual can be obtained from the following web address https://connect.ncdot.gov/letting/Pages/Letting-List.aspx?let_type=7. All questions during the bid are to be directed to Michael Mountcastle via email to mdmountcastle@ncdot.gov. It is the responsibility of all participating in the bid to check the web site at intervals for addenda, list of registered general contractors, etc. The list of pre-bid attendees will be posted on the web site after the pre-bid meeting.

Digital documents will be forwarded to the Associated General Contractors, Carolinas Branch, Charlotte, the local North Carolina offices of McGraw-Hill Dodge Corporation, and the Eastern Regional Office of Reed Construction Data in Norcross, GA, and to the following Minority Plan Rooms:

1. Hispanic Contractors Association of the Carolinas in the Winston-Salem, Charlotte, and Raleigh Areas (877-227-1680).
2. Raleigh Business & Technology Center, 900 S. Wilmington St., Raleigh, NC 27601 (919-836-8618).

Contractors are hereby notified that they must have proper license under the State laws governing their respective trades and that North Carolina General Statute 87 will be observed in receiving and awarding contracts. General Contractors must have general license classification, at minimum, for Building-Limited.

Pre-qualification with NCDOT is not required to bid and construct this project.

A bid bond is not required. Performance and payment bonds and insurance must be provided by the contractor.

No bid may be withdrawn after the opening of bids for a period of 30 days. The Owner reserves the right to reject any or all bids and waive informalities. Proposals shall be made only on the form provided herein with all blank spaces for bids properly filled in and all signatures properly executed.

Please note on the envelope – **Bid Proposal: Attn**: **Carolyn T. Huskins**

(Project Name)
(Bid Date)
(Contractor)
(License Number)

GENERAL CONDITIONS

GENERAL

It is understood and agreed that by submitting a bid that the Contractor has examined these contract documents, drawings and specifications and has visited the site of the Work, and has satisfied himself relative to the Work to be performed.

MATERIALS, EQUIPMENT AND EMPLOYEES

The contractor shall, unless otherwise specified, supply and pay for all labor, transportation, materials, tools, apparatus, lights, power, fuel, sanitary facilities and incidentals necessary for the completion of his work, and shall install, maintain and remove all equipment of the construction, other utensils or things, and be responsible for the safe, proper and lawful construction, maintenance and use of same, and shall construct in the best and most workmanlike manner, a complete job and everything incidental thereto, as shown on the plans, stated in the specifications, or reasonably implied there from, all in accordance with the contract documents.

All materials shall be new and of quality specified, except where reclaimed material is authorized herein and approved for use. Workmanship shall at all times be of a grade accepted as the best practice of the particular trade involved, and as stipulated in written standards of recognized organizations or institutes of the respective trades except as exceeded or qualified by the specifications.

No changes shall be made in the Work except upon written approval and change order of the Designer/Owner. Change orders shall be subject to provisions in the current North Carolina Construction Manual.

Products are generally specified by ASTM or other reference standard and/or by manufacturer's name and model number or trade name. When specified only by reference standard, the Contractor may select any product meeting this standard, by any manufacturer. When several products or manufacturers are specified as being equally acceptable, the Contractor has the option of using any product and manufacturer combination listed.

However, the contractor shall be aware that the cited examples are used only to denote the quality standard of product desired and that they do not restrict bidders to a specific brand, make, manufacturer or specific name; that they are used only to set forth and convey to bidders the general style, type, character and quality of product desired; and that equivalent products will be acceptable. Substitution of materials, items or equipment of equal or equivalent design shall be submitted to the architect or engineer for approval or disapproval; such approval or disapproval shall be made by the architect or engineer prior to the opening of bids.

If at any time during the construction and completion of the work covered by these contract documents, the conduct of any workman of the various crafts be adjudged a nuisance to the Owner, or if any workman be considered detrimental to the work, the Contractor shall order such parties removed immediately from the site.

The contractor shall designate a foreman/superintendent who shall direct the work.

CODES, PERMITS AND INSPECTIONS

The Contractor shall obtain the required permits, if required, give all notices, and comply with all laws, ordinances, codes, rules and regulations bearing on the conduct of the work under this contract. If the Contractor observes that the drawings and specifications are at variance therewith, he shall promptly notify the Designer in writing. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, codes, rules and regulations, and without such notice to the Owner, he shall bear all cost arising there from.

All work under this contract shall conform to the current North Carolina Building Code and other state and national codes as are applicable

Projects constructed by the State of North Carolina or by any agency or institution of the State are not subject to county or municipal building codes and may not be subject to inspection by county or municipal authorities. The Contractor shall, however, cooperate with the county or municipal authorities by obtaining building permits. Permits may be obtained by the contractor at no cost to the owner.

SAFETY REQUIREMENTS

The Contractor shall be responsible for the entire site and the construction of the same and provide all the necessary protections as required by laws or ordinances governing such conditions and as required by the Owner or Designer. He shall be responsible for any damage to the Owner's property, or that of others on the job, by himself, his personnel or his subcontractors, and shall make good such damages. He shall be responsible for and pay for any claims against the Owner arising from such damages.

The Contractor shall adhere to the rules, regulations and interpretations of the North Carolina Department of Labor relating to Occupational Safety and Health Standards for the Construction Industry (Title 29, Code of Federal Regulations, Part 1926 published in Volume 39, Number 122, Part 11, June 24, 1974 Federal Register), and revisions thereto as adopted by General Statutes of North Carolina 95-126 through 155.

The Contractor shall provide all necessary safety measures for the protection of all persons on the work, including the requirements of the AGC Accident Prevention Manual in Construction as amended, and shall fully comply with all state laws or regulations and North Carolina Building Code requirements to prevent accident or injury to persons on or about the location of the work. He shall clearly mark or post signs warning of hazards existing, and shall barricade excavations and similar hazards. He shall protect against damage or injury resulting from falling materials and he shall maintain all protective devices and signs throughout the progress of the work.

TAXES

Federal Excise Taxes do not apply to materials entering into State work (Internal Revenue Code, Section 3442(3)).

Federal Transportation Taxes do not apply to materials entering into State work (Internal Revenue Code, Section 3475 (b) as amended).

North Carolina Sales Taxes and Use Tax do apply to materials entering into State Work (N.C. Sales and Use Tax Regulation No. 42, Paragraph A), and such costs shall be included in the bid proposal and contract sum.

Local Option Sales and Use Taxes do apply to materials entering into State work as applicable (Local Option Sales and Use Tax Act, Regulation No. 57), and such cost shall be included in the bid proposal and contract sum.

ACCOUNTING PROCEDURES FOR REFUND OF COUNTY SALES & USE TAX
(THIS SECTION ONLY APPLIES TO STATE OWNED PROJECTS)

Contractors for State owned projects shall provide the owner a signed statement containing the information listed in G.S. 105-164.14(e) for all materials purchased for the project.

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

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

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

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

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

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

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

EQUAL OPPORTUNITY

The non-discrimination clause contained in Section 202 (Federal) Executive Order 11246, as amended by Executive Order 11375, relative to Equal Employment Opportunity for all persons without regard to race, color, religion, sex or national origin, and the implementing rules and regulations prescribed by the Secretary of Labor, are incorporated herein.
The Contractors agree not to discriminate against any employees or applicant for employment because of physical or mental handicap in regard to any position for which the employees or applicant is qualified. The Contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices.

INSURANCE

The Contractor shall not commence work until he has obtained all insurance required, and the Owner has approved such insurance, nor shall the Contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been obtained.

The Contractor shall provide and maintain during the life of this contract Workmen's Compensation Insurance for all employees employed at the site of the project under his contract.

The Contractor shall provide and maintain during the life of this contract such Public Liability and Property Damage Insurance as shall protect him and any subcontractor performing work covered by this contract, from claims for damage for personal injury, including accidental death, as well as from claims for property damages which may arise from operations under this contract, whether such operation be by the Contractor himself or by any subcontractor, or by anyone directly or indirectly employed by either of them and the amounts of such insurance shall be as follows:

Public Liability Insurance in an amount not less than $300,000 for injuries, including accidental death, to any one person and subject to the same limit for each person, in amount not less than $500,000 on account of one accident; and Property Damage Insurance in an amount not less that $100,000/$300,000.

The Contractor shall furnish such additional insurance as may be required by General Statutes of North Carolina, including motor vehicle insurance in amounts not less than statutory limits.

Each Certificate of Insurance shall bear the provision that the policy cannot be canceled, reduced in amount or coverage eliminated in less than fifteen (15) days after mailing written notice to the insured and/or the Owner of such alteration or cancellation, sent by registered mail.

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

INVOICES FOR PAYMENT

No partial payment will be made unless agreed to in advance. Final payment will be made lump sum within forty-five (45) consecutive days after acceptance of the work and the submission both of notarized contractor's affidavit and four copies of invoices which are to include the contract, account and job order numbers.

The contractor's affidavit shall state: "This is to certify that all costs of materials, equipment, labor, and all else entering into the accomplishment of this contract, including payrolls, have been paid in full."

Executed contract documents, insurance certifications and, upon completion and acceptance of the work, invoices and other information requested are to be sent to:

Michael Mountcastle
1525 Mail Service Center
Raleigh, NC 27699
919-707-4547

It is imperative that contract documents, invoices, etc., be sent only to the above address in order to assure proper and timely delivery and handling.

CLEANING UP

The Contractor shall keep the sites and surrounding area reasonably free from rubbish at all times and shall remove debris from the site from time to time or when directed to do so by the Owner. Before final inspection and acceptance of the project, the Contractor shall thoroughly clean the sites, and completely prepare the project and site for use by the Owner.

GUARANTEE

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

Where items of equipment or material carry a manufacturer's warranty for any period in excess of twelve (12) months, then the manufacturer's warranty shall apply for that particular piece of equipment or material. The contractor shall replace such defective equipment or materials, without cost to the owner, within the manufacturer's warranty period.

Additionally, the owner may bring an action for latent defects caused by the negligence of the contractor, which is hidden or not readily apparent to the owner at the time of beneficial occupancy or final acceptance, whichever occurred first, in accordance with applicable law.

Guarantees for roofing workmanship and materials shall be stipulated in the specifications sections governing such roof, equipment, materials, or supplies.

CONTRACTOR-SUBCONTRACTOR RELATIONSHIPS

The Contractor agrees that the terms of these contract documents shall apply equally to a subcontractor as to the Contractor, and that the subcontractor is bound by those terms as an employee of the Contractor.

SUPPLEMENTARY GENERAL CONDITIONS

TIME OF COMPLETION

The Contractor shall commence work to be performed under this Contract on a date to be specified in written order from the Designer and shall fully complete all work hereunder within (120) consecutive calendar days from the Notice to Proceed for base bid contract. For each day in excess of the above number of days, the Contractor shall pay the Owner the amount of two-hundred dollars ($200) as liquidated damages reasonably estimated in advance to cover the losses to be incurred by the Owner should the Contractor fail to complete the Work within the time specified.

If the Contractor is delayed at anytime in the progress of his work by any act or negligence of the Owner, his employees or his separate contractor, by changes ordered in the work; by abnormal weather conditions; by any causes beyond the Contractor's control or by other causes deemed justifiable by Owner, then the contract time may be reasonably extended in a written order from the Owner upon written request from the contractor within ten days following the cause for delay.

APPLICATIONS FOR PAYMENT

Contractor may make monthly draws with 5% retainage as specified in Section 01200 of the Specifications.

ROOFING GUARANTEE

The following paragraph is hereby added and shall become a part of the Guarantee of the General Conditions of the Contract. The substitution of an equal or longer term manufacturer's warranty in lieu of this requirement will not be accepted.

The Roofing Contractor shall warrant the materials and workmanship of the roofing system against leakage and against defects due to faulty materials, workmanship and contract negligence for a period of two (2) years following acceptance of the project by the Owner."

The Roofing System Manufacturer shall inspect the installation and warrant the materials and workmanship of the roofing system against leakage for a minimum period of ten (10) years following acceptance of the project by the Owner.

UTILITIES

Water and power are available on this site, use of which will be established at the preconstruction meeting.

SECURITY

The contractor is responsible for the security of their tools and construction materials.

USE OF SITE

Coordination with the Owner's work hours will be established at the preconstruction conference.

UNIT PRICES

There are no unit prices.

PERFORMANCE AND PAYMENT BONDS

Contractor shall furnish a Performance Bond and Payment Bond executed by a surety company authorized to do business in North Carolina. The bonds shall be in the full contract amount. Bonds shall be executed in the form bound with these specifications (Forms 307 & 308). An authorized agent of the bonding company who is licensed to do business in North Carolina shall countersign all bonds.

SECTION 01100

SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: Rockingham County Salt Storage Building.

B. Owner's Name: State of North Carolina, through the North Carolina Department Of Transportation.

C. Architect's Name: Facilities Design Section, NCDOT.

D. The Project consists of the following: Construction of the new four-bay salt storage building (approximately 3320 sq. ft.) on the NCDOT Rockingham County Maintenance Yard.

1.02 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Notice to Bidders.

1.03 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.

B. Utility Outages and Shutdown:
   1. Prevent accidental disruption of utility services to other facilities.
   2. Coordinate necessary shut-offs with Owner.

C. Contractor can connect to Owner's site utilities (setting up temporary service access, as needed).

END OF SECTION

SECTION 01151

CONSTRUCTION AND DEMOLITION MATERIALS RECYCLING REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Requirements and procedures for ensuring optimal diversion of demolition and construction waste materials generated by the Work from landfill disposal within the limits of the Construction Schedule and Contract Sum.

1. State of North Carolina Executive Order 156, Section 1.b, states that "...all state agencies are to maximize their efforts to...reduce and recycle material recoverable from solid waste originating...from the construction and renovation of new facilities..."
2. The Waste Reduction Goal of this Contract is that a minimum of 50% by weight of the construction and demolition materials generated in the Work be diverted from landfill disposal through a combination of re-use and recycling activities.
3. Requirements for submittal of Contractor's Construction Waste and Recycling Plan prior to the commencement of the Work.
4. Contractor's quantitative reports for construction waste materials as a condition of approval of progress payments submitted to the Architect

1.02 DEFINITIONS

A. Class III Landfill: A landfill that accepts non-hazardous resources such as household, commercial, and industrial waste, resulting from construction, remodeling, repair, and demolition operations.

B. Construction and Demolition Debris: Building materials and solid waste resulting from construction, remodeling, repair, cleanup, or demolition operations that are not hazardous. This term includes, but is not limited to, asphalt concrete, Portland cement concrete, lumber, cardboard and other associated packaging, roofing material, and steel. This will also include other jobsite materials such as cardboard packaging, sheet vinyls, plastic bottles, white paper, and aluminum cans.

C. C&D Recycling Center. A facility that receives C&D material that has been separated for reuse. Recycling facilities are often part of the overall County waste management facilities.

D. Disposal. Final deposition of construction and demolition material

E. Mixed Debris Recycling Facility: A processing facility that accepts loads of commingled construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing the non-recyclable residual materials.

F. Recycling: The process of sorting, cleansing, treating and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.

G. Reuse. The use, in the same or similar form as it was produced, of a material which might otherwise be discarded.

H. Source-Separated: Materials, including commingled recyclables, that have been separated or kept separate from the solid waste stream at the point of generation, for the purpose of additional sorting or processing of those materials for reuse or recycling in order to return them to the economic mainstream in the form of raw materials for new, reused, or reconstituted products which meet the quality standards necessary to be used in the marketplace.

I. Waste Hauler: A company that possesses a valid permit from the [local waste management authority to collect and transport solid wastes from individuals or businesses for the purpose of recycling or disposal in [the locality].

1.03 SUBMITTALS

A. Contractor's Reuse, Recycling, and Disposal Report
   1. Submit Contractor's Reuse, Recycling, and Disposal Report on the form provided (Section 01151B) with each application for progress payment. Failure to submit the form and its supporting documentation will render the application for progress payment incomplete and delay progress payments. If applicable, include manifests, weight tickets, receipts, and invoices specifically identifying the Project for re-used and recycled materials:
      a. Reuse of building materials or salvage items on site
      b. Salvaging building materials for reuse
      c. Recycling source separated materials on site, with approval
      d. Recycling source separated material at an off site recycling center
      e. Delivery of soils or mixed inerts to an inerta landfill for disposal (inert fill).
      f. Disposal at a landfill or transfer station (where no recycling takes place).
      g. Other (describe).

B. Contractor's Reuse, Recycling, and Disposal Report must quantify all materials generated in the Work, disposed in landfills, or diverted from disposal through recycling. Indicate zero (0) if there is no quantity to report for a type of material. As indicated on the form:
   1. Report disposal or recycling either in tons or in cubic yards: if scales are available at disposal or recycling facility, report in tons; otherwise, report in cubic yards. Report in units for salvage items when no tonnage or cubic yard measurement is feasible.
   2. Indicate locations to which materials are delivered for reuse, salvage, recycling, accepted as daily cover, inert backfill, or disposal in landfills or transfer stations.
   3. Provide legible copies of weigh tickets, receipts, or invoices that specifically identify the project generating the material. Said documents must be from recyclers and/or disposal site operators that can legally accept the materials for the purpose of re-use, recycling, or disposal.
      a. Indicate project title, project number, progress payment number, name of the company completing the Contractor's Report and compiling backup documentation, the printed name, signature, and daytime phone number of the person completing the form, the beginning and ending dates of the period covered on the Contractor's Report, and the date that the Contractor's Report is completed.
   4. NCDOT General Services Division will provide a list of waste recycling sites, sorted by County and by Highway Division. It is the responsibility of the General Contractor to confirm the locations and manage the waste material.

PART 2 PRODUCTS

2.01 (Not used.)

PART 3 EXECUTION

3.01 SALVAGE, RE-USE, RECYCLING AND PROCEDURES

A. Identify re-use, salvage, and recycling facilities.

B. Develop and implement procedures to re-use, salvage, and recycle new construction and excavation materials, based on the Contract Documents, the Contractor's Construction Waste and Recycling Plan, estimated quantities of available materials, and availability of recycling facilities. Procedures may include on-site recycling, source separated recycling, and/or mixed debris recycling efforts.
   1. Identify materials that are feasible for salvage, determine requirements for site storage, and

transportation of materials to a salvage facility.

2. Source separate new construction, excavation and demolition materials including, but not limited to the following types:
   a. Asphalt.
   b. Concrete, concrete block, slump stone (decorative concrete block), and rocks.
   c. Metal (ferrous and non-ferrous).
   d. Miscellaneous Construction Debris.
   e. Paper or cardboard.
   f. Soils.
   g. Wood studs
   h. Other
3. Miscellaneous Construction Debris: Develop and implement a program to transport loads of mixed (commingled) new construction materials that cannot be feasibly source separated to a mixed materials recycling facility.

3.02 DISPOSAL OPERATIONS AND WASTE HAULING

A. Legally transport and dispose of materials that cannot be delivered to a source separated or mixed recycling facility to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal.

B. Use a permitted waste hauler or Contractor's trucking services and personnel. To confirm valid permitted status of waste haulers, contact the local solid waste authority.

C. Become familiar with the conditions for acceptance of new construction, excavation and demolition materials at recycling facilities, prior to delivering materials. NCDOT General Services Division will work with the General Contractor on identifying sites that will accept recycled materials.

D. Deliver to facilities that can legally accept new construction, excavation and demolition materials for purpose of re-use, recycling, composting, or disposal.

E. Do not burn, bury or otherwise dispose of solid waste on the project job-site.

3.03 REVENUE

A. Revenues or other savings obtained from recycled, re-used, or salvaged materials shall accrue to the General Contractor. Accounting of revenues or savings is for the Owner's tracking purposes only.

END OF SECTION

SECTION 01200

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. See also INVOICES FOR PAYMENT, page 4 of GENERAL CONDITIONS.

1.02 SCHEDULE OF VALUES

A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

B. Forms filled out by hand will not be accepted.

C. Contractor is to divide the schedule of values into three parts- site, storage building and office building (so the owner can assess the final value for insurance purposes). General condition can be kept together, owner will pro rate to establish value.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

C. Forms filled out by hand will not be accepted.

D. Execute certification by signature of authorized officer.

E. Submit five originals of each Application for Payment.

F. Submit County Sales and Use Tax forms (see page 3 of the GENERAL CONDITIONS) with each application for payment.

G. Submit "MBE Documentation for Contract Payments" form with final application for payment.

END OF SECTION

SECTION 01300

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.

B. Progress meetings.

C. Construction progress schedule.

D. Submittals for review, information, and project closeout.

E. Submittal procedures.

F. Quality assurance.

1.02 RELATED REQUIREMENTS

A. Section 01325 - Construction Progress Schedule

B. General Conditions

C. Supplementary General Conditions

D. Section 01700 - Execution and Closeout Requirements: Additional coordination requirements.

E. Section 01780 - Closeout Submittals: Project record documents.

1.03 PROJECT COORDINATION

A. Project Coordinator: General Contractor.

B. Cooperate with the Owner's Representative in allocation of mobilization areas of site; for field offices and sheds, for vehicular access, traffic, and parking facilities.

C. Coordinate with Owner's procedures for submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts. Any discrepancies noted in the contract documents is to be reported to the architect.

D. Coordinate temporary utilities and construction facilities w/owner.

E. Make the following types of submittals directly to the Architect:
   1. Requests for interpretation.
   2. Requests for substitution.
   3. Shop drawings, product data, and samples.
   4. Test and inspection reports.
   5. Manufacturer's instructions and field reports.
   6. Applications for payment and change order requests.
   7. Progress schedules.
   8. Coordination drawings.
   9. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Architect will schedule a meeting after Notice of Award.

B. Attendance Required:
   1. NC DOT (Owner).
   2. Designer.
   3. Contractor.
   4. Major Subcontractors.
   5. State Construction Office.

C. Agenda:
   1. Distribution of Contract Documents.
   2. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
   3. Designation of personnel & emergency personal representing the parties to Contract, State Construction Office, and Architect.
   4. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Designer, NC DOT, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

A. The architect will administer meetings throughout progress of the Work at monthly intervals.

B. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Owner, Architect and State Construction Monitor.

C. Agenda:
   1. Review minutes of previous meeting.
   2. Review of Work progress- one month look-ahead.
   3. Field observations & issues.
   4. Review of submittals schedule and status of submittals.
   5. Progress schedule.
   6. Corrective measures to regain project schedule, if necessary.
   7. Planned progress during succeeding work period.
   8. Outstanding RFI's/RFP's.

D. Architect will record minutes and distribute copies after the meeting to participants.

E. Architect and/or engineer will also be on site weekly for an informal jobsite visit.

3.03 CONSTRUCTION PROGRESS SCHEDULE

A. If preliminary schedule requires revision after review, submit revised schedule within 7 days.

B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
   1. Include written certification that major Subcontractors have reviewed and accepted proposed schedule.

C. Within 10 days after joint review, submit complete schedule.

D. Submit updated schedule at each monthly meeting if there is a change.

3.04 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with the contract documents.

C. Samples will be reviewed for color and finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01780 - CLOSEOUT SUBMITTALS.

3.05 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Designer's knowledge as contract administrator or for NC DOT. No action will be taken.

3.06 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

B. Submit for NC DOT's benefit during and after project completion.

3.07 SUBMITTAL PROCEDURES

A. Transmit each submittal with AIA Form G810.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Identify Project, SCO ID Number, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

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 the requirements of the Work and Contract Documents. The submittal will be rejected by the Architect without this verification.

E. Schedule submittals to expedite the Project, and coordinate submission of priority and related items.

F. For each submittal for review, allow 15 days excluding delivery time.

G. Identify variations from Contract Documents and Product or system limitations.

H. Provide space for Contractor and Architect review stamps.

I. When revised for resubmission, identify all changes made since previous submission.

J. Architect will distribute copies of reviewed submittals.

3.08 SOILS AND MATERIALS QUALITY ASSURANCE

A. Quality assurance will be provided by Owner or testing agency employed by Owner.

B. General Contractor will notify the Architect and Owner's testing agency 48 hours in advance to schedule the testing on site.

C. Testing will include soil and gravel compaction testing, and slump and strength testing for all concrete and structural grout (footing, slab, wall & sidewalk).

D. Visual inspection of structural elements will be done by the NCDOT Structural Engineer.

E. For testing required for plumbing, mechanical and electrical, see relevant specification sections.

END OF SECTION

SECTION 01400

QUALITY ASSURANCE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Quality assurance submittals.

C. Control of installation.

D. Testing and inspection services.

1.02 RELATED REQUIREMENTS

A. Section 01300 - Administrative Requirements: Submittal procedures.

B. Section 01600 - Product Requirements: Requirements for material and product quality.

1.03 SUBMITTALS

A. Contractor to submit concrete mix design and any additional information required elsewhere in the specifications.

B. Testing Agency Qualifications:
   1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.

C. Test Reports: After each test/inspection, promptly submit report to Architect and to Contractor.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
   1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

1.04 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

PART 2 EXECUTION

2.01 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 manufacturer's instructions, including each step in sequence.

C. Should manufacturer's instruction conflict with contract documents, request clarification from Architect 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. Have work performed by person qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

2.02 TESTING AND INSPECTION

A. Site inspections will be by state construction officer monitor, state electrical inspector, and designers of record.

B. Contractor Responsibilities:
   1. Deliver to owner at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Notify Architect and Engineers 48 hours prior to expected time for operations requiring testing/inspections services.

2.03 DEFECT ASSESSMENT

A. Replace work or portions of the work not conforming to specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01525

FIELD OFFICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary field office for use of Contractor.

1.02 RELATED REQUIREMENTS

A. Section 01100 - Summary: use of premises and responsibility for providing field offices.

PART 2 PRODUCTS

2.01 MATERIALS, EQUIPMENT, FURNISHINGS

A. Materials, Equipment, Furnishings: Serviceable, new or used, adequate for required purpose.

2.02 CONSTRUCTION

A. Portable or mobile buildings, securely fixed to foundations, with steps and landings at entrance doors.

B. Construction: Structurally sound, secure, weather tight enclosures for office. Maintain during progress of Work; remove when no longer needed- can make use of Owner's site utilities for connection.

C. Fire Extinguishers: Appropriate type fire extinguisher at each office.

2.03 Contractor OFFICE AND FACILITIES

A. Size: For Contractor's needs- project meetings will be held at Owner's County Maintenance Building.

B. Toilet: Provide toilet in office or portable toilet facility on site.

PART 3 EXECUTION

3.01 PREPARATION

A. Fill and grade sites for temporary structures to provide drainage away from buildings.

3.02 INSTALLATION

3.03 MAINTENANCE AND CLEANING

A. Maintain approach walks free of mud, water, and snow.

END OF SECTION

SECTION 01550

VEHICULAR ACCESS AND PARKING

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

A. Section 02310 - Grading: Specifications for earthwork and paving bases.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 PARKING

A. Parking and staging areas on site will be coordinated at the preconstruction conference.

3.02 NEW PERMANENT PAVEMENTS

A. Prior to Substantial Completion the base for permanent roads and parking areas may be used for construction traffic.

3.03 MAINTENANCE

A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, waste material, mud, snow and ice..

B. Maintain existing 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.

3.04 REMOVAL, REPAIR

A. Repair existing facilities damaged by use, to original condition.

B. Repair damage caused by installation.

3.05 MUD FROM SITE VEHICLES

A. Provide means of removing mud from vehicle wheels before entering streets.

END OF SECTION

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations and procedures.

1.02 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

2.02 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

C. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the substitution as for the specified product.

3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension that may subsequently become apparent.

D. Substitution Submittal Procedure:
1. Submit one copy 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 the proposed product equivalence. Burden of proof is on proposer.
3. The Architect will notify Contractor in writing of decision to accept or reject request.

3.02 TRANSPORTATION AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. For exterior storage of fabricated products, place on sloped supports above ground.

E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

F. Prevent contact with material that may cause corrosion, discoloration, or staining.

G. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01700

EXECUTION & CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Cutting and patching.

C. Surveying for laying out the work.

D. Cleaning and protection.

E. Starting of systems and equipment.

F. Demonstration and instruction of NC DOT personnel.

G. Closeout procedures, except payment procedures.

1.02 RELATED REQUIREMENTS

A. Section 01100 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 01300 - Administrative Requirements: Submittals procedures.

C. Section 01780 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Survey work: Staking and grading is to be done per contract document information, with General Contractor's Surveyor prior to starting work; Contractor is to alert Designer to any discrepancies.
   1. Submit surveys and survey logs for the project record.

1.04 QUALIFICATIONS

A. For survey work, employ a land surveyor registered in North Carolina.

B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in North Carolina.

1.05 PROJECT CONDITIONS

A. Grade site as shown on Contract document. Maintain excavations free of water. Provide, operate, and maintain pumping equipment if necessary.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

C. As work progresses, ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.06 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. General contractor to coordinate completion and clean-up of work of subcontractors.

D. After Owner occupancy of premises, Owner's representative will coordinate access to site for correction of warranty work.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01600.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that 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. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 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 any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

D. Promptly report to Designer the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Designer.

F. Utilize recognized engineering survey practices.

G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.

H. Periodically verify layouts by same means.

I. Maintain a complete and accurate log of control and survey work as it progresses.

3.04 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-conforming work.

C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

F. Restore work with new products in accordance with requirements of Contract Documents.

G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. 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 the penetrated element.

I. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.06 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a 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 the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.07 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.08 FINAL CLEANING

A. Use cleaning materials that are nonhazardous.

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 a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

D. Clean filters of operating equipment.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.09 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.

B. Notify Designer when work is considered ready for Substantial Completion.

C. 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 Designer's review.

D. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.

E. Notify Designer when work is considered finally complete.

F. Complete items of work determined by Designer's final inspection.

END OF SECTION

SECTION 01780

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 00700 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.

B. Section 01300 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

C. Section 01700 - Execution Requirements: Contract closeout procedures.

D. Individual Product Sections: Specific requirements for operation and maintenance data.

E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: ("As Built" mark-up set) Submit documents to Designer with claim for final Application for Payment.

B. Operation and Maintenance Manual:
   1. For equipment, or component parts of equipment put into service during construction and operated by NC DOT, submit completed documents with acceptance of work.
   2. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   3. Submit three sets of final documents at the final inspection.
   4. Operation and Maintenance manuals shall be loose leaf notebook with "tabs" to separate sections.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with NC DOT's permission, submit documents with acceptance of work.
   2. Make other submittals at the final Application for Payment.
   3. For all the work, the date of warranty will be the date of the final inspection.

PART 2 EXECUTION

2.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings, Project manual.
   2. Addenda, Bulletin drawings.
   3. Change Orders and other modifications to the Contract.
   4. Reviewed / approved shop drawing submittals, product data, and samples.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record the information as construction progresses.

E. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Field changes of dimension and detail.
   2. Details not on original Contract drawings.
   3. All subcontractors are to mark on the same record set.

2.02 OPERATION AND MAINTENANCE DATA

A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

2.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. Provide for Each Product, applied material, and finish.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

2.04 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined. All warranties and bonds must be submitted at (or by) the final inspection.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

END OF SECTION

SECTION 02315

EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating for footings, slabs-on-grade, paving, and utilities within the building.

1.02 RELATED REQUIREMENTS

A. Section 02310 - Grading: Grading.

B. Section 02316 - Fill and Backfill: Fill materials, filling, and compacting.

PART 2 EXECUTION

2.01 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Locate, identify, and protect utilities that remain and protect from damage.

2.02 EXCAVATING

A. Excavate to accommodate new structures and construction operations.

B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

D. Excavate and pour in 45 degree bearing splay of foundations at connection to existing building in one day.

E. Cut utility trenches wide enough to allow inspection of installed utilities.

F. Hand trim excavations. Remove loose matter.

G. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 02316.

H. Grade top perimeter of excavation to prevent surface water from draining into excavation.

I. Stockpile excavated material that is unsuitable for re-use to location on owner's site (owner will direct).

J. Stockpile excess excavated material on owner's site, as directed.

END OF SECTION

SECTION 02316

FILL AND BACKFILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling, backfilling, and compacting for building volume below grade.

1.02 RELATED REQUIREMENTS

A. Section 02310 - Grading: Site grading.

B. Section 02315 - Excavation: Removal and handling of soil to be re-used.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Compaction Density Test Reports.

PART 2 EXECUTION

2.01 EXAMINATION

A. Identify required lines, levels, contours, and datum locations.

2.02 PREPARATION

A. Scarify subgrade surface to a depth of 6 inches to identify soft spots.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

2.03 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.

F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

G. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into existing grade/sidewalk/curb.

H. Correct areas that are over-excavated.
   1. Load-bearing foundation surfaces: Use structural fill, flush to required elevation, compacted to 95 percent of maximum dry density. Upper 12" compacted to 98 percent of maximum dry density.
   2. Other areas: Use general fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.

I. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.

J. Reshape and re-compact fills subjected to vehicular traffic.

2.04 FIELD QUALITY CONTROL

A. See Section 01400 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017.

C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor"), ASTM D 1557 ("modified Proctor"), or AASHTO T 180.

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

END OF SECTION

SECTION 02741

BITUMINOUS CONCRETE PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate base course.

B. Double course bituminous concrete paving.

C. Surface sealer.

1.02 QUALITY ASSURANCE

A. Perform Work in accordance with State of North Carolina Highways standard.

B. Mixing Plant: Conform to State of North Carolina Highways standard.

C. Obtain materials from same source throughout.

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphalt Cement: ASTM D 946.

B. Aggregate for Base Course: In accordance with State of North Carolina Highways standards.

2.02 ASPHALT PAVING MIXES AND MIX DESIGN

A. Binder Course: State of NC Highways standards.

B. Wearing Course: State of NC Highways standards.

C. Submit proposed mix design of each class of mix for review prior to beginning of work.

PART 3 EXECUTION

3.01 PREPARATION - TACK COAT

A. Apply tack coat in accordance with manufacturer's instructions.

B. Apply tack coat on asphalt or concrete surfaces over subgrade surface at uniform rate of 1/3 gal/sq yd.

3.02 PLACING ASPHALT PAVEMENT - DOUBLE COURSE

A. Place asphalt binder course within 24 hours of applying primer or tack coat.

B. Place binder course to 4.0 inch compacted thickness.

C. Place wearing course within two hours of placing and compacting binder course.

D. Place wearing course to 2.0 inch compacted thickness.

E. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

F. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.03 SEAL COAT

A. Apply seal coat to surface course and asphalt curbs in accordance with AI MS-19.

3.04 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Variation from True Elevation: Within 1/2 inch.

END OF SECTION

SECTION 03100

CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

1.02 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute; 2005.

B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute; 2008.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

C. Comply with applicable State Codes with respect to design, fabrication, erection, and removal of formwork.

2.02 WOOD FORM MATERIALS

A. Form Materials: At the discretion of the Contractor.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

3.03 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

3.04 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

3.05 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. Section 03100 - Concrete Forms and Accessories.

B. Section 03300 - Cast-in-Place Concrete.

C. Section 04810 - Unit Masonry Assemblies: Reinforcement for masonry.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301.
   1. Maintain one copy of each document on project site.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M Grade 60 (420).
   1. Plain billet-steel bars.
   2. Unfinished.

B. Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain type.
   1. Flat Sheets.
   2. Mesh Size and Wire Gage: As indicated on drawings.

C. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   3. Provide stainless steel components for placement within 1-1/2 inches of weathering surfaces.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

B. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Conform to applicable code for concrete cover over reinforcement.

3.02 SCHEDULES

A. Reinforcement For Foundation Wall Framing Members and Slab-on-Grade: Deformed bars and welded wire reinforcement.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete foundations.

B. Concrete walls.

C. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 03100 - Concrete Forms and Accessories: Forms and accessories for formwork.

B. Section 03200 - Concrete Reinforcement.

1.03 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).

B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2005.

C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.

D. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 1999.

E. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 1988 (Reapproved 2002).

F. ACI 308R - Guide to Curing Concrete; American Concrete Institute International; 2001.

G. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2008.

H. ASTM C 33 - Standard Specification for Concrete Aggregates; 2007.

I. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2005.

J. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2007.

K. ASTM C 143/C 143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2005a.

L. ASTM C 150 - Standard Specification for Portland Cement; 2007.

M. ASTM C 173/C 173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2007.

N. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete; 2006.

O. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2007.

P. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete; 2008.

Q. ASTM C 1107/C 1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2007a.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

A. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

2.02 REINFORCEMENT

A. Comply with requirements of Section 03200.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C 150, Type I - Normal portland type.

B. Fine and Coarse Aggregates: ASTM C 33.

C. Water: Potable.

2.04 CHEMICAL ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260.

2.05 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

D. Normal Weight Concrete:
   1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.
   2. Water-Cement Ratio: Determined by mix design.
   3. Total Air Content: As indicated on plans.
   4. Maximum Slump: 4 inches.
   5. Chlorides are not permitted in mix.

2.06 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

3.03 INSTALLING REINFORCEMENT

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

3.04 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Notify Architect not less than 24 hours prior to commencement of placement operations. C.

Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

3.05 CURING AND PROTECTION

A. Comply with requirements of ACI 308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.06 FIELD QUALITY CONTROL

A. NC DOT's testing agency will perform field quality control tests.

B. Provide free access to concrete operations at project site and cooperate with NCDOT personnel.

C. Submit proposed mix design of each class of concrete to design engineer for review prior to commencement of concrete operations.

D. Compressive Strength Tests: ASTM C39/C39M. For each test, mold and cure five concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.

E. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

F. Perform one slump test for each truck on jobsite, following procedures of ASTM C 143/C 143M.

3.07 DEFECTIVE CONCRETE

A. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural dimension lumber framing.

B. Non-structural dimension lumber framing.

C. Sheathing.

D. Roofing nailers.

E. Preservative treated wood materials.

F. Miscellaneous framing and sheathing.

G. Concealed wood blocking, nailers, and supports.

H. Miscellaneous wood nailers, furring, and grounds.

I. Water-resistive barrier over wall sheathing.

1.02 RELATED REQUIREMENTS

A. Section 06173 - Plate Connected Wood Trusses.

1.03 REFERENCE STANDARDS

A. ANSI A208.1 - American National Standard for Particleboard; 1999.

B. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association; 2001.

C. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.

D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007

E. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association; 2003.

F. AWPA C9 - Plywood -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association; 2003.

G. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood-Preservers' Association; 2007.

H. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2005.

I. SPIB (GR) - Grading Rules; Southern Pine Inspection Bureau, Inc.; 2002.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER

A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB) and Northeastern Lumber Manufacturer's Association (NELMA).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: Kiln-dry or MC15.

D. Stud Framing (2 by 2 through 2 by 6):
   1. Species: Any allowed under referenced grading rules.
   2. Grade: No. 2.

E. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16):
   1. Species: Any allowed under grading rules.
   2. Grade: No. 2.

F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

A. Roof Sheathing: Oriented strand board wood structural panel; PS 2, Exposure 1.
   1. Thickness: 5/8 inch, nominal.

B. Wall Sheathing: APA PRP-108/APA PRP-108, Form B455Rated Sheathing, Exposure 1, and as follows:
   1. Span Rating: 24/16.
   2. Thickness: as indicated on drawings

2.04 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
   1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing per ASTM A653/A653M.

C. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
   1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing per ASTM A653/A653M.

D. Water-Resistive Barrier: No. 15 asphalt felt.

2.05 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:
   1. Preservative Pressure Treatment of Lumber Above Grade: AWPA Use Category UC3B, Commodity Specification A (Treatment C2) using waterborne preservative to 0.25 lb/cu ft retention.
      a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
   2. Preservative Pressure Treatment of Plywood Above Grade: AWPA Use Category UC2 and UC3B, Commodity Specification F (Treatment C9) using waterborne preservative to 0.25 lb/cu ft retention.
      a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.

PART 3 EXECUTION

3.01 PREPARATION

A. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

B. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.

E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

3.04 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

3.05 INSTALLATION OF CONSTRUCTION PANELS

A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
   1. Use plywood or other acceptable structural panels at building corners, for not less than 96 inches, measured horizontally.
   2. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.

3.06 CLEANING

A. Waste Disposal: Comply with the requirements of Section 01732.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06173

PLATE CONNECTED WOOD TRUSSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pre-engineered shop fabricated wood trusses for roof framing.

B. Bridging, bracing, and anchorage.

1.02 RELATED REQUIREMENTS

A. Section 06100 - Rough Carpentry: Installation requirements for miscellaneous framing.

B. Section 06100 - Rough Carpentry: Material requirements for blocking, bridging, plates, and miscellaneous framing.

1.03 REFERENCE STANDARDS

A. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007.

B. SPIB (GR) - Grading Rules; Southern Pine Inspection Bureau, Inc.; 2002.

C. TPI DSB-89 - Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses; Truss Plate Institute; 1989.

D. BCSI 1 - Building Component Safety Information Booklet: The Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses; joint publication of the Truss Plate Institute and the Wood Trust Council of America; 2006.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on plate connectors, bearing plates, and metal bracing components.

C. Shop Drawings: Show truss configurations, sizes, spacing, size and type of plate connectors, cambers, framed openings, bearing and anchor details, and bridging and bracing.
   1. Include identification of engineering software used for design.
   2. Provide shop drawings stamped or sealed by design engineer registered in North Carolina.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Handle and erect trusses in accordance with BCSI 1. Comply with AITC recommendations and manufacturer's printed instructions.

B. Protect trusses from weather and condensation. Trusses showing discoloration, corrosion, or other evidence of deterioration must be inspected by the truss plate manufacturer or other acceptable inspection agency before concealment. Replace trusses which inspection determines to be damaged or defective.

C. Store trusses in vertical position resting on bearing ends.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Truss Plate Connectors:
   1. Alpine Engineered Products, Inc: www.alpeng.com.
   2. MiTek Industries, Inc: www.mii.com.

3. Truswal Systems: www.truswal.com.
4. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Lumber:
   1. Grade: SPIB (GR), Grade 2, minimum.
   2. Moisture Content: Between 7 and 9 percent.

B. Steel Connectors: Hot-dipped galvanized steel sheet, ASTM A653/A653M Structural Steel (SS) Grade 33/230, with G90/Z275 coating; die stamped with integral teeth; thickness as indicated.

C. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

2.03 FABRICATION

A. Fabricate trusses to achieve structural requirements specified.

B. Brace wood trusses in accordance with TPI DSB-89 and BCSI 1.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that supports and openings are ready to receive trusses.

3.02 ERECTION

A. Install trusses in accordance with manufacturer's instructions and TPI DSB-89 and BCSI 1; maintain a copy of each TPI document on site until installation is complete.

B. Set members level and plumb, in correct position.

C. Do not field cut or alter structural members without approval of Architect.

D. Install permanent bridging and bracing.

E. Frame openings between trusses with lumber in accordance with Section 06100.

END OF SECTION

SECTION 06181

GLUED-LAMINATED STRUCTURAL UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glue laminated wood beams.

1.02 REFERENCE STANDARDS

A. AITC 117 - Standard Specifications for Structural Glued Laminated Timber of Softwood Species; American Institute of Timber Construction; 2010.

B. AITC A190.1 - American National Standard for Wood Products - Structural Glued Laminated Timber; American Institute of Timber Construction; 2007.

C. SPIB (GR) - Grading Rules; Southern Pine Inspection Bureau, Inc.; 2002.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate framing system, sizes and spacing of members, loads and cambers, bearing and anchor details, bridging and bracing, framed openings.

1.04 QUALITY ASSURANCE

A. Manufacturer/Fabricator Qualifications: Company specializing in manufacture of glue laminated structural units with three years of documented experience, and certified by AITC in accordance with AITC A190.1.

PART 2 PRODUCTS

2.01 GLUED-LAMINATED UNITS

A. Glued-Laminated Units: Fabricate in accordance with AITC 117 Industrial grade.
   1. Verify dimensions and site conditions prior to fabrication.
   2. Cut and fit members accurately to length to achieve tight joint fit.
   3. Fabricate member with camber built in.
   4. Do not splice or join members in locations other than those indicated without permission.
   5. After end trimming, seal with penetrating sealer in accordance with AITC requirements.

2.02 MATERIALS

A. Lumber: Softwood lumber conforming to SPIB grading rules with 12 percent maximum moisture content before fabrication. Design for the following values:
   1. Bending (Fb): 2400 psi.
   2. Horizontal Shear (Fv): 190 psi.
   3. Modulus of Elasticity (E): 1,700,000 psi.

2.03 FABRICATION

A. Fabricate glue laminated structural members in accordance with AITC Industrial grade.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that supports are ready to receive units.

B. Verify sufficient end bearing area.

3.02 ERECTION

A. Lift members using protective straps to prevent visible damage.

B. Set structural members level and plumb, in correct positions or sloped where indicated.

END OF SECTION

SECTION 07260

WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water-Resistive Barrier: Under exterior wall cladding, over sheathing or other substrate; not air-tight or vapor retardant.

1.02 RELATED REQUIREMENTS

A. Section 06100 - Rough Carpentry: Water-resistive barrier under exterior cladding.

1.03 DEFINITIONS

A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, vapor retarders, or water-resistive barriers.

B. Water-Resistive Barrier: Water-shedding barrier made of material that is moisture-resistant, to the degree specified, intended to be installed to shed water without sealed seams.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 WATER-RESISTIVE BARRIER MATERIALS (NEITHER AIR BARRIER NOR VAPOR RETARDER)

A. Asphalt Felt: ASTM D226 Type I felt (No.15).

2.02 ADHESIVES

A. Mastic Adhesive: Compatible with sheet seal and substrate, thick mastic of uniform knife grade consistency.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.

B. Water-Resistive Barriers: Install continuous barrier over surfaces indicated, with sheets lapped to shed water but with seams not sealed.

C. Mechanically Fastened Sheets - On Exterior:
   1. Install sheets shingle-fashion to shed water, with seams generally horizontal.
   2. Overlap seams as recommended by manufacturer but at least 6 inches.
   3. Overlap at outside and inside corners as recommended by manufacturer but at least 12 inches.
   4. Attach to framed construction with fasteners extending through sheathing into framing. Space fasteners at 12 to 18 inches on center along each framing member supporting sheathing.
   5. Install water-resistive barrier over jamb flashings.
   6. Install air barrier and vapor retarder UNDER jamb flashings.
   7. Install head flashings under weather barrier.

8. At openings to be filled with frames having nailing flanges, wrap excess sheet into opening; at head, seal sheet over flange and flashing.

3.03 FIELD QUALITY CONTROL

A. Do not cover installed weather barriers until required inspections have been completed.

3.04 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07311

ASPHALT SHINGLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Asphalt shingle roofing.

B. Flexible sheet membranes for eave protection, underlayment, and valley protection.

C. Associated metal flashings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 06100 - Rough Carpentry: Roof sheathing.

B. Section 07631 - Gutters and Downspouts.

1.03 REFERENCE STANDARDS

A. ASTM D225 - Standard Specification for Asphalt Shingles (Organic Felt) Surfaced with Mineral Granules; 2007.

B. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2006.

C. ASTM D 3161 - Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method); 2008b.

D. ASTM D 3462 - Standard Specification for Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules; 2007.

E. ASTM D4869 - Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing; 2005.

F. NRCA MS104 - The NRCA Steep Roofing Manual; National Roofing Contractors Association; 2001, Fifth Edition, with interim updates.

G. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2003.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating material characteristics.

C. Shop Drawings: For metal flashings, indicate specially configured metal flashings.

D. Samples: Submit two samples of each shingle color indicating color range and finish texture/pattern; for color selection.

E. Manufacturer's Instructions: Indicate installation criteria and procedures.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 WARRANTY

A. Submit Manufacturer's standard 30 year warranty on shingles with submittals in Section 1.04.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with the recommendations of NRCA Steep Roofing Manual.

1.07 FIELD CONDITIONS

A. Do not install shingles or eave protection membrane when surface temperatures are below 45 degrees F.

PART 2 PRODUCTS

2.01 SHINGLES

A. Manufacturers:
   1. GAF Materials Corporation: www.gaf.com.
   2. Owens Corning Corp: www.owenscorning.com.
   3. Tamco Building Products: www.tamco.com.

B. Asphalt Shingles: Asphalt-coated glass felt, mineral granule surfaced, complying with ASTM D3462; Class A fire resistance.
   1. Wind Resistance: Class F, when tested in accordance with ASTM D3161.
   2. Warranted Wind Speed: 90 mph.
   3. Style: Architectural.
   4. Color: Selected by architect from manufacturer's standart pallette.

2.02 ACCESSORIES

A. Nails: Standard round wire shingle type, of hot-dipped zinc coated steel, 12 gage, 0.105 inch shank diameter, 3/8 inch head diameter, of sufficient length to penetrate through roof sheathing or 3/4 inch into roof sheathing or decking.

B. Lap Cement: Fibrated cutback asphalt type, recommended for use in application of underlayment, free of toxic solvents.

C. Ridge Vents: Ridge vents are not required on this project.

2.03 METAL FLASHINGS

A. Metal Flashings: Provide sheet metal eave edge, gable edge, ridge, and other flashing indicated.
   1. Form flashings to profiles indicated on Drawings.
   2. Hem exposed edges of flashings minimum 1/4 inch on underside.
   3. Coat concealed surfaces of flashings with bituminous paint.

B. Sheet Metal: Prefinished aluminum, 0.016 inch thick; PVC coating.

C. Bituminous Paint: Acid and alkali resistant type; black color.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

B. Verify that deck is of sufficient thickness to accept fasteners.

C. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.

D. Verify roof openings are correctly framed.

E. Verify deck surfaces are dry, free of ridges, warps, or voids.

3.02 PREPARATION

A. Seal roof deck joints wider than 1/16 inch with deck tape.

B. At areas where eave protection membrane is to be adhered to substrate, fill knot holes and surface cracks with latex filler.

C. Broom clean deck surfaces before installing underlayment or eave protection.

D. Install eave edge flashings tight with fascia boards. Weather lap joints 2 inches and seal with plastic cement. Secure flange with nails spaced 6 inches on center.

3.03 INSTALLATION - ICE PROTECTION UNDERLAYMENT

A. Ice protection underlayment (ice dam protection) is not required on this project.

3.04 INSTALLATION - UNDERLAYMENT

A. At Roof Slopes Greater Than 4:12 : Install underlayment perpendicular to slope of roof, with ends and edges weather lapped minimum 4 inches. Stagger end laps of each consecutive layer. Nail in place. Weather lap minimum 4 inches over eave protection.

B. Items projecting through or mounted on roof: Weather lap and seal watertight with plastic cement.

3.05 INSTALLATION - VALLEY PROTECTION

A. Install one ply of smooth surfaced roll roofing, minimum 18 inches wide, centered over valleys.

B. Weather lap joints minimum 2 inches.

C. Nail in place minimum 18 inches on center, 1 inch from edges.

3.06 INSTALLATION - METAL FLASHING AND ACCESSORIES

A. Install flashings in accordance with NRCA requirements.

B. Weather lap joints minimum 2 inches and seal weather tight with plastic cement.

C. Items Projecting Through or Mounted on Roofing: Flash and seal weather tight with plastic cement.

3.07 INSTALLATION - SHINGLES

A. Install shingles in accordance with manufacturer's instructions.
   1. Fasten individual shingles using 6 nails per shingle, or as required by code, whichever is greater.
   2. Fasten strip shingles using 6 nails per strip, or as required by code, whichever is greater.

B. Place shingles in straight coursing pattern with 5 inch weather exposure to produce double thickness over full roof area. Provide double course of shingles at eaves.

C. Project first course of shingles 3/4 inch beyond fascia boards.

D. Extend shingles 1/2 inch beyond face of gable edge fascia boards.

E. Complete installation to provide weather tight service.

END OF SECTION

SECTION 07466

FIBER CEMENT SIDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood-fiber cement siding.

1.02 RELATED REQUIREMENTS

A. Section 06100 - Rough Carpentry: Water-resistive barrier under siding.

B. Section 07260 - Weather Barriers: Weather barrier under siding.

C. Section 09900 - Paints and Coatings: Field painting.

1.03 REFERENCE STANDARDS

A. ASTM C 1186 - Standard Specification for Flat Fiber Cement Sheets; 2007.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Manufacturer's requirements for related materials to be installed by others.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods, including nail patterns.

C. Test Report: Applicable model code authority evaluation report (e.g. ICC-ES).

D. Maintenance Instructions: Periodic inspection recommendations and maintenance procedures.

E. Warranty: Submit copy of manufacturer's warranty, made out in Owner's name, showing that it has been registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified in this section with minimum 3 years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products under waterproof cover and elevated above grade, on a flat surface.

PART 2 PRODUCTS

2.01 SIDING

A. Panel Siding: Vertically oriented panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186 Type A Grade II; with machined edges, for nail attachment.
   1. Length (Height): 96 inches, nominal.
   2. Width: 48 inches.
   3. Thickness: 5/16 inch, nominal.
   4. Finish: Unfinished.
   5. Warranty: 50 year limited; transferable.

2.02 ACCESSORIES

A. Trim: Same material and texture as siding.

B. Fasteners: Galvanized or corrosion resistant; length as required to penetrate minimum 1-1/4 inch.

C. Joint Sealer: As specified in Section 07900.

PART 3 EXECUTION

3.01 PREPARATION

A. Examine substrate and clean and repair as required to eliminate conditions that would be detrimental to proper installation.

B. Verify that weather barrier has been installed over substrate completely and correctly.

C. Do not begin until unacceptable conditions have been corrected.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions and recommendations.
   1. Read warranty and comply with all terms necessary to maintain warranty coverage.
   2. Install in accordance with conditions stated in model code evaluation report applicable to location of project.
   3. Use trim details indicated on drawings.
   4. Touch up all field cut edges before installing.
   5. Pre-drill nail holes if necessary to prevent breakage.

B. Over Wood Studs without Sheathing: Install siding over weather-resistive barrier, fastened into studs.

C. Allow space between both ends of siding panels that butt against trim for thermal movement; seal joint between panel and trim with exterior grade sealant.

D. Joints in Vertical Siding: Install Z-flashing in horizontal joints between successive courses of vertical siding.

E. Do not install siding less than 6 inches from surface of ground nor closer than 1 inch to roofs, patios, porches, and other surfaces where water may collect.

F. After installation, seal all joints except lap joints of lap siding. Seal around all penetrations. Paint all exposed cut edges.

G. Finish Painting: Specified in Section 09900.

3.03 PROTECTION

A. Protect installed products until completion of project.

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

END OF SECTION

SECTION 07631

GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pre-finished aluminum gutters and downspouts.

1.02 REFERENCE STANDARDS

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 1998.

B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.

C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2007.

D. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2003.

1.03 DESIGN REQUIREMENTS

A. Conform to SMACNA Architectural Sheet Metal Manual for sizing components for rainfall intensity determined by a storm occurrence of 1 in 5 years.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.

C. Product Data: Provide data on prefabricated components.

D. Samples: Submit two samples, illustrating component design, finish, color, and configuration.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.

B. Prevent contact with materials that could cause discoloration, staining, or damage.

1.06 PROJECT CONDITIONS

A. Coordinate the work with downspout discharge pipe inlet.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Gutters and Downspouts:
   1. Peterson Aluminum: www.pac-clad.com.
   2. Cheney Flashing Company: www.cheneyflashing.com.
   3. Perimeter Systems: www.perimeter-systems.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Pre-Finished Aluminum Sheet: ASTM B209 (ASTM B209M); 0.032 inch thick.
   1. Finish: Plain, shop pre-coated with modified silicone coating.

2. Color: As selected from manufacturer's standard colors.

2.03 COMPONENTS

A. Gutters: square style profile.

B. Downspouts: CDA Rectangular profile.

C. Anchors and Supports: Profiled to suit gutters and downspouts.
   1. Anchoring Devices: In accordance with CDA requirements.
   2. Gutter Supports: Brackets.
   3. Downspout Supports: Brackets.

D. Fasteners: Galvanized steel, with soft neoprene washers.

2.04 ACCESSORIES

A. Splash Pads: Precast concrete type, size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.

B. Downspout Boots: Plastic.

2.05 FABRICATION

A. Form gutters and downspouts of profiles and size indicated.

B. Fabricate with required connection pieces.

C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.

D. Hem exposed edges of metal.

E. Fabricate gutter and downspout accessories; seal watertight.

2.06 FACTORY FINISHING

A. Modified silicone polyester coating: Baked enamel system conforming to AAMA 603.8.

B. Primer Coat: Finish concealed side of metal sheets with primer compatible with finish system, as recommended by finish system manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.

END OF SECTION

SECTION 07900

JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sealants and joint backing.

B. Precompressed foam sealers.

1.02 RELATED REQUIREMENTS

A. Section 04810- Unit Masonry Assemblies.

B. Section 07260 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders:

1.03 REFERENCE STANDARDS

A. ASTM C 834 - Standard Specification for Latex Sealants; 2005.

B. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2005.

C. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2005a.

D. ASTM D2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for concrete Pavements; 1991 (Reapproved 2005).

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating sealant chemical characteristics.

C. Manufacturer's Installation Instructions: Indicate special procedures.

1.05 QUALITY ASSURANCE

A. Maintain one copy of each referenced document covering installation requirements on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

1.06 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.07 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.08 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Elastomeric Sealants:
   1. Bostik Inc: www.bostik-us.com.
   2. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com.
   3. Pecora Corporation: www.pecora.com.
   4. BASF Construction Chemicals-Building Systems: www.chemrex.com.

2.02 SEALANTS

A. General Purpose Exterior Sealant: Acrylic, solvent release curing; ASTM C920, Grade NS, Class 12-1/2, Uses M, G, and A; single or multi- component.
   1. Color: Standard colors matching finished surfaces, or paintable.
   2. Applications: Use for:
      a. Control, expansion, and soft joints in masonry.
      b. Joints between concrete and other materials.
      c. Joints between metal frames and other materials.
      d. Other exterior joints for which no other sealant is indicated.

B. Exterior Expansion Joint Sealer: Precompressed foam sealer; urethane with water-repellent;
   1. Size as required to provide weathertight seal when installed.
   2. Provide product recommended by manufacturer for traffic-bearing use.

C. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
   1. Applications: Use for:
      a. Interior wall and ceiling control joints.
      b. Joints between door and window frames and wall surfaces.
      c. Other interior joints for which no other type of sealant is indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Install bond breaker where joint backing is not used.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Tool joints concave.

G. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect sealants until cured.

END OF SECTION

SECTION 09900

PAINTS AND COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, varnishes, and other coatings.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:

D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.

1.02 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on all finishing products, including VOC content.

1.03 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the work as described in this section, with minimum three years experience.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. 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.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.05 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior coatings during rain or snow, when concrete is damp, or when relative humidity is outside the humidity ranges required by the 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 Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. Duron, Inc: www.duron.com.
   2. ICI Paints: www.icipaintsinna.com.
   3. Benjamin Moore & Co: www.benjaminmoore.com.

C. Substitutions: See Section 01600 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
   1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each coating material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:
   1. Provide coatings that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

2.03 PAINT SYSTEMS - EXTERIOR

A. Fiber cement trim (shop primed), Opaque, 2 Coat:
   1. Two coats of 100 % acrylic paint flat finish.

B. Masonry/Concrete, Opaque, Latex, 2 Coat:
   1. One coat of block filler.
   2. Semi-gloss: One coat of latex enamel; .
   3. Flat: One coat of latex enamel; .

PART 3 EXECUTION

3.01 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

3.02 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance.

D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16010- GENERAL PROVISIONS

PART 1 - GENERAL

1.01
SCOPE:

The scope of the electrical phase of this project shall include all labor, materials, equipment, etc., required to fulfill the intent of the Contract Documents and shall include the work specified under the following sections:

SECTION 16050- BASIC MATERIALS AND METHODS
SECTION 16400- SERVICE AND DISTRIBUTION
SECTION 16500- LIGHTING

1.02 RELATED DOCUMENTS:

All applicable provisions of Division 0 and 1 govern work under this division. Refer to these articles in the specifications for additional information.

1.03 REFERENCED STANDARDS:

1.03.1 All work shall be performed in accordance with the latest editions of the applicable state, national and local ordinances and building codes and in accordance with the National Electric Code.

1.03.2 Refer to each section for applicable codes and reference standards.

1.03.3 The provisions of the North Carolina Construction Manual shall apply to this project along with the requirements of the following agencies:

AEIC	American Association of Edison Illuminating Companies
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronic Engineers
NCCM	N.C. Construction Manual w/ G.S. as listed
NCSBC	N.C. State Building Code
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
UIL	Underwriters' Laboratories Inc.
OSHA	Occupational Safety and Health Standards

1.03.4 See below the THIRD PARTY AGENCIES ACCREDITED BY THE NCBCC TO

LABEL ELECTRICAL AND MECHANICAL EQUIPMENT. Strict adherence to this list is mandatory.

THIRD PARTY AGENCIES ACCREDITED BY THE NCBCC TO LABEL ELECTRICAL AND MECHANICAL EQUIPMENT AS OF JULY 1, 2006

Applied Research Laboratories 5371 Northwest 161st Street Miami, Florida 33014 (305) 624-4800	Equipment Categories: 6,8, 12, 14, 15, 16, 18, 21, 22, 24, 31, and 43
CSA International 178 Rexdale Boulevard, Toronto, Ontario, Canada M9W IR3 (416) 747-2798	Equipment Categories: All
Entela, Inc. 3033 Madison Avenue SE Grand Rapids, Michigan 49548 (616) 247-0515	Equipment Categories: 11, 12 ,26,2 7,28,2 9,3 1,4 0, 43,47 &48
Factory Mutual Research PO Box 9102 Norwood, Massachusetts 02062 (781) 762-4300	Equipment Categories: 4 ,5 ,9 , 17, 19 ,24 ,28, 31,32, 39,4 3, 4 7 - 5 1
Intertek Testing Services ITS-ETL 3933 US Route 11 Cortland, NewYork 13045-2014 (607) 753-6711	Equipment Categories: All except 21
Intertek Testing Service ITS-Warnock 3933 US Route 11 Cortland, New York 13045-2014 (607) 753-6711	Equipment Categories: 17, 18, 21, 24 & 25
MET Laboratories 2200 Gateway Centre Blvd., Suite 215 Morrisville, NC 27560 (919) 481-9319	Equipment Categories: 7, 10, 11, 12, 13, 14, 15, 16, 18, 22 ,23 ,26, 27, 28, 29, 30 ,31 ,37, 38, 39, 40, 43, 44, 47, 48 and 50

National Technical Systems (NTS)
533 Main Street
Acton, Massachusetts 01720
(978) 263-2933

Equipment Categories:
26, 27 & 28

Omni-Test Laboratories
PO Box743
Beaverton,Oregon 97075
(503) 643-3788

Equipment Categories:
17, 18, & 21

PFS Corporation
2402 Daniels Street
Madison, Wisconsin 53718
(608) 221-3361

Equipment Categories:
17, 19, 20, 21 & Replacement
Blowers & coils

RADCO
3220 East 59th Street
Long Beach, California 90805
(310) 272-7231

Equipment Categories:
17, 18 & Replacement
Blowers and coils

TUV America
65 T. W. Alexander Dr.
RTP, North Carolina 27709
(800) 888-0123

Equipment Categories:
4-8, 10-20, 22, 23, 26-29, 31' 35,
36, 38, 39, 43, 46-48 & 50

TUV Rheinland of North America
762 Park Avenue
Youngsville, North Carolina 27596
(919) 554-3668

Equipment Categories:
7,8 ,9, 11, 12, 13, 14, 16,
26, 27, 28, 31' 40, 43, 47 & 48

Underwriters Laboratories, Inc.
12 Laboratory Drive
RTP, North Carolina 27709
(919) 549-1400

Equipment Categories:
All

Wyle Laboratories
7800 Highway 20 West
Huntsville, Alabama 35806
(256) 837-4411 x4125

Equipment Categories:
4, 26 & 43

EQUIPMENT CATEGORIES

1. Conductors for General Wiring.
2. Flexible Cords.
3. Wires and Cables for Special Applications.
4. Materials and Components for Special Applications.
5. Alarm Signal and Detecting System Components.
6. CATV and Radio Distribution System Components.
7. Communication System Components.
8. Radio and Television Components.
9. Energy Management System Components and Controllers.
10. Sound Recording and Reproduction Equipment.
11. Fixed Office Appliances and Business Equipment.
12. Electrical Appliances.
13. Electric Space Heating Equipment and Accessories.
14. Air Conditioning Equipment and Accessories.
15. Heat Pump Equipment and Accessories.
16. Refrigerant Equipment and Accessories.
17. Gas Fired Heating Equipment and Accessories.
18. Gas Fired Appliances.
19. Oil Fired Heating Equipment and Accessories.
20. Oil Fired Appliances.
21. Solid Fuel Heating Equipment.
22. Fans and Ventilators.
23. Filtering Equipment.
24. Duct Materials Including Dampers.
25. Chimneys and Vents.
26. Electrical Data Processing Equipment.
27. Medical, Dental, and X-Ray Equipment.
28. Laboratory Equipment, Electrical Measuring, and Testing Equipment.
29. Food Preparation Machines.
30. Swimming Pool and Spa Equipment.
31. Miscellaneous Fixed Equipment- Amusement Machines, Animal Care, Appliances, Battery Chargers, Cleaning Machines, etc.
32. Fire Extinguishing Equipment.
33. Circuit Breakers.
34. Fuses.
35. Wiring Devices, Attachment Plugs and Toggle Switches.
36. Switches and Switching Devices- Other than Toggle.
37. Panelboards.
38. Switchboards.
39. Transformers.
40. Electrical Signs and Accessories.
41. Ground-Fault Circuit Interrupters.
42. Ground-Fault Sensing and Relaying Equipment.

43. Industrial Control Equipment - Motor Controllers, Industrial Control Panels, Motor Control Centers, Motorized Valves, Solenoids, etc.
44. Trans ient Voltage Surge Suppressors and Filters.
45. Lightning Protection System Components and Lightning Protection Devices.
46. Metering Enclosures and Meter Sockets.
47. Emergency Lighting and Power Equipment System Components.
48. Lighting Fixtures, Lamp Holders, and Accessories.
49. Auxiliary Gutters, Junction, Pull and Outlet Boxes, and Cabinets and Cutout Boxes.
50. Electrical Equipment for Hazardous Locations.
51. Grounding and Bonding Equipment.
52. Wire Connectors, Lugs, and Terminal Fittings.
53. Insulating Tape and Closures.

1.04 FEES, PERMITS AND TAXES:

This Contractor shall make arrangements for and pay for all inspection fees and permits required by the local authorities. The Contractor shall also pay all taxes levied for labor and materials associated with work under this Division. It shall be the electrical contractor's responsibility to notify the Office of Electrical Inspector, D epartment o f Insurance, to schedule all required electrical inspections.

1.05 SUBMITTALS:

1.05.1 The symboi"<S>" indicates a requirement for submittals.

1.05.2 Shop drawings, manufacturer's data materials lists, etc., are required for all equipment and material where submittals are required.

1.05.3 Refer to "General Conditions" and/or "Instructions to Bidders" for additional information on submittals.

1.05.4 Submittals shall be presented from published manufacturer's data and in such a form that the Engineer can readily verify compliance with c odes, s tandards, and the Contract Documents including construction features, rough-in requirements, etc. Each submittal shall contain data relevant to the particular equipment (including options). The data shall be identified by "hy-liteing", arrows, underlining, etc. Do not submit pages of non-relevant information. Broad general data is not acceptable. If equipment submitted is not as specified in the Contract Documents, then the submittal shall contain specific details prominently identifying any differences in form, fit or function. T his contractor is responsible for any additional costs arising from any substitution of any item.

1.06 OPERATING AND MAINTENANCE MANUALS AND INSTRUCTIONS:

1.06.1 The symbol "<OM>" indic ates that operating and maintenance manuals are to be furnished.

1.06.2 Each operating and maintenance manual shall apply specifically to the equipment installed. In those cases where one manual covers a general class of equipment, the contractor shall be required to identify (hy-liteing, underlining, etc.) those portions which apply to the installed equipment. All operating and maintenance manuals shall be available for inspection by the Architect/Engineer at the final inspection.

1.06.3 Provide (3) three copies of operating and maintenance manuals. Manuals shall be

bound in large ring loose-leaf binders and contain the following:

a. Manufacturer's instructions and/or installation manual.
b. Additional items that may be required in Division 1.

1.07 PRIOR APPROVAL:

Where the c ontractor wishes to substitute equipment or materials under an "or equal" clause, he shall submit to the Engineer in writing seven (7) calendar days prior to bid opening lists of proposed substitutions which, from published manufacturer's data, cover the salient features of the proposed substitution. Approvals will be issued in writing.

1.08 DEFINITIONS: The following words and phrases are hereby defined:

1.08.1 "provide": Furnish and install all material and labor required for a complete installation ready for operation in accordance with the intent of the Contract Documents.

1.08.2 "as required": Indicates that the contractor shall perform the work or provide the material as indicated in accordance with m anufacturer's installation instructions and in accordance with applicable codes or regulations.

1.08.3 "or equal": Indicates that the contractor may substitute equipment by another manufacturer if the salient features of the equipment indicated by manufacturer's name and/or described are, in the judgment o f the Architect, adequate. See article PRIOR APPROVAL.

1.08.4 "contractor": Where the word(s) "contractor" or "this contractor" is used herein it refers to the contractor engaged to execute the work under this division of the specifications only, even though he may be technically described as a sub-contractor.

1.08.5 "Intent of the Contract Documents": The specific intent of these documents is to provide to the owner, in a thoroughly functional condition, all the various systems, equipment, etc., indicated herein. Final interpretation of the "intent" shall rest with the Engineer.

1.08.6 "shall": Indicates a mandatory requirement.

1.09 INSPECTION OF THE SITE:

1.09.1 The drawings are prepared from th e best information available and re flect all conditions commensurate with this information. However, the contractor should visit the site prior to submitting a proposal and should verify the locations, sizes, depths, pressures, etc., of all existing utilities and familiarize himself with working conditions, hazards, existing grades, soil conditions, obstructions, etc. If it becomes evident that existing site conditions will impair the proper operation of the utilities, the Architect shall be notified in writing.

1.09.2 All proposals shall take these existing conditions and any revisions required into consideration, and the lack of specific site information on the drawings shall not relieve the contractor of any responsibility

1.10 CONSTRUCTION SAFETY:

This Contractor assumes all responsibility for the safety of his personnel on the project

during construction. The Contract Documents do not include materials, procedures, components, etc., required to insure construction safety. Refer to General Conditions for additional information.

1.11 DAMAGE:

1.11.1 This Contractor shall be responsible for damage to the project caused by this Contractor's failure to recognize hazards associated with items such as lack of power, scheduling of work (tardiness), inexperienced workmen, excessive cutting, etc.

1.11.2 This Contractor shall repair at no expense to the owner any such damage.

1.11.3 This Contractor shall familiarize himself with working conditions to the extent that he shall be responsible for damage to concealed piping, wiring and other equipment meant to remain, and shall repair any damage caused by his negligence at no cost to the owner.

PART 3 - EXECUTION

3.01 WORKMANSHIP:

3.01.1 All work shall be done by experienced craftsmen skilled in the applicable trade.

3.01.2 Unprofessional and incomplete work shall be rejected and corrected at no additional expense.

3.02 MANUFACTURER'S INSTALLATION INSTRUCTIONS:

3.02.1 All equipment shall be installed in strict compliance with manufacturer's installation instructions.

3.03 PROTECTION OF EQUIPMENT:

3.03.1 The Contractor shall continuously maintain adequate protection of stored materials and installed equipment. Fixtures and equipment, whether located inside or outside, shall be tightly covered with sheet polyethylene or waterproof tarpaulin as protection against dirt, rust, moisture and abuse from other trades. Adequate air circulation shall be provided under any protective sheet to prevent condensate build up. Materials and equipment shall not be stored directly on the ground.

3.03.2 Ductwork, piping, conduit and equipment shall not be used by other trades as supports for scaffolds or personnel. At the completion of the work, equipment, fixtures, exposed supports and piping shall be cleaned of loose dirt, construction debris, overspray, etc., to the satisfaction of the Engineer. Repairs made necessary by damage shall be paid for by the Contractor.

3.03.3 All equipment and conduit furnished and installed under this contract shall be seismically restrained as required by Chapter 16, STRUCTURAL DESIGN, in the North Carolina State Building Code, 2009 Edition, with specific attention to Section 1613, EARTHQUAKE LOADS. These seismic load provisions are also required in Chapter 13 of the American Society Civil Engineers' publication ASCE 7, 2005 Edition. The Electrical Contractor shall include in his/her bid price the cost to accomplish all requirements of the aforementioned code.

3.04 CONFLICTS, INTERFERENCES AND COORDINATION BETWEEN TRADES:

3.04.1 The drawings are not to be construed as shop drawings but indicate the extent, general locations, arrangement, etc., of conduit systems and equipment. If the contractor has any questions regarding the layout of a particular device or equipment item he shall contact the architect for clarification. This Contractor shall, in laying out his work, refer to other sections of the specifications and other drawings such as air conditioning, structural, plumbing, architectural, etc., in order to eliminate conflicts and undue delays in the progress of the work. See article CUTTING AND PATCHING for additional coordination required. Where items are furnished by other trades require connections by this Contractor, they shall be held responsible for providing rough-in drawings and assistance upon request.

3.04.2 All work shall be closely coordinated with other trades. Failure to do so could result in the relocation of installed work of the contractor at fault at his/her own expense.

3.04.3 In the event of interferences, piping or equipment requiring set grades or elevations shall have precedence over conduit, lighting, outlet boxes, air conditioning, ductwork, etc.

3.04.4 In the event of conflicts between specifications and drawings, specifications shall take precedence over drawings.

3.04.5 In the event of conflict between codes as interpreted by th e authority having jurisdiction, and the contract documents, the codes shall govern.

3.04.6 In the event of a conflict between manufacturer's installation instructions and the drawings,the manufacturer's installation instructions shall govern.

3.04.7 In all events, the intent of the Contract Documents shall govern. Minor conflicts and interferences shall, wherever possible, be worked out on the project. Major conflicts shall be referred to the Architect for solution.

3.04.8 Where electrical wiring is required by trades other than covered by Division 16, the installer shall refer to the wiring materials and methods as specified under Division 16, No Exceptions.

3.05 CUTTING AND PATCHING:

3.05.1 All cutting required by the installation of sleeves, conduit, equipment, etc., shall be coordinated with the General Contractor, but performed by this Contractor. Patching shall be by General Contractor. Thi s Contractor shall not cut any structural element or any finished work without written permission from the Architect.

3.05.2 This Contractor shall cut and patch all paving/concrete as required by the installation of buried conduit or wire.

3.06 PAINTING:

3.06.1 All painting except "touch-up" shall be provided under the painting section (Division 9) unless noted otherwise. All exposed conduit, equipment, etc., shall be left clean and free from rust or grease and ready for the painter.

3.06.2 Where equipment finishes are damaged, this Contractor shall obtain touch-up paint in matching colors from the equipment manufacturer and paint as required.

3.07 DIVISION OF WORK:

3.07.1 A ll individual motor starters and drives for mechanical equipment (fans, pumps, etc.) shall be furnished and installed under Division 15, except where noted differently on the plans.

3.07.2 Division 16 is responsible for providing power wiring up to a termination point adjacent to mechanical equipment. This termination point may consist of a junction box, starter, drives, disconnect switch, etc. Line side termination to this equipment shall be supplied by the electrical contractor. Wiring from the termination point to the mechanical equipment, including final connections, shall be provided under Division 15.

3.07.3 Duct smoke detectors shall be furnished and wired by Division 16, installed by Division 15. Shut down circuits shall be wired from the fire alarm control panel to a termination point, adjacent to the AHU control, under Division 16. AHU control wiring from the termination point to the equipment shall be under Division 15.

3.07.4 All relays, actuators, timers, and miscellaneous other devices associated with equipment under Division 15 shall be furnished, installed and wired under Division 15.

3.07.5 All control wiring shall be by Division 15.

3.07.6 All roof exhaust fan motors shall be wired to built-in disconnects provided under Division 15, except where noted differently on the plans.

3.07.7 All control and interlock wiring shall be performed by the respective contractors, except where noted on plans.

3.08 FLASHING AND WATERPROOFING:

All building penetrations to the outside shall be flashed and counter-flashed as required to eliminate leaks.

3.09TESTS:

See Section 16050 for required tests.

3.10 CLEAN-UP:

Where all work has been finally tested, this Contractor shall clean all work installed by him, including all fixtures, equipment, and all exposed work.

END OF SECTION

SECTION 16050 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SCOPE:

Work of this Section shall include specification of electrical devices to be used in subsequent sections and shall include the following principal items:

Raceways
Wires and Cables
Outlet and Junction Boxes
Wiring Devices
Device Plates
Mounting Heights
Identification and Nameplates

1.02 REFERENCED STANDARDS

NFPA 70 - National Electrical Code
NFPA 101 -Life Safety Code

PART 2 - PRODUCTS

2.01 ABOVE GROUND RACEWAYS:

2.01.1 All wiring indicated including power wiring, emergency systems wiring (NEC Article 700), temperature control wiring, communication wiring where indicated, etc., shall be in separate raceways. All wiring shall be in raceway. BX, MC, AC, NM and other cable assemblies shall not be used.

2.01.2 Flexible metal conduit may be used for final connections to recessed ligh ting fixtures and shall be used for final connections to motors and transformers. Maximum length permitted is 72 inches. Use "liquid-tight" type for outdoor installations.

2.01.3 Conduit shall be sized in accordance with the latest edition of the NEC unless shown otherwise, with minimum conduit size being 1/2 inch. Flexible metal and watertight ("sealtite") conduit in sizes 1/2 inch and larger are acceptable for motor, appliance and fixture connections provided green wire is installed and NEC is followed.

2.01.4 Conduit, exposed and concealed (except "in slab" conduits), shall be neatly installed parallel to, or at right angles to beams, walls and floors of buildings.

2.01.5 Conduit types may be utilized as permitted by the NEC, with the following restrictions:

a. EMT shall not be installed where tubing, couplings, elbows and fittings would be in direct contact with the earth; underground (in/below slab-on-grade or in earth); or any location where the tubing, etc., would be exposed to the elements.

b. EMT shall not be installed where exposed to severe corrosive influence.

c. EMT shall not be installed where exposed to severe physical damage.

2.01.6 The raceway system shall not be relied upon for grounding continuity.

2.01.7 The use of "LB's" shall be limited where possible. Where necessary to use "LB's" sized above 2 inch, mogul units shall be installed.

2.01.8 PVC Schedule 40 shall not be used.

2.01.9 Metal surface raceways equal to Wiremold shall be used at existing construction where concealment is impractical. Acceptable manufacturers: Wiremold, Panduit and National.

2.02 UNDERGROUND RACEWAYS:

2.02.1 Raceways run external to building foundation walls, with the exception of branch circuit raceways, shall be encased with a minimum of three (3) inches of concrete on all sides.

a. Encased raceways must have a minimum cover of eighteen (18) inches, except for raceways containing circuits with voltages above 600 volts, which must have a minimum cover of thirty (30) inches.

b. Encased raceways shall be of a type approved by the NEC as "suitable for concrete encasement."

2.02.2 Branch circuit raceways run underground external to building foundation walls shall be run in raceways installed in accordance with the NEG, and shall be of a type approved by the NEG as "suitable for direct burial." Minimum raceway size shall be 3/4 inch.

2.02.3. All underground raceways shall be identified by underground line marking tape located directly above the raceway at 6 to 8 inches below finished grade. Tape shall be permanent, bright-colored, continuous printed, plastic tape compounded for direct burial not less than 6 inches wide and 4 mils thick. Printed legend shall be indicative of general type of underground line below.

2.02.4. Raceways run underground internal to building foundation walls shall be of a type and installed by a method approved by the NEG.

2.02.5. At all locations where underground raceways are required to turn up in the slab, including poles bases, the elbow required and the stub-up out of the slab or earth shall be of rigid steel.

2.02.6. The raceway system shall not be relied on for grounding continuity.

2.02.7. Where passing through a "below grade" wall from a conditioned interior building space, raceways shall be sealed utilizing fittings similar and equal to OZ/GEDNEY type "FSK" thru-wall fitting with "FSKA" membrane clamp adapter if required.

2.03 TERMINATION

2.03.1 IMC and GRC shall terminate with either a double locknut/bushing set, or in a threaded hub.

2.03.2 Where concentric, eccentric or over-sized knockouts are encountered, a grounding-type insulated bushing shall be provided.

2.03.3 EMT te rminations shall be made utilizing steel-plated hexagonal compression connectors of the insulated throat type. NO POT METAL or INDENTED type fittings shall be utilized.

2.03.4 EMT terminations shall be concrete tight where buried in masonry or concrete. EMT fittings, where installed in damp locations, shall be the rain tight type.

2.04 CONDUIT COUPLINGS

2.04.1 Where conduits of any type pass over a building expansion joint, a standard "expansion joint fitting", compatible with the type raceway in use, shall be provided.

2.04.2 Conduit couplings for IMC, GRC and PVC shall be in accordance with NEC.

2.04.3 EMT couplings shall be of the plated steel hexagonal compression type. No pot metal, set screw or indented type couplings shall be utilized.

2.04.4 EMT couplings shall be concrete tight where buried in masonry or concrete. EMT couplings, where installed in damp locations, shall be of the rain tight type.

2.05 BUILDING WIRES AND CABLES (600 VOLTS AND LESS)

2.05.1 Provide all wiring as indicated and/or required to each piece of equipment, wiring device, lighting fixture, etc. Provide control/interlock wiring as described in Section 16010.

2.05.2 All wire sizes specified shall be in accordance with and designated by AWG (American Wire Gauge).

2.05.3 Copper conductors equal to A naconda, Phelps-Dodge, Southwire or Genera l Electric shall be used throughout unless specifically noted otherwise. The design is based on copper conductors only.

2.05.4 No aluminum conductors may be used on this project.

2.05.6 Color coding of conductor insulation shall be uniform throughout the project. The secondary service, feeders and branch circuits shall be color coded as follows:

	120/208 volts	277/480 volts
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Natural Gray
Ground	Green	Green

No other colors may be used for branch circuits. Main feeders must be taped at panelboard terminations. From left to right, the first bus in each panel shall be phase "A", middle "B", and right bus "C".

2.05.7 All wire and cable shall be listed by an approved third party testing agency.

2.05.8 Conductors

a. Power and lighting circuits #10 AWG and smaller shall have solid copper conductors. Conductor sizes #8 AWG and larger shall have Class B stranded conductors.

1. Fire alarm and control wiring shall have stranded copper conductors.

b. The minimum conductor size for all power and lighting circuits shall be #12 AWG. The maximum conductor size allowed shall be 500 kcmil.

1. Fire alarm and control wiring shall be #14 AWG minimum.

2.05.9 Insulation

a. The insulation type for interior wiring shall be dual-rated THHN/THWN.

2.05.10 Voltage Drop

a. Where conductor lengths from the panel to the first outlet on a 277v circuit exceeds 125 feet, the branch circuit conductors form the panel to the first outlet shall not be smaller than #10 AWG.

b. Where the conductors length from the panel to the first outlet on a 120v circuit exceeds 50 feet, the branch circuit conductors from the panel to the first outlet shall not be smaller than #10 AWG.

2.05.11 Splicing

a. Joints in solid conductors shall be spliced using Ideal "wirenuts", 3M Company "Scotchlock" of T&S "Piggy" connectors in junction boxes, outlet boxes and lighting fixtures.

b. "Sta-kon" or other permanent type crimp connectors shall not be used for branch. circuit connections.

c. Joints in stranded conductors shall be spliced by approved mechanical connectors and g um rubber tape or friction tape. Solderless· mechanical connectors for splices and taps, provided with UL-approved insulating covers, may be used instead of mechanical connectors plus tape.

d. Conductors, in all cases, shall be continuous from outlet to outlet and no splicing shall be made except within outlet or junction boxes, troughs and gutters.

2.06 OUTLET AND JUNCTION BOXES:

2.06.1 Provide metallic galvanized boxes per the NEC at each outlet location indicated on the drawings or as required.

2.06.2 Boxes at exterior locations shall be cast aluminum with threaded hubs and gasketed in-use type covers.

2.06.3 The owner reserves the right to make minor adjustments to the locations of outlet boxes prior to rough-in.

2.06.4 Sizes and configuration of boxes shall be as required for the intended service and shall conform to and be applied in accordance with the NEC Provide extension rings, expandable bars sets, supports, gaskets for weatherproof type, where required. Boxes shall be equal to Steel City with "CV" bracket or equal by Thomas & Betts or Arlington.

2.06.5 Gang type boxes shall be used where multiple wiring devices are located adjacent to one another, including cast in floor boxes.

2.06.6 Junction boxes shall not be installed above gypsum board ceilings or any location that is not accessible. If the conditions are such that this can not be avoided, the architect shall be notified for approval and this contractor shall supply and install all access panels as required for access to the junction box in question.

2.07 WIRING DEVICES

2.07.1 General: Provide wiring devices as indicated on drawings. Device color shall be ivory unless otherwise indicated. Each type of device on the project shall be of the same manufacturer and catalog number throughout.

2.07.2 Toggle Switches

a. Toggle switches shall be single pole, three-way, or four-way as indicated on the dr awings. Switches shall be of th e g rounding ty pe, with hex-head grounding screw, rated 20A, 120/277 volt, heavy duty, speCification grade, AC only. Lighted handle switches shall have neon lights of the correct voltage rating where indicated on the drawings.

b. All switches shall have quiet operating mechanisms without the use of mercury switches. The type switch shall be indicated on the drawings.

Single pole	-Hubbell HBL221
Double pole	-Hubbell HBL1222
3-way	- Hubbell HBL1223
4-way	- Hubbell HBL1224
Pilot light	- Hubbell HBL1221-PL

Acceptable manufacturers: Arrow Hart, Bryant, G.E., P & S, Hubbell, Cooper

2.07.3 Duplex receptacles:

a. Duplex receptacles shall be of the grounding type, arranged for back and side wiring, with separate single or double grounding terminals. Receptacles s hall be straight blade, rated 20A, 125 volt and the face configuration shall conform to the NEMA Standard No. WDI.101968. Self-grounding or automatic type grounding receptacles are not acceptable in lieu of receptacles with separate grounding screw lugs and a direct, green insulated conductor connection to the equipment grounding system.

b. Receptacles shall be industry heavy duty, specification grade, and be mounted vertically. Receptacles mounted over counters, back-splashes, etc., shall be mounted horizontally.

c. Provide the following and verify mounting height on site with GC & Architect.

Standard	Hubbell HBL5352
Ground fault	Hubbell GF5362
Clock hanger	Cooper 93632 SS plate w/recessed receptacle and integral clock hook.

Acceptable manufacturers: Arrow Hart, Bryant, G.E., P&S., Hubbell, Cooper

2.08 DEVICE PLATES

2.08.1 Cover plates for flush mounted wiring devices and for telephone outlets shall be type "302" stainless steel, standard size, single or ganged as shown on the drawings. Cover plate mounting screws shall be tamper proof screws and shall match the finish and material of the plate, and shall be furnished with the plate by th e plate manufacturer. Quantity of 2% spare cover plates of each type shall be provided to the owner.

2.08.2 Switch and receptacle cover plates on exposed work s hall be galvanized cast ferrous metal of Feraloy, standard size, and shall be single or ganged as indicated on drawings.

2.08.3 Exterior mounted switch and receptacle plates, and those noted to be weatherproof, PVC cover plates, standard size, single or ganged as indic ated on th e drawings, and shall be "approved" as "raintight while in use".

2.08.4 Plates on s urface mounted boxes not used in conjunction with surface metal raceway system shall be galvanized steel with 1/2" raised face and rounded edges.

2.08.5 Single multi-gang device plates shall be used where multiple devices occur.

2.08.6 Sectionalized plates will not be acceptable.

2.09 SUPPORTING DEVICES:

2.09.1 Conduit shall be supported in a method and at a spacing as approved by the NEC, except as described herein.

2.09.2 Conduit shall be supported by approved pipe straps or clamps.

a. Conduits installed on the interior of exterior building walls shall be spaced off the wall surface a minimum of 1/4 inch using "clamp-backs" or strut.

2.09.3 Pipe straps or clamps shall be secured by means of:

a. Toggle bolts on hollow masonry.

b. Metal expansion shields and machine screws, or standard pre-set inserts, on concrete or solid masonry.

c. Machine screws, or bolts on metal surfaces.

d. Wood screws on wood construction.

2.10 MOTOR AND CIRCUIT DISCONNECTS: <S>

2.10.1 Provide safety switches at each location indicated on the drawings or required by code. Switches shall be rigidly supported and properly aligned. Switches shall be equal to Square "D" type HD.

a. Switching mechanism shall be quick-make, quick-break mechanism with handle as integral part of the box. All current carrying parts shall be electroplated.

b. Enclosures shall be NEMA 1 for interior locations and NEMA 3R for exterior locations, and shall be of code gauge steel (galvanized for NEMA 3R) with baked enamel finish and shall have locking hasp.

c. Ratings, fusing provisions, poles, etc., shall be as indicated.

d. Safety switches shall be the "heavy duty" type. General duty switches are not acceptable.

e. Safety switches shall be third-party listed.

f. Switches shall have defeatable door interlocks that prevent the door from opening when the operating handle is in the "on" position.

g. Switches shall have handles whose positions are easily recognizable in the "on" or "off" position. Padlock shall be provided for switches located in public areas.

h. Switches shall have non-teasible, positive, quick make-quick break mechanisms.

i. Switches shall be properly labeled. See Article 3.05 of this Section, Electrical Identification.

2.10.2 General-use snap switches suitable only for use on AC shall be provided to disconnect 120, 208 or 240 volt motors, 2 horsepower or less where indicated. Switch ampere rating shall be 125% of motor full-load current.

2.10.3 Manual Motor Switches shall be provided as indicated. U nits shall have NEMA 1 surface mounted enclosures unless otherwise indicated. Switches not located adjacent to equipment served shall have pilot lights. Devices shall be equal to Square D type KG-1/2.

2.10.4 Refer also to Section 16010, article 3.07 for division of work between Division 15 and Division 16 trades.

Acceptable manufacturers: Square D, General Electric, Cutler Hammer, and Siemens.

2.11 GROUNDING AND BONDING:

2.11.1 Grounding conductors, where insulated, shall be colored solid green. Conductors intended as neutral shall be colored solid white on 120/208 volt circuits and neutral gray on 277/480 volt circuits.

2.11.2 The raceway system shall not be relied upon for ground continuity. A green grounding conductor, properly sized per NEC Table 250-122, shall be run in ALL raceways. Exceptions are as follows:

a. Raceways for telecommunications.

b. Raceways for data.

c. Raceways for audio conductors.

2.11.3 Boxes with concentric, eccentric or over-sized knockouts shall be provided with bonding bushings and jumpers. The jumper shall be sized per NEC Table 250-122 and lugged to the box.

PART 3 - EXECUTION

3.01 RACEWAYS:

3.01.1 Raceways shall be installed neatly racked, routed parallel or perpendicular to building lines, securely attached and supported. Installation shall conform to applicable sections of N.E.C. Article 342 through 360.

3.01.2 Concealed raceway shall be supported with galvanized stamped steel clamps secured to structure. Conduit shall not be used to support other conduit. Exposed raceways shall be secured to structure with galvanized stamped steel clamps or suspended from structure with beam clamps and conduit hangers.

Grouped raceways shall be supported with galvanized steel channel assemblies equal to Kindorf B-909 and single-bolt straps equal to Kindorf C-105.

Acceptable manufacturers: Unistrut, Power Strut, Globe Strut.

Raceway supports shall be spaced as follows:

a. rigid metal, IMC or EMT- within 3' of termination or connection & 10' on ctr.
b. rigid nonmetallic - per NEC paragraph 352.3.
c. flexible nonmetallic- per NEC paragraph 356.3.

3.01.3 Raceways shall be concealed where possible in finished areas, and may be exposed in mechanical/electrical equipment rooms.

3.01.4 Provide expansion fittings in all conduits crossing an expansion joint. Fittings shall be O.Z. type "EX" for rigid metal conduit or IMC, and O.Z. type "TX" for EMT. Metallic

conduit not containing a grounding conductor shall have O.Z. type "BJ" bonding jumpers installed across expansion joists.

Acceptable manufacturers: Bumdy, ITT Blackburn, Thomas & Betts, Anderson.

3.01.5 Pull boxes shall be provided as required for long runs and where excessive turns are encountered.

3.01.6 Grade raceways away from service entrance equipment to prevent water damage.

3.01.7 All conduit penetrations through fire rated ceilings, walls or floors shall be fire stopped using approved materials to maintain the fire rating of the ceiling, wall or floor structure. All penetrations through smoke portions shall also be sealed using approved materials.

3.02 WIRES AND CABLES:

3.02.1 All splices, taps, connections, terminations, etc., shall be made with appropriate connectors in a workmanlike manner and in compliance with the N.E.C.

3.02.2 All home runs shall be #12 or larger as indicated. No wire smaller than #12 shall be permitted serving lighting or outlets. Also refer to Article 2.05.10 of this section.

3.02.3 Provide suitable split-wedge cable supporting devices in each conduit riser, as required to properly support vertical cables.

3.03 OUTLET AND JUNCTION BOXES

3.03.1 Outlet and Junction Boxes shall be installed in a workmanlike manner, rigidly supported and properly aligned. Unless otherwise noted, boxes shall be flush with finished surfaces.

3.03.2 In masonry walls, rough-in boxes at joints.

3.03.3 Do not rough-in boxes back-to-back.

3.04 MOUNTING HEIGHTS:

Wiring devices & other equipment shall, unless noted otherwise, be mounted as follows:

Fire alarm signals:	Minimum 80" above floor to the bottom, maximum 96" above floor to the top of the device. Verify on-site with Architect.
Fire alarm stations:	4'-0" above floor on center.
Receptacles:	18" above floor or 6" above working surface on center unless noted otherwise on plan.
Switches:	4'-0" above floor on center (OC).

Data / Telephone outlets: Same as receptacles. Wall phones at 54" above floor OC.

Panelboards: 6'-6" to the top of the panelboard above finished floor.

3.05 IDENTIFICATION AND NAMEPLATES:

3.05.1 Furnish and install engraved laminated phenolic "bakelite" nameplates for all safety switches, panelboards, transformers, switchboards, motor control centers and other electrical equipment supplied for the project. The nameplate shall identify the equipment, how it is controlled, where it is served from, phase, voltage, etc. Nameplates shall be securely attached to equipment with self-tapping stainless steel screws, and shall identify equipment controlled, attached, etc. Letters shall be approximately 1/2 inch high, minimum. Embossed, self-adhesive plastic tape is not acceptable for marking equipment. Nameplate material colors shall be:

Blue surface with white core for 120/208 volt equipment

Black surface with white core for 277/480 volt equipment

Bright red surface with white core for all equipment related to fire alarm system

Dark red (burgundy) surface with white core for all equipment related to security

Green surface with white core for all equipment related to "emergency" systems

Orange surface with white core for all equipment related to telephone systems

Brown surface with white core for all equipment related to data systems

White surface with black core for all equipment related to paging systems

Purple surface with white core for all equipment related to TV systems

3.05.2 All empty conduit runs and conduit with conductors for future use shall be identified for use and shall indicate where they terminate. Identification shall be by tags with string or wire attached to conduit and outlet.

3.05.3 All outlet boxes, junction boxes and pull boxes shall have their covers and exterior visible surfaces painted with colors to match the surface color scheme outlined above. This includes covers on boxes above lift-out and other type accessible ceilings.

3.06 ELECTRICAL TESTING:

3.06.1 FE EDER INSULATION RESISTANCE TESTING

a. All current carrying phase conductors and neutrals shall be tested as installed, and before connections are made, for insulation resistance and accidental grounds. This shall be done with a 500 volt megger. The procedures listed below shall be followed:

1. Minimum readings shall be one million (1,000,000) or more ohms for #6 wire and smaller, 250,000 ohms or more for #4 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 to the panel and until the low readings are 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. The contractor shall send a letter to the engineer certifying that the above has been done and tabulating the megger readings for each panel. This shall be done at least four (4) days prior to final inspection.

4. At final inspection, the contractor shall furnish a megger and show the engineer that the panels comply with the above requirements, He shall also furnish a hook-on type ammeter and a voltmeter and take current and voltage readings as directed by the representatives.

3.06 .2 DOCUMENTATION

a. All tests specified shall be completely documented indicating time of day, date, temperature and all pertinent test information.

b. At final inspection, the contractor shall furnish a megger and show th e engineer's representative that the panels comply with the above requirements. He shall also furnish a hook -on type am meter and a voltmeter, taking current an d voltage readings as directed by the engineer.

c. All required documentation of readings indicated above shall be submitted to the engineer prior to, and as one of the prerequisites for, final acceptance of the project.

END OF SECTION

SECTION 1640 0- SERVICE AND DISTRIBUTION

PART 1 - GENERAL

1.01 SCOPE:

Work of this Section shall be in accordance with the intent of the Contract Documents and shall include the following principal items:

Service
Service Equipment
Duct Bank
Panelboards
Equipment Grounding
Fuses
Surge Protection Device (SPD)
Electrical Load Balancing

1.02 REFERENCED STANDARDS:

NFPA 70- National Electrical Code
NFPA 101 - Life Safety Code

PART 2 - PRODUCTS

2.03 PANELBOARDS <S>

2.03.1 Provide panelboards rated and sized as indicated in the schedule and shown on the plans equal to Square D Company Model NQOD for services up to 240 volts; Model NEH for services up to 480 volts; and "1-Line" for power distribution panels.

2.03.2 Construction features s hall include m inimum 5" wide gutters, dead front construction, electroplated current carrying parts; UL listed terminals suitable for conductors specified; flush front hinged "door-in-door" construction with cylinder tumbler type locks (all keys alike); circuit directory and frame, code gauge steel, galvanized and baked enamel finish.

2.03.3 Circuit breakers shall be bolt-on type QOB (NQO panelboards), type EHB (NEH panelboards), and type FY and FA (1-line panelboards). Breakers shall be toggle action with quick-make, quick-break mechanism. T rip indication shall be by breaker handle taking a position between ON and OFF. All multi-pole breakers shall be common trip with a single handle. Minimum interrupting rating of breakers shall be as indicated.

2.03.4 Panelboards and fused disconnects identified for use as service equipment shall be labeled as service equipment. Panel bus bars shall be copper. A typed directory card shall be supplied with each panel and it shall be mounted on the door interior. The directory shall indicate what each circuit powers to include room names and specific equipment. Load centers are not acceptable. G.E. Type "A" panels shall be provided with screw

covers.

Acceptable manufacturers: SquareD, General Electric and Siemens.

2.04 EQUIPMENT GROUNDING

The electrical equipment in the new building shall be grounded per NEG 250.32 and as follows.

a. To the metallic cold water pipe.

b. To the steel frame of the building, provided the building frame is effectively grounded.

c. To ground rods (min. of 2). Ground rods shall be 10 feet long and 3/4 inch in diameter, and shall be of copper-clad steel construction. All ground connections shall be accessible.

d. To the concrete encased electrode (footing rebar).

Refer also to testing requirements listed in 3.03 of this section.

2.05 FUSES (600VOLTS OR LESS <S>

2.05.1 Fus es shall be so selected as to provide a fully selective system.

2.05.2 The following criteria shall be followed for fuse selection:

CIRCUIT TYPE	FUSE TYPE
Service Entrance & Feeder Circuits 600A& less	Class RK1 or J U/L listed, current limiting with 200K Amp interrupting rating.
Motor, motor controller & Transformer circuits	Class RK5 UIL listed, current limiting time delay, w/200K Amp AIC
Individual Equipment where fault current does not exceed 50 KA	Class K5 UIL listed, with 50 KA interrupting rating.

The contractor shall provide 10% of each fuse size (size and type) required by the project (with a minimum of one set as spares) to the owner upon completion.

2.05.3 Fusible safety switches with short-circuit withstand ratings of 100K Amp or 200K Amp require Class R or Class J rejection fuse block feature. (Compliance with NEG Article 110-9 and 240-60b.)

PART3 - EXECUTION

3.01 ELECTRICAL LOAD BALANCING

3.01.1 The Contractor shall balance electrical loads at each panel so that neutral current flow is reduced to the lowest possible level and all phase conductors (A, B & C) are as equally balanced as possible. Contractor shall relocate circuit breakers or individual branch circuits as required to accomplish electrical load balance.

3.02 CIRCUIT BREAKER TESTING:

For services 1000 amperes and larger, the following tests should be performed on the service circuit breakers and the distribution circuit breakers. On site testing shall be performed by a qualified factory technician. All readings shall be presented in tabulated format.

a. Phase tripping tolerance (within 20% of U/L requirements).
b. Trip time (per phase) in seconds.
c. Instantaneous trip (amps) per phase.
d. Insulation resistance (in mega ohms) at 100 volts (phase to phase and line to load).

3.03 GROUND SYSTEM TESTING:

Upon completion of installation of the electrical grounding and bonding systems, the ground resistance shall be tested with a ground resistance tester. Where test 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 grounding and bonding system shall then be retested.

END OF SECTION

SECTION 16500 - LIGHTING

PART 1: GENERAL

1.01 SCOPE:

Work of this Section shall include the following items:

Interior fluorescent
Exterior fluorescent
Exterior HID
Occupancy Sensors

1.02 REFERENCED STANDARDS

NFPA 70 - National Electrical Code
NFPA 101 -Life Safety Code

PART 2 - PRODUCTS

2.01 LIGHTING FIXTURES AND LAMPS <S>

2.01.1 Provide fixtures including interior and exterior fixtures as indicated on the plans and described in the schedule. Acceptable manufacturers: Thomas, Hubbell, Cooper

2.01.2 Fixtures shall be complete with lamps as indicated, ballasts, internal wiring, brackets, fittings, lenses, louvers, guards, reflectors, pole supports and accessories as required, indicated or detailed.

2.01.3 Ballasts for HID fixtures shall be high power factor constant wattage autotransformer type.

2.01.4 Lamps shall be provided as indicated in the schedule. Nomenclature is based on General Electric lamp code numbers. Comparable lamps by Westinghouse, Philips, Norelco, or Sylvania are acceptable.

2.01.5 All battery packs supplying emergency lighting fixtures shall be capable of sustained operation for at least 90 minutes without any degradation in performance and without going into deep cell discharge. See additional requirements below:

a. When the fixture is powered by the battery pack, at least one third of the normal light output shall be available for emergency lighting.

b. All emergency lights shall have a lighted push-to-test button clearly visible and accessible.

c. All battery packs shall be NICAD unless noted otheiWise on the plans.

2.01.6 EMERGENCY EXIT LIGHTING FIXTURES

a. The Exit light fixtures shall be completely self-contained and be provided with a maintenance-free battery and automatic charger. The fixtures must be third-party listed as emergency lighting equipment and meet or exceed the following standards: National Electrical Code, N.C. Building Code, NC 2009 Energy Conservation Code, NFPA-101 and NEMA Standards.

2.01.6.1 BATTERY

a. The battery shall be a sealed, maintenance-free type with a minimum of 90 minutes operating time. It shall have a life expectancy of 10 years. It shall be a high temperature type with an operating temperature range of 0 to 60 degrees C. The battery shall contain a resealable pressure vent, a sintered (+) positive terminal and (-) negative terminal.

2.01.6.2 CHARGER

a. The charger shall be a current limiting, full wave rectifying, fully automatic solid state type. The 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 percent. If a LEAD battery is used, a low voltage disconnect switch shall be included to disconnect the battery from the load and prevent damage from a deep discharge during extended power outage.

2.01.6.3 ADDITIONAL FEATURES

a. The unit shall have a pilot light to indicate the unit is connected to AC power. The battery shall have high rate charge pilot light, unless it is a self-diagnostic type. A test switch is also required to simulate the loss of power.

2.01.6.4 WARRANTY

a. The entire unit shall be warranted for three years with an additional two more years of pro-rated warranty for the battery. The warranty shall start the date of project final acceptance and be included in contract documents.

2.01.6.5 LED

a. The use of LED lamps is required. The maximum LED failure rate is 25% within a seven (7) year period. If that maximum is exceeded, the manufacturer shall replace the complete unit at no charge to the owner.

2.01.6.6 UNIT TEST

a. Contractor shall perform a test on each unit after permanent installation and charged a minimum of 24 hours. The battery shall be tested for 90 minutes in accordance with NEC 700.12 (F). The battery test shall be done 10 days prior to final inspection by the State Construction Office. Any unit failing the test must be repaired or replaced, and tested again. A copy of the test report shall be sent to the State Construction Office.

2.01.7 EMERGENCY EGRESS FIXTURE

a. It shall be completely self-contained (or remote battery backup as shown on plans), provided with a maintenance-free 12 volt battery, automatic charger, two lamps and other features. Fixture must be third-party listed as emergency lighting equipment, and meet or exceed the following standards: NEC, N.C. Building Code, NC 2009 Energy Conservation Code, NFPA-101, and NEMA Standards.

2.01.7.1 ADDITIONAL FEATURES

a. It shall have a pilot light to indicate the unit is connected to A.C power and a test switch to 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 a 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.

2.01.7.2 BATTERY

a. The battery shall be a sealed, maintenance-free type with minimum o f 90 minutes operating time. It shall have a life expectancy of 10 years. It shall be a high temperature type with an operating temperature range of 0 to 60 degrees C. The battery shall c ontain a resealable pres sure vent and a sintered positive (+) terminal and a negative (-) terminal.

2.01 .7.3 CHARGER

a. The charger shall be a current limiting, full wave rectifying, fully automatic type. It shall restore the battery to its full charge within 24 hours after a discharge of 90 minutes under full rated load. It shall be activated when the voltage drops below 80 percent. If a LEAD Battery is used, a low voltage disconnect switch shall be included to disconnect the battery from the load and prevent damage from a deep discharge during extended power outage.

2.01.7.4 WARRANTY

a. The entire unit shall be warranted for three years with an additional two more years' pro-rated warranty for the battery. Warranty shall start the date of project final acceptance and shall be included in contract documents.

2.01.7.5 UNIT TEST

a. 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 in accordance with NEG 700.12 (F). The battery test shall be done 10 days prior to final inspection by the State Construction Office. Any unit which fails the test must be repaired or replaced, and tested again. A copy of the test report shall be sent to the State Construction Office.

2.01.7.6 ELECTRONIC BALLAST

a. Ballast must be "U/L Listed, Class P", with a sound rating of "A". No PCB ballast are permitted. The ballast size will be a maximum size of that of a magnetic ballast.

b. Light regulation shall be +/- 10% input voltage variation, and a high power factor with a minimum of 90%.

c. Lamp current crest factor shall be equal to, or less than, 1.7.

d. Input current third harmonics shall not exceed ANSI recommendations (32% total harmonic distortion, 27.5% of the third triplets). Ballast shall also meet FCC Rules and Regulations.

e. Minimum of five (5) years warranty is required with each electronic ballast. The ballast manufacturer shall have a minimum of 5 years experience in electronic ballast manufacturing.

f. Flicker shall be 15% or less with any lamp suitable for the ballast.

g. Parallel wiring between the ballast and the fixture is recommended.

h. Ballast case temperature shall not exceed 25 degrees C rise over 40 degrees C ambient.

PART 3 - EXECUTION

3.01 LIGHTING FIXTURES

3.01.1 Installation methods for each fixture shall be as indicated or detailed and as recommended by the fixture manufacturer for the application. Supports such as mounting brackets, hangers, clamps, etc., shall be provided in the best practical manner consistent with good workmanship and appearance.

3.01.2 Lay-in fluorescent fixtures shall be supported at the two opposite ends to the steel frame of the building. Supports shall be provided with the same type of wire as used to support the lay-in ceiling track. Attach one end of the wire to one corner of the fixture and the other end to the building structural system. The fixture shall then be screwed with sheet metal screws to the main runners of the grid at all four corners.

3.01.3 In the event of fixture damaged during construction and prior to final acceptance of the project the fixture shall be replaced or repaired to the satisfaction of the Engineer.

3.01.4 The contractor shall note architectural finish schedules and existing conditions and furnish proper mounting accessories or trim as required to properly mounting each fixture type.

3.01.5 Recessed fixtures shall be provided with mounting frames or rings and shall finish flush to the ceiling without light leaks. Fixtures shall be connected by means of flexible metal conduit (maximum of 6'-0" length whips unless approved by SCO) from outlet boxes mounted above or alongside the fixture. Where recessed fixtures are installed in "hard" ceilings, lighting branch circuit wiring shall be installed in conduit (EMT, etc.) from fixture to fixture and to switching.

3.01.6 Fixtures exposed to outdoor temperatures shall be rated for 0 degree Fahrenheit operation.

END OF SECTION

PROPOSAL AND CONTRACT

for

Four-Bay Salt Storage Building, Rockingham County
SCO ID# - 09-07377-011

This contract is for construction of a new, four-bay bulk salt storage facility. The building is constructed of cast in place concrete walls bearing on a shallow concrete foundation, with wood truss roof. There is no plumbing or mechanical work included in this project. The minor electrical work is provided by the contractor.

The undersigned, as bidder, proposes and agrees if this proposal is accepted to contract with the State of North Carolina through the North Carolina Department of Transportation for the furnishing of all materials, equipment, and labor necessary to complete the construction of the work described in these documents in full and complete accordance with plans, specifications, and contract documents, and to the full and entire satisfaction of the State of North Carolina and the North Carolina Department of Transportation for the sum of:

BASE BID: _____ **Dollars $** _____

Respectively submitted this _____ day of _____ 20____

_____
(Contractor

Federal ID#: _____ By: _____

Witness: _____ Title: _____
(Owner, partner, corp. Pres. Or Vice President)

_____ Address: _____
(Proprietorship or Partnership)

Attest: *(corporation)* Email Address: _____

(***Corporate Seal***)

By: _____ License #: _____

Title: _____
(Corporation.Secretary./Ass't Secretary.)

GC to acknowledge review of Addenda: _____Add. 1 _____Add. 2 _____Add. 3

ACCEPTED by the STATE OF NORTH CAROLINA

through the

_____
(Agency/Institution)

BY: _____ TITLE: _____

DATE: _____ 20____

FORM OF PERFORMANCE BOND

Date of Contract: _____

Date of Execution: _____

Name of Principal (Contractor) _____

Name of Surety: _____

Name of Contracting Body: _____

Amount of Bond: _____

Project

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

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

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

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

Executed in _____ counterparts.

Witness:

_____
(Proprietorship or Partnership)

Attest: (Corporation)

By: _____

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

(Corporate Seal)

_____
Contractor: (Trade or Corporate Name)

By: _____

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

_____
(Surety Company)

Witness:

_____

By: _____

Title: _____
(Attorney in Fact)

Countersigned:

_____

_____
(N.C. Licensed Resident Agent)

_____

_____
Name and Address-Surety Agency

_____

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

(Surety Corporate Seal)

FORM OF PAYMENT BOND

Date of Contract: _____

Date of Execution: _____

Name of Principal (Contractor) _____

Name of Surety: _____

Name of Contracting Body: _____

Amount of Bond: _____

Project _____

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

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

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

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

Executed in _____ counterparts.

Witness:

_____
(Proprietorship or Partnership)

Attest: (Corporation)

By: _____

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

(Corporate Seal)

_____
Contractor: (Trade or Corporate Name)

By: _____

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

_____
(Surety Company)

Witness:

_____

By: _____

Title: _____
(Attorney in Fact)

Countersigned:

_____

_____
(N.C. Licensed Resident Agent)

_____

_____
Name and Address-Surety Agency

_____

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

(Surety Corporate Seal)

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

CONTRACTOR: _____ Page __1____ of _____

PROJECT: _____ FOR PERIOD: _____

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

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

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

Sworn to and subscribed before me,

This the _____ day of _____, 20____

_____
Signed

_____
Notary Public

_____
Print or Type Name of Above

My Commission Expires: _____

Seal

NOTE:
This certified statement may be subject to audit.

STATE OF NORTH CAROLINA
SALES AND USE TAX REPORT DETAIL

CONTRACTOR: _____

SUBCONTRACTOR _____ FOR PERIOD: _____

PROJECT: _____

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

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

SECTION 01151A

CONTRACTOR'S CONSTRUCTION WASTE AND RECYCLING PLAN

(Submit after award of Contract and prior to commencing work)

Project Title:		
Contractor's Name:		
Street Address:		
City:	State:	Zip:
Phone: ( )	Fax: ( )	
E-Mail Address:		
Prepared by: (Print Name)		

Date Submitted:		
Project Period:	From:	To:

SECTION I - RE-USED/RECYCLED MATERIALS

Include all recycling activities for source separated or mixed material recycling centers where recycling will occur

Type of Material	Type of Activity	Facility to be Used/Location	Total Truck Loads	Total Quantities Tons	Cubic YD	Cost/Reven.
a. Total Diversion						

SECTION II - DISPOSED MATERIALS

Include all disposal activities for landfills, transfer stations, or inert landfills where no recycling will occur.

Type of Material	Type of Activity	Facility to be Used/Location	Total Truck Loads	Total Quantities Tons	Cubic YD	Cost
b. Total Disposal						

SECTION III - TOTAL MATERIALS GENERATED

This section calculates the total materials to be generated during the project period (Reuse/Recycle + Disposal = Generation

				Tons	Cubic YD	Other Wt.
a. Total Reused/Recycled						
b. Total Disposed						
c. Total Generated						

SECTION 01511B

CONTRACTOR'S CONSTRUCTION WASTE AND RECYCLING REPORT

(Submit with each Pay Application)

Project Title:		
Contractor's Name:		
Street Address:		
City:	State:	Zip:
Phone: ( )	Fax: ( )	
E-Mail Address:		
Prepared by: (Print Name)		

Date Submitted:		
Project Period:	From:	To:

SECTION I - RE-USED/RECYCLED MATERIALS

Include all recycling activities for source separated or mixed material recycling centers where recycling will occur.

Type of Material	Type of Activity	Facility to be Used/Location	Total Truck Loads	Total Quantities Tons	Cubic YD	Cost/Reven.
a. Total Diversion						

SECTION II - DISPOSED MATERIALS

Include all disposal activities for landfills, transfer stations, or inert landfills where no recycling will occur.

Type of Material	Type of Activity	Facility to be Used/Location	Total Truck Loads	Total Quantities Tons	Cubic YD	Cost
b. Total Disposal						

SECTION III - TOTAL MATERIALS GENERATED

This section calculates the total materials to be generated durmg the project period (Reuse/Recycle + Disposal = Generation

				Tons	Cubic YD	Other Wt.
a. Total Reused/Recycled						
b. Total Disposed						
c. Total Generated						

APPENDIX E

MBE DOCUMENTATION FOR CONTRACT PAYMENTS

Prime Contractor/Architect: _____

Address & Phone: _____

Project Name: _____

Pay Application #: _____ Period: _____

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

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

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

Date: _____ Approved/Certified By: _____
Name

_____
Title

_____
Signature

SUBMIT WITH EACH PAY REQUEST & FINAL PAYMENT

(Revised on 3/14/2003)