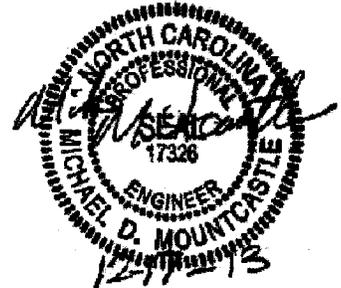
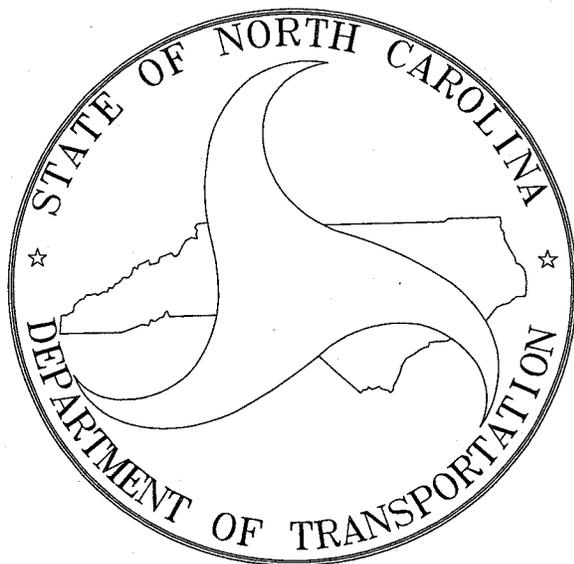


SPECIFICATIONS FOR: **I 386**

I-85 GASTON COUNTY WEIGH STATION BUILDINGS

GASTON COUNTY, NORTH CAROLINA

TIP No. I-4928
Project No. WBS 41188.3.1



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Architect / Engineer:

**FACILITIES DESIGN UNIT
FACILITIES MANAGEMENT DIVISION, NCDOT
1 SOUTH WILMINGTON STREET
RALEIGH, NORTH CAROLINA 27601**

December 20, 2013

PROJECT: I-85 GASTON COUNTY WEIGH STATION
NC Department of Transportation
Gaston County, NC

PROJECT NO.: 411883.3.1

OWNER: NC Department of Transportation

ARCHITECT: Facilities Design, NCDOT
Raleigh, NC (919) 707-4550
Mark D. Gibson AIA, Architect

ENGINEERS:

STRUCTURAL: Facilities Design, NCDOT
Raleigh, NC (919) 707-4547
Michael D. Mountcastle, PE

**PLUMBING,
MECHANICAL,
& ELECTRICAL:** Burke Design Group, PA
Raleigh, NC (919) 771-1916
Ben Burke, PE

New 2-14-14



BURKE DESIGN GROUP, PA
CONSULTING ENGINEERS

387-A

benburke@nc.rr.com

(919) 771-1916 ▪ (919) 779--0826 fax
3305-109 Durham Dr. ▪ Raleigh, NC 27603

Date: 02/12/14
Project: I-4928: I-85 NBL Weigh Station
Gaston County NC
RE: Addendum # 2
Building Utilities



- 1) The contractor shall provide a separate 4" PVC sewer line from the Scale Building and Inspection Building to an existing manhole on site. See plumbing plans for locations of sewer lines leaving the building. The manhole is due west from the building locations. The elevation of the top of the man-hole is 730.07'. The manhole is located approximately 400 feet from the Scale Building and 480 feet from the Inspection Building. The lines shall be installed for gravity flow to the manhole. Provide clean-outs every 100 feet. Provide traffic rated cast-iron covers in all paved areas. Provide cast-iron covers with pre-cast concrete covers in all grassy areas.
- 2) The water supply to both buildings shall be from a new well. The contractor shall provide an allowance, as listed below, for the well, well pump, fiberglass pre-fabricated well house, etc. as required for a complete operating system. The system shall be capable of supplying 50 gpm. The minimum well pump size shall be 5 hp, 208 volt, 3 phase. The contractor shall provide water supply piping from the well location to both the buildings. See plumbing plans for water service sizes. Provide power to the well pump location from the Scale Building's main distribution panel. Provide a new breaker and wire to the well location. The wire shall be sized to maintain a maximum of 3% voltage drop. Provide an additional 120 volt, 20 amp circuit to the well house for heat tracing.

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DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

- A. The Owner is: North Carolina Department of Transportation, 1 S. Wilmington St., Raleigh, NC.
- B. Section Includes:
 - 1. Project description.
 - 2. Access to the site.
 - 3. Contractor's use of the premises.
 - 4. Coordination requirements.
 - 5. Pre-construction meeting.

1.02 PROJECT DESCRIPTION

- A. The project consists of a new Weigh Station building of 3,925 gross square feet, a new Weigh Station booth of 159 gross square feet, and an Inspection Building of 3,060 square feet.
 - 1. At I-85 off of the Northbound lane (NBL) southwest of Gastonia, NC, in Gaston County, NC.
 - 2. As shown in contract documents for the Gaston County I-85 Weigh Station building prepared by Facilities Design, NCDOT.
 - a. Dated December 20, 2013.
- B. The Work consists of:
 - 1. A one story office building with slab-on-grade, wood framing and wood trusses w/ masonry foundations, brick veneer, metal roofing panels; unprotected construction; and a similar booth.
 - 2. A one story pre-engineered metal building with slab-on-grade and a concrete pit, masonry wainscot walls, metal wall and roofing panels.
 - 2. Concrete entrance sidewalks (see Roadway Design Specifications).
 - 3. Building and immediate site rough and finish grading of all disturbed areas (see Roadway Design Specifications).
 - 4. The General Contractor is responsible for all **layout and surveying** of adjacent sidewalks, utilities, Weigh Station building, Weigh Station booth, and Inspection building.

1.03 ACCESS TO THE SITE AND USE OF THE PREMISES

- A. The space available to the Contractor for the performance of the work, either exclusively or in conjunction with others performing other construction as part of the project, is an outdoor space sufficient for storage trailers and access to the construction area from the exit ramps on the NBL of I-85 having full use of building site.
- B. Exit ramps, drives and parking spaces shall remain open for the Contractor's use for the construction site.
- C. The Contractor shall provide temporary restroom facilities at the construction site for the entire construction period.
- D. The Contractor shall provide a construction/office trailer at the Northbound Lane construction site, with heating and air conditioning, large enough for his office telephone and fax, layout space for the construction drawings (as-built set and shop drawings) with seating area to hold 12 people for monthly meetings, and for his secured storage of small tools and materials.
- E. Signs: Do not install, or allow to be installed, signs other than specified sign(s) and signs identifying the principal entities involved in the project. NCDOT will provide "Closed" signs at the highway and barrels for closing off the entry/exit lanes.

PART 2 - PRODUCTS (NOT USED)

3.01 PRECONSTRUCTION MEETING

- A. A pre-construction meeting will be held at a time and place designated by the Engineer, for the purpose of identifying responsibilities of the Owner's and the Architect/Engineer's personnel and explanation of administrative procedures.

3.02 SECURITY PROCEDURES

- A. Provide secure storage for materials for which the Owner has made payment and which are stored on site.
- B. Secure completed work as required to prevent loss.

3.03 COORDINATION

- A. If necessary, inform each party involved, in writing, of procedures required for coordination; include requirements for giving notice, submitting reports, and attending meetings.
 - 1. Inform the Owner when coordination of his work is required.
- B. See other requirements in other portions of the contract documents.
- C. Conduct meetings for the specific purpose of coordination, at least once a month.
 - 1. Attendees shall include:
 - a. Contractor.
 - b. Subcontractors currently working at the site.
 - c. Engineer and Architect.

END OF SECTION 01010

SECTION 01026 - PAYMENT AND COMPLETION PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

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

1.02 CONTRACT CONDITIONS

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

1.03 DEFINITIONS

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

1.04 SUBMITTALS

- A. Schedule of Values: First application for payment will not be reviewed without schedule of values.
 - 1. Submit in size not larger than 8-1/2 by 11 inches.
 - 2. Submit 5 copies,
 - 3. Identify with:
 - a. Project name, Project number, Architect's name, Owner's name, Contractor's name and address, and Submittal date.
- B. Applications for Progress Payments: Submit sufficiently in advance of date established for the progress payment to allow for the processing indicated.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SCHEDULE OF VALUES

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

3.02 APPLICATIONS FOR PAYMENT

- A. Application for Payment Forms: Use AIA original current editions of G702, Application and Certificate for Payment, and AIA G703, Continuation Sheet.
- B. Preparation of Applications for Payment: Complete form entirely.
 - 1. Make current application consistent with previous applications, certificates for payment, and payments made.
 - 2. Base application on current schedule of values and contractor's construction schedule.
 - 3. Include amounts of modifications issued before the end of the construction period covered by the application.
 - 4. Include signature by person authorized by the contractor to sign legal documents.
 - 5. Notarize each copy.
 - 6. Submit in 5 copies.
 - 7. Attach revised schedule of values, if changes have occurred, unless application forms already show entire schedule of values.
 - 8. Attach copy of the owner's agreement to pay for materials and equipment stored off site, and any other supporting documentation required by the owner or the contract documents.
- C. Provide the following information with every application for payment which involves work completed on a time and material basis:
 - 1. Detailed records of work done, including:
 - a. Dates and times work was performed, and by whom.
 - b. Time records and wage rates paid.
 - c. Invoices and receipts for products.
 - 2. Provide similar detailed records for subcontracts.
- D. Transmit application for payment with a transmittal form itemizing supporting documents attached.
 - 1. Transmit to the Architect/Engineer.

3.03 FIRST PAYMENT PROCEDURE

- A. The first application for payment will not be reviewed until the following submittals have been received:
 - 1. Certificates of insurance.
 - 2. Performance and payment bonds.
 - 3. Schedule of values.
 - 4. List of subcontractors, principal suppliers, and fabricators.
 - 5. Contractor's construction schedule. Monthly Progress Schedules are required, see Section 01200.
 - 6. Names of the contractor's principal staff assigned to the project.
 - 7. All submittals specified to occur prior to first application for payment or prior to first payment.

3.04 SUBSTANTIAL COMPLETION PROCEDURES

- A. The architect will perform a Pre-Final Inspection with the contractor two weeks before substantial completion inspection, upon request of the contractor. Plumbing, Mechanical, & Electrical subcontractors shall be present for all Final Inspections.
- B. The architect will perform a Final Inspection with the contractor for substantial completion and verification that the Pre-Final Inspection punch list is complete, upon request of the contractor.
 - 1. Only one certificate of substantial completion will be issued, for the entire project.
- C. Submit the following with application for payment following substantial completion:
 - 1. Certificate of Substantial Completion; use AIA original current editions of G704.
 - 4. Final Inspection list of incomplete work.
 - 5. Other data required by the contract documents.

3.05 FINAL COMPLETION PROCEDURES

- A. Request for Final Inspection and final application for payment may coincide.
- B. The architect/engineer will perform inspection for final completion, upon request of the contractor.
 - 1. Submit the following with request for inspection:
 - a. Previous inspection lists indicating completion of all items.
 - b. If any items cannot be completed, obtain prior approval of such delay.
- C. Do not submit request for Final Inspection until the following activities have been completed:
 - 1. Completion of all work, Pre-Final Inspection Punch List, except those items agreed upon by the owner.
 - 2. Final cleaning.
 - 3. All activities specified to occur between substantial completion and final completion.
- D. Do not submit request for final inspection until the following submittals have been completed:
 - 1. Startup reports; HVAC balance and test reports.
 - 2. Operation and maintenance data. Demonstration reports. Instruction reports.
 - 3. Water bacterial test report of new domestic water supply.
 - 4. Final Electrical Inspection and certification by the State Construction Office electrical inspector.
 - 5. Project record documents, record drawings or as-built drawings.
 - 6. All other outstanding specified submittals.
- E. Submit the following with the final application for payment:
 - 1. Certified copy of the previous list of items to be completed or corrected, stating that each has been completed or otherwise resolved for acceptance.
 - 2. Contractor's Affidavit of Payment of Debts and Claims; use AIA original current editions of G706
 - 3. Contractor's Affidavit of Release of Liens; use AIA original current editions of G706A.
 - 4. Consent of surety to final payment; use AIA original current editions of G707.
 - 5. Final liquidated damages statement.
 - 6. Certification that financial obligations to governing authorities and public utilities have been fulfilled.
 - 7. Description of unsettled claims.
 - 8. Other data required by the contract documents.

END OF SECTION 01026

SECTION 01200 - PROGRESS DOCUMENTATION AND PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Progress documentation requirements:
 - a. Contractor's construction schedule.
 - 2. Progress procedures:
 - a. Progress meetings.
- B. Contract time is indicated elsewhere.

1.02 SUBMITTALS

- A. Contractor's Construction Schedule.
 - 1. Submit within 14 days after execution of contract.
 - 2. Submit revised schedule with application for payment to Highway Division 12 Resident Engineer.

1.03 FORM OF SUBMITTALS

- A. Schedules - General:
 - 1. Provide legend of symbols and abbreviations for each schedule.
 - 2. Use the same terminology as that used in the contract documents.
 - 3. When transparencies are submitted, use only media which will not fade or lose contrast over time.
- B. Bar Charts:
 - 1. Provide individual horizontal bars representing the duration of each major activity.
 - 2. Coordinate each element on the schedule with other construction activities.
 - 3. Show activities in proper sequence.
 - 4. Show percentage of completion of each activity.
 - 5. Include cost bar at top of chart, showing estimated and actual costs of work performed at the date of each application for payment.
 - 6. Use vertical lines to mark the time scale at not more than one week intervals.
 - 7. Prepare on reproducible transparency.
 - 8. Use sheets of sufficient number and width to show the full schedule clearly.

1.04 COORDINATION

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

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Prepare and submit a construction schedule.
- B. Provide construction schedule in the form of bar charts:
 - 1. Where related activities must be performed in sequence, show relationship graphically.
 - 2. Indicate activities separately for:
 - a. Each separate building.
 - 3. Incorporate the submittal schedule specified elsewhere.
 - 4. Show dates of:
 - a. Each activity that influences the construction time.
 - b. Ordering dates for products requiring long lead time.
 - c. All submittals required.
 - d. Completion of structure.
 - e. Completion of permanent enclosure.
 - f. Instruction of the owner's personnel in operation and maintenance of equipment and systems.
 - g. Substantial and final completion, with time frames for the Architect/Engineer's completion procedures.

5. In developing the schedule, take into account:
 - a. Work by owner.
 - b. Need for temporary heating, ventilating, or air-conditioning.
- C. The Architect/Engineer will notify the contractor if schedule is not satisfactory; revise and resubmit.
 1. Resubmit within 5 business days.
- D. Make and distribute copies of schedule to the Architect/Engineer, to subcontractors, and to other entities whose work will be influenced by schedule dates.
 1. Hang a copy of the schedule up in each field office or meeting room.
- E. Update the schedule whenever changes occur or are made, or when new information is received, but not less often than at the same intervals at which applications for payment are made.
 1. Indicate changes made since last issue; show actual dates for activities completed.
 2. Submit updated schedule with application for payment.
 3. Issue updated schedule with report of meeting at which revisions are made.
 4. Issue updated schedule in same manner as original schedule.

3.02 PROGRESS MEETINGS

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

END OF SECTION 01200

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 SUMMARY

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

1.02 DEFINITIONS

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

1.03 FORM OF SUBMITTALS

- A. Sheets Larger Than 8-1/2 by 14 Inches:
 - 1. Maximum sheet size: 24 by 36 inches.
 - a. Exception: Full size pattern or template drawings.
 - 2. Number of copies:
 - a. Submittals for review:
 - 1. One correctable reproducible print, not folded and 6 copies of blue- or black-line print(s).
 - 2. Reproducible will be returned.
- B. Small Sheets or Pages:
 - 1. Minimum sheet size: 8-1/2 by 11 inches.
 - 2. Maximum sheet size for opaque copies: 8-1/2 by 14 inches.
 - 3. Number of copies:
 - a. Transparencies: Same as for larger sheets.
 - b. Opaque copies: 6 copies.
 - 4. For review: 6 copies.
 - a. 4 copies will be retained.
- C. Samples: 2 sets of each.
 - 1. 1 set will be returned.

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

1.04 COORDINATION OF SUBMITTALS

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

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 TIMING OF SUBMITTALS

- A. Transmit each submittal at or before the time indicated on the approved schedule of submittals.
 - 1. Prepare and submit for approval a schedule showing the required dates of submittal of all submittals.
 - 2. Organize the schedule by the applicable specification section number.
 - 3. Incorporate the contractor's construction schedule specified elsewhere.
 - 4. Submit within 10 business days after commencement of the work.
 - 5. Revise and resubmit the schedule for approval when requested.
- B. Deliver each submittal requiring approval in time to allow for adequate review and processing time, including resubmittals if necessary; failure of the contractor in this respect will not be considered as grounds for an extension of the contract time.
- C. Deliver each informational submittal prior to start of the work involved, unless the submittal is of a type which cannot be prepared until after completion of the work; submit promptly.
- D. If a submittal must be processed within a certain time in order to maintain the progress of the work, state so clearly on the submittal.

3.02 SUBMITTAL PROCEDURES - GENERAL

- A. Contractor Review: Sign each copy of each submittal certifying compliance with the requirements of the contract documents.
- B. Notify the Architect/Engineer, in writing and at time of submittal, of all points upon which the submittal does not conform to the requirements of the contract documents, if any.
- C. Preparation of Submittals:
 - 1. Label each copy of each submittal, with the following information:
 - a. Project name.
 - b. Date of submittal.
 - c. Contractor's name and address.
 - d. Architect/Engineer's name and address.
 - e. Subcontractor's name and address.
 - f. Other necessary identifying information.
 - 2. Pack submittals suitably for shipment.
 - 3. Submittals to receive Architect/Engineer's action marking:
Provide blank space on the label or on the submittal itself for action marking; minimum 4 inches wide by 5 inches high.
- D. Transmittal of Submittals:
 - 1. Submittals will be accepted from the contractor only. Submittals received from other entities will be returned without review or action.
 - 2. Submittals received without a transmittal form will be returned without review or action.
 - 3. Transmittal form: Similar to AIA G810.
 - 4. Fill out a separate transmittal form for each submittal; also include the following:
 - a. Other relevant information.
 - b. Requests for additional information.

3.03 SHOP DRAWINGS

- A. Content: Include the following information:
 - 1. Dimensions, at accurate scale.
 - 2. All field measurements that have been taken, at accurate scale.

3. Names of specific products and materials used.
4. Coordination requirements; show relationship to adjacent or critical work.
5. Name of preparing firm.

B. Preparation:

1. Identify as indicated for all submittals.
2. Space for Architect/Engineer's action marking shall be adjacent to the title block.

3.04 PRODUCT DATA

- A. When product data submittals are prepared specifically for this project (in the absence of standard printed information) submit such information as shop drawings and not as product data submittals.

B. Content:

1. Submit manufacturer's standard printed data sheets.
2. Show compliance with properties specified.
3. Show compliance with the specific standards referenced.
4. Show compliance with specified testing agency listings; show the limitations of their labels or seals, if any.
5. Identify dimensions which have been verified by field measurement.
6. Show special coordination requirements for the product.

3.05 SAMPLES

A. Samples:

1. Provide samples that are the same as proposed product.
2. Where unavoidable variations must be expected, submit "range" samples, minimum of 3 units, and describe or identify variations among units of each set.

B. Preparation:

1. Attach a description to each sample.
2. Attach name of manufacturer or source to each sample.

- C. Keep final sample set(s) at the project site, available for use during progress of the work.

3.06 REVIEW OF SUBMITTALS

- A. Submittals for approval will be reviewed, marked with appropriate action, and returned.

- B. Informational submittals: Submittals will be reviewed.

1. "X" action: No action taken.
2. "Not Approved" action: Revise the submittal or prepare a new submittal complying with the comments made.
3. A copy will be returned if submittal is unsatisfactory.

3.07 RETURN, RESUBMITTAL, AND DISTRIBUTION

- A. Submittals will be returned to the contractor by mail.

- B. Perform resubmittals in the same manner as original submittals; indicate all changes other than those requested by the Architect/Engineer.

C. Distribution:

1. Make extra copies for operation and maintenance data submittals, as required.

END OF SECTION 01300

DIVISION 2 - SITE WORK

SECTION 02200 - EARTHWORK

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Earth moving and excavation.
 - 2. Grading.
 - 3. Backfilling.
 - 4. Filling.
 - 5. Compacting.

1.02 SUBMITTALS

- A. Test Reports: NCDOT testing laboratory will submit the following reports directly to the Architect/Engineer and shall copy the contractor:
 - 1. Analysis of soil materials, whether procured on or off site, and including fill, backfill, and borrow materials.
 - 2. Verification of each footing subgrade.
 - 3. Moisture-density relationship test reports.
 - 4. Compressive strength or bearing test reports.

1.03 QUALITY ASSURANCE

- A. Testing Laboratory Services:
 - 1. The Owner, NCDOT, Division 12, will provide services to classify new structural fill soil materials, to recommend and to classify proposed borrow materials when necessary, to verify compliance of materials with specified requirements, and to perform required field and laboratory testing.

1.04 SITE CONDITIONS

- A. Traffic: The construction site will be open to the contractor for use at all times.
- B. Site Utilities:
 - 1. Advise utility companies of excavation activities before starting excavations. Locate and identify underground utilities passing through work area before starting work.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Topsoil: Friable clay loam surface soil.
- B. Satisfactory Topsoil: Fertile agricultural soil, typical for locality, capable of sustaining vigorous plant growth; free of subsoil, rocks larger than 2 inches in diameter, clay, toxic matter, plants, weeds, and roots.
- C. Any structural fill or backfill placed at the site shall utilize a low plasticity soil (liquid limit less than 50, plasticity index less than 25) free of organic material or debris. All fill shall be placed in 8 to 10 inch loose lifts and shall be compacted to at least 95 percent of the standard Proctor maximum dry density (ASTM D 698). The soils shall be aerated or moistened as necessary to maintain the moisture content within 3 percentage points of optimum moisture content.
- D. Capillary Water Barrier: Clean, crushed rock or gravel or uncrushed gravel; 100 percent passing a 1-1/2-inch sieve; not more than 2 percent passing a No. 4 sieve.
- E. Subbase Material: Well-graded, clean, sound, durable particles of crushed stone, crushed blast furnace slag, or crushed gravel, and screenings. Obtain the Engineer's approval of source, quality, and gradation.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Protection: Provide markers indicating limits of work and clear identification of items and areas requiring protection.

- B. Provide barricades, warning signs, and warning lights around open excavations as necessary to prevent injury to persons.

3.02 PROTECTION OF TREES

- A. Provide temporary guards to protect trees and vegetation to remain. Place guards so as to prevent all forms of vehicular traffic or parking within drip lines.
- B. Promptly repair any damaged trees to prevent death or loss of vigor.

3.03 CLEARING AND GRUBBING

- A. Remove dredge material from site and replace with approved structural fill per Roadway's requirement before excavating for the building footings.

3.04 DEWATERING

- A. Do not allow surface or ground water to flow into or accumulate in excavations.

3.05 EXCAVATION

- A. General: Excavation includes the removal of any materials necessary to achieve the required subgrade elevations and includes reuse or disposal of such materials.
- B. Excavation for Structures:
 - 1. Excavate beyond footings and foundations so as to allow proper construction and inspection of concrete formwork and other materials. Excavate to the required elevation.
- C. Excavation for Footings and Foundations:
 - 1. Delay excavation to final grade and final compaction until just before concrete will be placed.

3.06 STORAGE

- A. Stockpile materials to be used for filling and backfilling, including excavated materials classified as satisfactory soil materials, at locations indicated or as directed. Stockpile in a manner to freely drain surface water; cover if necessary to prevent wind-blown dust.

3.07 BACKFILLING

- A. Installation: Place approved soil materials in layers to required elevations.
- B. Installation: Place satisfactory soil materials in layers to required subgrade elevations.

3.08 FILLING

- A. Preparation: Verify that area has been stripped of vegetation including roots below grade. Remove and dispose of any unsatisfactory soils.
 - 1. When filling slopes steeper than 1 in 4 rise, plow, step, or break up surfaces to promote bond of new to existing material.
- B. Installation: Place fill materials to required elevations in lifts of required depth. Provide fill materials beneath each area as indicated.
 - 2. Building slabs: Capillary water barrier material.

3.09 BUILDING SLAB AREAS

- A. Place fill or backfill lifts such that compaction true to grade and level is accomplished with a minimum of surface disturbance and segregation or degradation of materials. Maintain grade control and cross section by means of line and grade stakes. Maintain moisture content within prescribed limits during placing and compacting.
 - 1. Capillary water barrier: Under slabs on grade, place capillary water barrier material directly on subgrade, shape surface to within the required tolerances and compact.

3.10 COMPACTION

- A. Place material simultaneously on opposite sides of walls, small structures, utility lines, etc. to avoid displacement or overstressing.
- B. In-Place Density Requirements: Compact soil to not less than the values given below, expressed as a percentage of maximum density at optimum moisture content.
 - 1. Exterior steps and ramps: Top 8 inches of subgrade and subsequent lifts: 95 percent.
 - 2. Building slabs and structures: Top 12 inches of subgrade and subsequent lifts: 95 percent.

3.11 GRADING

- A. General: Smooth grade to a uniform surface that complies with compaction requirements and required lines, grades, and cross sections and is free from irregular surface changes.

3.12 FIELD QUALITY CONTROL

- A. Testing Laboratory Services: Provide timely notice to testing laboratory. Do not proceed with construction until testing of each subgrade and lift of fill or backfill has been performed and required inspections and approvals have been obtained.
- B. Maximum Density at Optimum Moisture Content: Determine in accordance with ASTM D 698.
 - 1. For each subgrade, fill, and backfill material, perform one moisture-density relationship test for each 1500 cubic yards, or fraction thereof, of material used.
- C. If testing service reports indicate that subgrade or fills are below specified density, scarify or remove and replace to the required depth, recompact, and retest at no cost to the owner.

3.13 MAINTENANCE

- A. Completed Areas: Protect from damage by pedestrian or vehicular traffic, freezing, erosion, and contamination with foreign materials.

3.14 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Stockpile any excess satisfactory topsoil in locations on site as directed by the Engineer.
- B. Stockpile or spread any excess satisfactory soil in location on site as directed by the Engineer.
- C. Remove any unsatisfactory soil, trash, debris, and other materials not required for use on the project and legally dispose of it off the owner's property.
- D. On-site burning is not permitted.

END OF SECTION 02200

SECTION 02280 - SOIL TREATMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Subterranean termite prevention treatment of soil areas scheduled to receive new construction.
2. Subterranean termite prevention treatment of existing exterior side of existing foundations to remain.

1.02 SUBMITTALS

A. Product Data: Submit product label or accompanying labeling in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act.

B. Quality Control Submittals:

1. Certificates: Evidence of installer's authorization to apply products under applicable state and local law.
2. Manufacturer's instructions: Submit manufacturer's directions for use.

C. Contract Closeout Submittals:

1. Project record documents:
 - a. Submit a certificate signed by installer and contractor stating that treatment has been applied in accordance with applicable governing regulations and in accordance with this specification.
 - b. Incorporate into the certificate or attach thereto a plan drawing indicating actual application locations and, for each location, noting methods and rates of application and including typical sections or details where necessary for clarity.
2. Warranty.

1.03 QUALITY ASSURANCE

A. Installer Qualifications:

1. Licensed to install specified products in the state in which the project is located and in the local jurisdiction.
2. A company installing products of this section and whose installations have performed in a satisfactory manner under comparable conditions for a period of 5 years.

B. Regulatory Requirements:

1. Comply with applicable pesticide regulations of the state in which the project is located.
2. Comply with applicable local pesticide regulations.

1.04 WARRANTY

A. Special Warranty:

1. Submit manufacturer's warranty against infestation of treated areas.
2. Warranty shall not reduce or otherwise limit any other rights to correction which the owner may have under the contract documents.
3. Warranty period: **5 years.**

B. Correction during the warranty period shall include not less than the following:

1. Retreatment of areas in which evidence of infestation is discovered.

PART 2 PRODUCTS

2.01 TERMITICIDE

A. Registered with the United States Environmental Protection Agency (EPA) for use as a termiticide under conditions of use prevailing at the project site.

B. Registered with the applicable authorities in the state in which the project is located and with local governing authorities, as applicable for use as a termiticide under conditions of use prevailing at the project site.

PART 3 EXECUTION

3.01 APPLICATION

- A. Apply termiticide in strict accordance with manufacturer's instructions; treat new entire slab area and perimeter new and existing foundations.
- B. Apply termiticide at the maximum recommended application rates for the respective areas to be treated and methods of treatment used.
- C. Treat the entire structure. Do not leave any portion untreated.
- D. Schedule treatment of new construction to occur when treatment may be applied directly to the soils and surfaces to be treated, and prior to their concealment with subsequent construction.

3.02 CLEANING

- A. Do not allow contamination of surfaces not intended to be treated. Follow manufacturer's instructions to completely remove chemical from surfaces should contamination occur.
- B. Remove from beneath the structure any cellulosic material, wood that is not pressure-preservative treated, and debris. Do not allow non-pressure-preservative treated wood to contact with or remain proximate to soil.

END OF SECTION 02280

SECTION 02712 - SUBDRAINAGE SYSTEMS FOR STRUCTURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Subdrainage systems of the following types: Downspout drains; foundation drains where shown.
- B. Related Sections: Earthwork: Elsewhere in Division 2 and Landscape Section at the end of the specification.

1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's technical literature and installation instructions for the following:
 - 1. Drainage piping.
 - 2. Piping accessories.

PART 2 - PRODUCTS

2.01 DRAINAGE PIPE

- A. Piping System 1:
 - 1. Standard (solid) pipe: Polyethylene pipe; ASTM F 405 or ASTM F 667, as applicable for pipe size.
 - 2. Application: Gutter and downspout drainage.
- B. Piping System 2:
 - 1. Perforated, polyethylene (PE) pipe: ASTM F 405 corrugated.
 - 2. Application: Foundation drainage.
- C. Provide fittings and accessories of same material as pipe or compatible material for intersections, bends, transitions, and the like; provide black plastic downspout boots or downspout adapters; equal to Plastic Trends, Royal Pipe Systems, USPlastic, Flex-Drain or approved equal.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Engineering Layout: Establish lines, grades, and locations of piping and accessories.
 - 1. Maintain grade stakes, batter boards, and the like, to permit rapid checking of grades and lines as work progresses.

3.02 INSTALLATION - GENERAL

- A. Earthwork and Trenching: Perform required excavation, backfilling, and compacting in accordance with requirements of other Division 2 sections as applicable.
- B. Piping Installation:
 - 1. General: Install piping in accordance with governing authorities, except where more stringent requirements are indicated.
 - 2. Inspect piping before installation to detect apparent defects. Mark defective materials and promptly remove from site.
 - 3. Lay piping, beginning at low point of system, true to line and grade indicated and with unbroken continuity of invert.
 - 4. Polyethylene pipe: Install in accordance with ASTM F 449.
 - 5. Joint adapters: Make joints between different types of pipe or different diameters of the same type of pipe with standard manufactured adapters intended for that purpose.
- C. Filling and Backfilling:
 - 1. Place and compact fill or backfill in uniform layers, and achieve required compaction.
 - 2. Take care when backfilling to avoid damaging or dislodging drainage system components.
 - 3. Provide crushed stone backfill over perforated pipe; stone shall be larger than perforations to prevent clogging of pipe.

3.04 FIELD QUALITY CONTROL

- A. Piping: After installation of piping and placement of initial backfill, test piping for crushing and obstructions.
 - 1. Pull a mandrel with diameter of 90 percent of the pipe diameter through the pipe.
 - 2. Locate and replace damaged pipe or remove obstructions and retest until mandrel passes entire length of pipe.

END OF SECTION 02712

SECTION 03310 - STRUCTURAL CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Cast-in-place concrete and concrete curing.
 - 1. Sidewalks, see Roadway Design concrete section.
 - 2. Foundations, footings, and slabs.

1.02 SUBMITTALS

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

1.03 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the following documents, except where requirements of the contract documents or of governing codes and governing authorities are more stringent:
 - 1. Sidewalks, curb ramps, steps, curb & gutters, and parking lot paving shall comply with **NCDOT Standard Specifications** dated January 2012, Divisions 7 and 8; Sections 710, 844, 846 and 848; Class "A" concrete for Portland Cement Production and Delivery.
 - 2. ACI 301 & ACI 318.
- B. Testing Agency Services:
 - 1. NCDOT's testing agency will conduct tests and perform other services specified for quality control during construction.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

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

2.02 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. Formwork:
 - 1. Facing Materials: Unexposed finish concrete: Any standard form materials that produce structurally sound concrete.
 - 2. Formwork Accessories:
 - a. Form coating: Form release agent that will not adversely affect concrete surfaces or prevent subsequent application of concrete coatings.
 - b. Metal ties: Commercially manufactured types; cone snap ties, taper removable bolt, or other type which will leave no metal closer than 1-1/2 inches from surface of concrete when forms are removed, leaving not more than a 1-inch-diameter hole in concrete surface.
- B. Reinforcing Materials:
 - 1. Reinforcing Bars: Provide deformed bars complying with the following, except where otherwise indicated: ASTM A 615, Grade 60.
 - a. indicated: ASTM A 615, Grade 60.
 - 2. Welded Wire Fabric: ASTM A 185, cold-drawn steel, plain.
 - 3. Tie wire: Black annealed type, 16-1/2 gage or heavier.
 - 4. Supports: Bar supports conforming to specifications of CRSI "Manual of Standard Practice."

- C. Vapor Retarder: Membrane for installation beneath slabs on grade, resistant to decay when tested in accordance with ASTM E 1745, and as follows:
 - 1. 10 mils thick, multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single-ply polyethylene sheet is prohibited.
- D. Moisture-Retaining Cover: ASTM C 171, and as follows:
 - 1. Polyethylene film.
- E. Liquid Curing Compounds: Comply with ASTM C 309, Type 1 and compatible with flooring.

2.03 CONCRETE MIX DESIGN

- A. Proportioning of Normal Weight Concrete: Comply with recommendations of ACI 211.1.
- B. Specified Compressive Strength f_c at 28 Days for Locations as Indicated on Drawings:
 - 1. Footings: 3000 psi.
 - 2. Slabs, walls, and ramps: 4000 psi.
- C. Admixtures:
 - 1. Air-entraining admixture: Use in mixes for exterior exposed concrete unless otherwise specifically indicated. Add at rate to achieve total air content in accordance with Table 1.4.3 of ACI 201.2. For concrete not exposed to exterior, add at rate to achieve total air content between 2 percent and 4 percent.
 - a. Do not use in slabs-on-grade scheduled to receive topping, unless manufacturer of topping recommends use over air-entrained concrete.
 - 2. Water-reducing admixture: Add as required for placement and workability.
 - 3. Do not use admixtures not specified or approved.

PART 3 - EXECUTION

3.01 VAPOR RETARDER INSTALLATION

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

3.02 JOINT CONSTRUCTION

- A. Construction Joints: Locate and install construction joints as indicated on drawings. If construction joints are not indicated, locate in manner which will not impair strength and will have least impact on appearance, as acceptable to the Engineer.
 - 1. Keyways: Provide keyways not less than 1-1/2 inches deep.
 - 2. Reinforcement: Continue reinforcement across and perpendicular to construction joints, unless details specifically indicate otherwise.
- B. Control Joints: Construct contraction joints in slabs poured on grade to form panels of sizes indicated on drawings, but not more than 15 feet apart in either direction.
 - 1. Saw cuts: Form control joints by means of saw cuts one-fourth slab depth.

3.03 CONCRETE PLACEMENT

- A. Inspection: Before beginning concrete placement, inspect formwork, reinforcing steel, and items to be embedded, verifying that all such work has been completed.
 - 1. Wood forms: Moisten immediately before placing concrete in locations where form coatings are not used.
- B. Placement - General: Comply with requirements of ACI 304 and as follows:
 - 1. Schedule continuous placement of concrete to prevent the formation of cold joints.
 - 2. Provide construction joints if concrete for a particular element or component cannot be placed in a continuous operation.
 - 3. Deposit concrete as close as possible to its final location, to avoid segregation.
- C. Tolerances shall comply with ACI 117. Use class A for exposed surfaces and Class C otherwise.
- D. Placement in Forms: Limit horizontal layers to depths which can be properly consolidated, but in no event greater than 24 inches.
 - 1. Vibrate concrete sufficiently to achieve consistent consolidation without segregation of coarse aggregates.
 - 2. Do not use vibrators to move concrete laterally.

- E. Slab Placement: Schedule continuous placement and consolidation of concrete within planned construction joints.
 - 1. Thoroughly consolidate concrete without displacing reinforcement or embedded items, using internal vibrators, vibrating screeds, roller pipe screeds, or other means acceptable to Engineer.
 - 2. Strike off and level concrete slab surfaces, using highway straightedges, darbies, or bull floats before bleed water can collect on surface. Do not work concrete further until finishing operations are commenced.

3.04 REPAIR OF SURFACE DEFECTS

- A. Repair tie holes and surface defects including readily visible voids, bug holes, and honeycombs immediately after form removal.
- B. Repair defects in accordance with Section 5.3.7 of ACI 301-05.
- C. Remove stains, rust, efflorescence, and surface deposits considered objectionable by Architect or Owner.

3.05 FINISHING FORMED SURFACES

- A. Unspecified Finish: Where a specific finish is not specified, apply the following finishes.
 - 1. Rough Form Finish on concrete surfaces not exposed to public view.
 - 2. Smooth Rubbed Finish on concrete surfaces exposed to public view.
- B. Rough Form Finish: Patch tie holes and defects. Chip or rub off fins exceeding ¼" in height. Leave surfaces with the texture imparted by the forms.
- C. Smooth Form Finish: Patch tie holes and defects. Remove all fins completely. Rubbing is not required except as needed to provide a smooth surface.
- D. Smooth Rubbed Finish: Patch tie holes and defects. Produce finish on newly hardened concrete no later than the day following form removal. Wet the surface and rub it with carborundum brick or other abrasive until uniform color and texture are produced. Use no cement grout other than cement paste drawn from the concrete itself by the rubbing process.
 - 1. Optional Grout Cleaned Finish may be provided in accordance with Section 5.3.3.4.b of ACI 301-05.

3.06 FINISHING SLABS

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

G. Slab Finish Schedule: Apply finishes in the following typical locations and as otherwise shown on the drawings:

1. Trowel finish:
 - a. Exposed interior floors not otherwise scheduled.
 - b. Surfaces to receive resilient tile.
2. Trowel and fine broom: Surfaces to receive thinset tile.

3.07 CONCRETE CURING AND PROTECTION

A. General:

1. Prevent premature drying of freshly placed concrete, and protect from excessively cold or hot temperatures until concrete has cured.
2. Provide curing of concrete by one of the methods listed and as appropriate to service conditions and type of applied finish in each case.

B. Curing Period:

1. Not less than 7 days for standard cements and mixes.
2. Not less than 4 days for high early strength concrete using Type III cement.

C. Formed Surfaces: Cure formed concrete surfaces by moist curing with forms in place for full curing period or until forms are removed.

D. Surfaces Not in Contact with Forms:

1. Start initial curing as soon as free water has disappeared, but before surface is dry.
2. Keep continuously moist for not less than 3 days by uninterrupted use of any of the following:
 - a. Water ponding.
 - b. Water-saturated sand.
 - c. Water-fog spray.
 - d. Saturated burlap: Provide 4-inch minimum overlap at joints.
3. Begin final curing procedures immediately following initial curing and before concrete has dried.
4. Continue final curing to end of curing period.

E. Avoid rapid drying at end of curing period.

3.08 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. Composite Sampling, and Making and Curing of Specimens: ASTM C 172 and ASTM C 31.

B. Slump: ASTM C 143. One test per batch.

1. Modify sampling to comply with ASTM C 94.

C. Air Content of Normal Weight Concrete: ASTM C 173 or ASTM C 231. One test per strength test performed on air-entrained concrete.

D. Compressive Strength Tests: ASTM C 39.

1. Testing for acceptance of potential strength of as-delivered concrete:
 - a. Obtain samples on a statistically sound, random basis.
 - b. Minimum frequency:
 1. One set per 100 cubic yards or fraction thereof for each day's pour of each concrete class.
 2. One set per 3500 square feet of slab or wall area or fraction thereof for each day's pour of each concrete class.

END OF SECTION 03310

DIVISION 4 - MASONRY

SECTION 04220 – BRICK & CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Brick, and concrete masonry units foundation and brick veneer walls.
2. Mortar and grout, reinforcement, anchorage, and accessories.

PART 2 - PRODUCTS

2.01 BRICK MASONRY UNITS

A. Modular Facing Brick: ASTM C 216.

1. Basis of Design: Cherokee Brick and Tile Company " M/S Velour Light Gray".
2. Acceptable Manufacturers:
 - a. Cherokee Brick and Tile, Macon, GA
 - b. Triangle Brick, Durham, NC
 - c. Cunningham Brick, Lexington, NC
 - d. Statesville Brick, Statesville, NC
 - e. Other manufacturers as approved.
3. Submit samples.

2.02 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards for types required to match existing, and as follows:

1. Size: Standard units with nominal dimensions of 16" long, 8" high, and 8" thick.
2. Special shapes: Provide special block types where required for corners, control joints, headers, lintels, and other special conditions, whether or not specifically indicated on the drawings as special.
 - a. Outside corners: Square-edged units except where otherwise indicated.
3. Hollow load-bearing units: ASTM C 90, and as follows:
 - a. Standard weight.
 - b. Exposed faces: Manufacturer's standard color and texture.

2.03 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Aggregate for Mortar: ASTM C 144.
- D. Water: Potable.
- E. Colored Mortar at brick: As selected by Architect from manufacturer's full range of colors.

2.04 REINFORCEMENT AND ANCHORAGE

A. Joint Reinforcement and Anchorage Materials: Comply with the following general requirements for materials required in joint reinforcement and anchorage devices:

1. Steel wire: ASTM A 82.
 - a. Hot-dip galvanizing (after fabrication): ASTM A 153, Class B-2.
 1. Use: Exterior locations or in contact with earth.
 2. Hot-dip galvanized steel sheet: ASTM A 635 or ASTM A 366; galvanizing in compliance with ASTM A 153, Class B.
 - a. Use: Anchors and miscellaneous sheet metal in masonry accessories at exterior exposures.
- B. Joint Reinforcement: Welded-wire units prefabricated into straight lengths of not less than 10 feet, with deformed continuous side rods and plain cross rods.
1. Width: Approximately two inches less than nominal wall width, providing not less than 5/8 inch mortar coverage on exterior exposures and 1/2 inch elsewhere.
 2. Wire sizes:
 - a. Side rod diameter: 0.1483 inch.
 - b. Cross rod diameter: 0.1483 inch.

3. Configuration:
 - a. Applications of single unit width: Ladder design, cross rods at not more than 16 inches on center.
 - b. Corners: Prefabricated L- and T-shaped units.
- C. Reinforcing Bars: Provide deformed bars complying with the following: ASTM A615, Grade 60.

2.05 MISCELLANEOUS MASONRY ACCESSORIES

- A. Bond Breaker Strips: ASTM D 226, Type I; No. 15 asphalt felt.
- B. Sealant and Backer Rod: As specified in Division 7.
- C. Masonry Veneer Anchors at Wood Studs: Adjustable, 2-piece assemblies, for attachment over sheathing to wood studs, allowing vertical and horizontal movement and capable of withstanding a 100-lb load in tension or compression without deforming.
- D. Flexible Sheet Flashing: Perm-A-Barrier Wall Flashing by W. R. Grace & Company or Keystone Flashing Co. or Polyguard Products Inc. or approved equal, 40 mil thick x 18" wide rolls.
- E. Metal Flashing: where shown or required; galvanized; not less than 24 gage.

2.06 MORTAR AND GROUT MIXES

- A. Mortar for Unit Masonry: ASTM C 270, Proportion Specification.
 1. Limit cementitious materials to lime and portland cement.
 2. Masonry below grade and in contact with earth: Type S.
 3. Locations indicated on the drawings: Type S.
 4. Applications as follows: Type N.
 - a. Exterior, above-grade veneer.
 - b. Locations for which another mortar type has not been specifically indicated.

PART 3 - EXECUTION

3.01 INSTALLATION PROCEDURES

- A. Comply with manufacturer's installation instructions for the stone veneer selected with a stacked appearance.
- B. Concrete Masonry Units: Do not wet concrete masonry units prior to laying.
- C. Cutting: Where cutting is required, use power saws to provide clean, sharp, unchipped edges.
 1. Do not use wet cutting techniques with concrete unit masonry.

3.02 MASONRY CONSTRUCTION - GENERAL

- A. Pattern Bond: Lay exposed masonry in running bond except where other bonds are indicated at special features.
 1. Lay concealed masonry in running bond, or lap units at least 2 inches.
- B. Expansion and Control Joints: Build in movement joints where indicated, installing accessory items as masonry is constructed.

3.03 LAYING MASONRY UNITS

- A. Hollow Masonry Units: Install so that face shells are solidly mortared, horizontally and vertically. Bed webs solidly in mortar at starting course.
- B. Joints: Make mortar joints visually and dimensionally consistent.
 1. Except as otherwise indicated, maintain mortar joint widths of 3/8 inch.
- C. Exposed Joints: Using concave jointer slightly larger than joint width, tool exposed joints before mortar has assumed final set.

3.04 JOINT REINFORCEMENT, SINGLE-WYTHE WALLS

- A. General: Provide continuous horizontal joint reinforcement for specific single-wythe masonry walls indicated. Lap reinforcing a minimum of 6 inches.
- B. Vertical Spacing: Not more than 16 inches on center.

3.05 CLEANING AND PROTECTION

- A. Clean masonry after mortar is thoroughly set and cured.
 1. Scrape off adhered mortar particles by hand, using non-metallic tools.
 2. Comply with directions of concrete unit masonry manufacturer and NCMA Tek Bulletin No. 45 for cleaning CMU.

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B. Protection: Institute protective measures as required to ensure that unit masonry work will be clean and undamaged at substantial completion.

END OF SECTION 04220

DIVISION 5 - METALS
SECTION 05500 - METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe railings and guard rails
- B. Cast-in stair nosings
- C. Pipe bollards
- C. Other shop fabricated steel and aluminum items.

1.02 RELATED REQUIREMENTS

- A. Section 03300 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04200 - Unit Masonry: Placement of metal fabrications in masonry.
- C. Section 09900 - Painting and Coating: Paint finish.

1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 2012.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2008.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2012.
- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2012.
- G. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2010a.
- H. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2010.
- I. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2012.
- J. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2012e1.
- K. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2012.
- L. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2012.
- M. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.
- N. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; American Welding Society; 2008.
- O. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).
- P. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).
- Q. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A500, Grade B cold-formed structural tubing.
- C. Plates: ASTM A283.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, galvanized to ASTM A153/A153M where connecting galvanized components.
- F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209 (ASTM B209M), 5052 alloy, H32 or H22 temper.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210 (ASTM B210M), 6063 alloy, T6 temper.
- D. Aluminum-Alloy Bars: ASTM B211 (ASTM B211M), 6061 alloy, T6 temper.
- E. Bolts, Nuts, and Washers: Stainless steel.
- F. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

- A. Guards and railings as shown: Schedule 40 pipe, fully welded, ground smooth, prime paint finish.
- B. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- C. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.

- D. Lintels: As detailed; prime paint finish.
- E. Stair nosings: Cast angles with non-slip surface; anchor studs for permanent installation.

2.05 FINISHES - STEEL

- A. Prime paint all steel items.
 - 1. Exceptions: Galvanize items to be embedded in concrete or masonry.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.

2.06 FINISHES - ALUMINUM

- A. Interior Aluminum Surfaces: Class I natural anodized.
- B. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.07 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Obtain approval prior to site cutting or making adjustments not scheduled.
- D. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/8 inch.
- C. Maximum Out-of-Position: 1/8 inch.

END OF SECTION

SECTION 05510 - METAL STAIRS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum grating walkways.
- B. Structural aluminum stair framing and supports.
- C. Aluminum grate treads.
- D. Tubular Aluminum Handrails.

1.02 RELATED REQUIREMENTS

- A. Section 03300 - Cast-in-Place Concrete: Placement of metal anchors in concrete.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2008.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength; 2010.
- D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2012.
- E. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).
- F. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).
- G. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2012.
- H. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.
- I. NAAMM AMP 510 - Metal Stairs Manual; The National Association of Architectural Metal Manufacturers; 1992, Fifth Edition.
- J. NAAMM MBG 531 - Metal Bar Grating Manual; The National Association of Architectural Metal Manufacturers; 2009.
- K. NAAMM MBG 532 - Heavy Duty Metal Bar Grating Manual; 2009 (ANSI/NAAMM MBG 532).
- L. Aluminum Association Specifications and Guidelines for Aluminum Structures.
- M. ANSI/AWS D1.2-08 GMAW for aluminum welding.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data;
- C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

1.05 QUALITY ASSURANCE

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State of North Carolina or personnel under direct supervision of such an engineer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Products of the manufacturers listed or approved equal, provided they comply with requirements of the contract documents, will be among those considered acceptable.
1. Sapa Extrusions, LLC, 1-800-648-3696;
 2. Karnel Inc., 1-800-517-1396;
 3. Ridge Metal Works, 1-513-681-5500.

2.02 METAL STAIRS - GENERAL

- A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, and railings, fabricated accurately for anchorage to each other and to building structure.
1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.
 2. Structural Design: Provide complete stair and railing assemblies complying with the North Carolina Building Code.
 3. Dimensions: As indicated on drawings.
 4. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
 5. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
 6. Separate dissimilar metals using paint or permanent tape.
- B. Metal Jointing and Finish Quality Levels:
1. Commercial: Exposed joints as inconspicuous as possible, whether welded or mechanical; underside of stair not covered by soffit IS considered exposed to view.
 - a. Welded Joints: Intermittently welded on back side, and ground smooth and flush.
 - b. Welds Exposed to View: Ground smooth and flush.
 - c. Mechanical Joints: Butted tight, flush, and hairline.
 - d. Bolts Exposed to View: Countersunk flat or oval head bolts; no exposed nuts.
 - e. Exposed Edges and Corners: Eased to small uniform radius.
 - f. Bolts Exposed to Touch in Travel Area: No nuts or screw threads exposed to touch.
- C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- D. Anchors and Related Components: Same material and finish as item to be anchored, except where otherwise required structurally; provide all anchors and fasteners required.

2.03 STAIR COMPONENT DESIGN REQUIREMENTS

A. Stair stringers and treads:

1. Design stair assembly for a uniform load of 100 lb per square foot and a concentrated load of 300 lb per 4 square inches, or a single concentrated 1000 pound load without permanent deformation.
2. Design treads a single concentrated 1000 pound load without permanent deformation.

B. Walkway:

1. Design for a uniform load of 100 lb per square foot and a concentrated load of 300 lb per 4 square inches.

C. Handrails:

1. Design to resist a concentrated load of 200 lb applied at any point and in any direction at the top of the rail.
2. Design to resist load of 50 lb per lineal foot applied in any direction.

2.04 METAL STAIRS WITH GRATING TREADS

- A. Jointing and Finish Quality Level: Commercial, as defined above.
- B. Risers: Open.

- C. Treads and Walkway: Aluminum bar grating.
 - 1. Grating Type: Welded.
 - 2. Bearing Bar Depth: As required for loading required.
 - 3. Top Surface: Non-slip finish: abrasive.
 - 4. Nosing: Abrasive-coated plate.
 - 5. Nosing Width: 1-1/4 inch, minimum.
 - 6. Anchorage to Stringers: End plates welded to grating, bolted to stringers.
- D. Stringers: Extruded aluminum channels.
 - 1. Stringer Depth: 12 inches.
 - 2. End Closure: Same material as stringer flanges.
- E. Railings: 1 1/4" interior diameter Schedule 40 aluminum pipe railings.

2.05 PREFABRICATED STAIRS

- A. Prefabricated Stairs: Welded or bolted unit, factory fabricated to greatest degree practical and in the largest components possible.
 - 1. Design Requirements: Comply with structural design criteria stated elsewhere in this section, the applicable requirements of ASTM E985.
 - a. Comply with applicable sections of the North Carolina Building Code.
 - 2. Materials: Manufacturer's standard aluminum tubes, plates, bars, shapes, sheets, wire and mesh complying with the requirements of the MATERIALS article of this section.
 - a. Rails: Manufacturer's standard rails.
 - 1) Handrails: 34 inches to 36 inches above stair nosing to top of rail.
 - b. Treads: Manufacturer's standard aluminum grate.
 - c. Finish: mill finish; manufacturer's standard.

2.06 MATERIALS

- A. Primary structural components: 6000 Series aluminum alloy with 6061-T6:
 - 1. Stair stringers;
 - 2. Stair treads;
 - 3. Tread brackets;
 - 4. Stair attachment brackets.
- B. Grating Walkway: 6000 Series aluminum alloy with 6061-T6; removable panels up to 36" long laid on ledgers and butted end to end as shown.
- C. Steel Bolts, Nuts, and Washers: Stainless steel grade 304 where connecting dissimilar components.
- D. Welding Materials: AWS D1.2/D1.2M: 2008; type required for materials being welded.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects.
- B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.
- C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- D. Provide welded field joints where specifically indicated on shop drawings. Perform field welding in accordance with AWS D1.1.
- E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.

- F. Obtain approval prior to site cutting or creating adjustments not scheduled.
- G. Coat surfaces to be in contact with concrete with bituminous paint, or separate dissimilar materials by other means.

3.03 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

DIVISION 6 - WOOD AND PLASTICS

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Rough carpentry for:
 - a. Wood framing and sheathing.
 - b. Miscellaneous lumber for attachment and support of other work.
2. Preservative treatment.

1.02 SUBMITTALS

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

1.03 QUALITY ASSURANCE

A. Inspection Agencies:

1. SPIB: Southern Pine Inspection Bureau; treated lumber, trusses.
2. NLGA: National Lumber Grades Authority: structural framing.

PART 2 – PRODUCTS

2.01 DIMENSION LUMBER

- A. Size: Provide nominal sizes indicated, complying with NIST PS 20 except where actual sizes are specifically required. Provide continuous members; splicing is not acceptable.
 1. Surfacing: Dressed lumber (S4S).
 2. Moisture content: Kiln-dry or MC15 (15 percent maximum moisture content).
- B. Stud Framing -- 2 x 4 through 2 x 6: Grade: No. 2 (Structural Light Framing).
- C. Joist and Small Beam Framing -- 2 x 6 through 4 x 16:
 1. Species: Southern Yellow Pine (SP), Grade: No. 2.
- D. Engineer Lumber:
 1. GP Lam LVL (or equal) beams and headers qualified to ASTM D 5456 by APA- The Engineered Wood Association. 1.9E min., 1 3/4" thick, Fb = min. 2,600 psi. For depth other than 12", Fb shall be multiplied by $(12/d)^{1/9}$.
- E. Miscellaneous Lumber: Provide dimension lumber and boards necessary for the support of work specified in other sections, whether or not specifically indicated, and including but not limited to blocking, nailers, etc.
 1. Lumber: S4S, No. 2 or better, 15 percent maximum (kiln-dry).

2.02 CONSTRUCTION PANELS

- A. Roof Sheathing: Oriented Strand Board sheathing: APA Rated, OSB Structural Panels, Exposure 1 (exterior glue), PS-2 or APA PRP-108 performance standards, 24/16 spacing, and 5/8" thick.
 - a. Tongue and groove edges.
- B. Wall Sheathing: Oriented Strand Board (OSB), square edged, APA Rated (exterior glue) sheathing panels with nailing pattern recommended by the manufacturer for shear walls, and nominal 1/2" thick.

2.03 MISCELLANEOUS MATERIALS

- A. Fasteners: Provide as required by applicable codes and as otherwise indicated.
 1. Provide fasteners with a hot-dip zinc coating (ASTM A 153) for treated lumber and where wood is in ground contact, subjected to high relative humidity, or exposed to weather.
- B. Framing Connectors and Supports: Prefabricated, formed steel units; hot-dip galvanized finish unless otherwise indicated; type and size as required; approved by applicable codes.
- C. Air Infiltration Barrier: Spunbonded olefin or woven polyolefin sheet, UV-stabilized, for building wrap.

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1. The following products or approved equal, provided they comply with requirements of the contract documents, will be among those considered acceptable:

a. "Styrofoam Weathermate Plus", Brand Housewrap", The Dow Chemical Co.; "Tyvek"; or "Amowrap".

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

2.04 WOOD TREATMENT BY PRESSURE PROCESS

A. Aboveground Lumber: AWPB LP-2 (waterborne preservatives).

1. Kiln dried after treatment to 19 percent maximum moisture content.

2. Treat the following:

a. Wood in contact with masonry or concrete.

b. Sill plate.

c. Other members indicated.

B. Fasteners for Preservative Treated Wood: Hot-dip galvanized steel (ASTM A153).

PART 3 - EXECUTION**3.01 INSTALLATION - GENERAL**

A. Arrange work to use full length pieces except where lengths would exceed commercially available lengths. Discard pieces with defects that would lower the required strength or appearance of the work.

B. Cut and fit members accurately. Install plumb and true to line and level.

C. Fasten carpentry in accordance with applicable codes and recognized standards.

D. Where exposed, countersink nails and fill flush with suitable wood filler.

3.02 MISCELLANEOUS CARPENTRY

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

B. Use countersunk fasteners appropriate to applied loading.

3.03 WOOD FRAMING - GENERAL

A. Comply with sizes, spacing, and configurations indicated. Where not specifically indicated, comply with applicable codes and NFPA "Manual for Wood Frame Construction." Splice members only where specifically indicated or approved.

B. Space fasteners as indicated. Where not specifically indicated, comply with applicable codes and the "Recommended Nailing Schedule" of NFPA "Manual for Wood Frame Construction" and "National Design Specification for Wood Construction."

3.04 INSTALLATION OF CONSTRUCTION PANELS

A. Employ the following fastening methods:

1. Nail roof and wall sheathing to framing.

a. Provide solid blocking under panel edges other than intact tongue and groove edges.

3.05 AIR INFILTRATION BARRIER

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

END OF SECTION 06100

SECTION 06192 - PREFABRICATED WOOD TRUSSES

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Trusses fabricated from dimension lumber.
 - 2. Plate connectors.
 - 3. Engineering of trusses.
 - 4. Erection of trusses.
 - 5. Erection accessories and bracing.
 - 6. Bridging.
 - 7. Attachment to structure.

1.02 REFERENCES

- A. ASTM A 446/A 446M-93 -- Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality; 1993.
- B. ASTM A 525-93 -- Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process; 1993.
- C. ASTM A 792-93a—Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process, General Requirements; 1993.
- D. NBS PS 20-70 -- American Softwood Lumber Standard; U. S. Department of Commerce, National Bureau of Standards; 1970 (Amended 1986).
- E. TPI PCT-80 -- Design Specification for Metal Plate Connected Parallel Chord Wood Trusses; Truss Plate Institute; 1980.
- F. TPI QST-89 -- Quality Standard for Metal Plate Connected Wood Trusses (Appendix P to TPI-85); Truss Plate Institute; 1989.
- G. TPI-85 -- Design Specification for Metal Plate Connected Wood Trusses; Truss Plate Institute; 1985, with current errata and addenda. Refer to TPI Truss Bracing Booklet HIB-91.

1.03 SYSTEM DESCRIPTION

- A. Design trusses and bracing to support dead loads and to withstand live loads indicated on the drawings.

1.04 SUBMITTALS

- A. Shop Drawings: Submit detailed drawings for fabrication, bracing, and erection of trusses including plans, elevations, and large scale details of special connections, joining, and accessories.
- B. Shop drawings shall be sealed by a professional engineer registered in the state in which the project is located.

1.05 QUALITY ASSURANCE

- A. Provide trusses fabricated as specified herein and complying with the following:
 - 1. TPI-85, "Design Specification for Metal Plate Connected Wood Trusses."
 - 2. TPI-80, "Design Specification for Metal Plate Connected Parallel Chord Wood Trusses."
 - 3. TPI-89, "Quality Standard for Metal Plate Connected Wood Trusses."
- B. Lumber Quality:
 - 1. Comply with NBS PS 20 and applicable grading rules.
 - 2. Grade stamp: Provide factory marking on each lumber member showing type, grade, mill, and grading agency.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Handle units to avoid damage. Comply with AITC recommendations and manufacturer's printed instructions.
 - 1. 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.

PART 2 – PRODUCTS

2.01 TRUSS CONNECTOR PLATES

- A. Connector Plate Manufacturers:
 - 1. Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Alpine Engineered Products, Inc.
 - b. Clary, a Division of Alpine Engineered Products, Inc.
 - c. Mitek Industries, Inc.
 - d. Tee-Lok Corporation.
 - e. Truss Connectors of America.
- B. Connector Plates: Fabricate connector plates from sheet metal meeting the following requirements:
 - 1. Structural properties: ASTM A 446, any grade.
 - 2. Finish: Hot-dip galvanized; ASTM A 525, G60, minimum.
 - 3. Thickness: As required by truss design but not less than 0.036 inch (21 gage).

2.02 LUMBER

- A. General: Southern Yellow Pine, No. 2 or better.
 - 1. Surfacing: Dressed, S4S.
 - 2. Moisture content: 15 percent maximum at time of dressing and shipment.

2.03 FASTENERS AND ANCHORAGES

- A. Framing Anchors and Supports: Prefabricated, formed steel units; galvanized finish, ASTM A 525, G60, unless otherwise indicated; type and size as required; approved by applicable codes.
 - 1. Manufacturers: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Harlen Metal Products, Inc.
 - b. Simpson Strong-Tie Company, Inc.
 - c. Teco.
 - d. United Steel Products Company.
- B. Fasteners: Comply with applicable codes and standards. Fasten trusses to top plate per Table 2304.9.1 of the NCSBC for rafters to plate in addition to connector shown on the drawings.

2.04 FABRICATION

- A. Shop fabricate trusses to comply with TPI QST "Quality Standard for Metal Plate Connected Wood Trusses" and to fulfill with design requirements.
- B. Press connectors into both sides of joint simultaneously.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Lift trusses at designated lifting points only.
- B. Install trusses in accordance with manufacturer's instructions for erection.
 - 1. Truss spacing: 24 inches on center, typical.
- C. Install trusses true to line and level, with webs plumb, and with ends accurately located.
- D. Provide temporary bracing to hold trusses upright and in place until permanently secured.
- E. Install permanent bridging, bracing, and anchors to maintain trusses straight and in correct position before installing supported construction or superimposing loads.
- F. Field cutting of truss members not allowed.
- G. Coordinate installation of framing to be attached to or supported by trusses. Verify that concentrated loads will occur only at locations incorporated into the design of the trusses.

END OF SECTION 06192

PART 1 - GENERAL

1.01 SUMMARY

- A. Fiber-cement soffit panels, and trim.

1.02 SUBMITTALS

- A. Fiber-cement soffit panels, and trim.
 - 1. Product data.
- B. Coordinate installation of woodwork with other work to avoid damage.

1.03 MANUFACTURERS

- A. Fiber-cement panels and trim.
 - 1. Acceptable manufacturers include but are not limited to the following subject to the requirements of the specifications and the drawings.
 - a. Certainteed Saint Gobain: www.certainteed.com; Weatherboards.
 - b. Guardian Building Products: www.guardian.com; Guardian Trim.
 - c. James Hardie Building Products: jameshardie.com.

PART 2 - PRODUCTS

2.01 WOODWORK

- A. All Woodwork Finishes: As indicated on drawings.

2.02 WOOD MATERIALS

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

2.03 FABRICATION

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

3.01 PREPARATION

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

3.02 INSTALLATION - GENERAL

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

3.03 PROTECTION

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

END OF SECTION 06200

SECTION 06410 - ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Specially fabricated casework units.
- B. Shop fabricated cabinet units.
- B. Countertops.
- C. Cabinet hardware.
- D. Factory finishing.

1.02 REFERENCE STANDARDS

- A. ANSI A135.4 - American National Standard for Basic Hardboard; 2004.
- B. ANSI A208.1 - American National Standard for Particleboard; 2009.
- C. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2009.
- D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2009.
- E. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association; 2010 (ANSI/BHMA A156.9).
- F. GSA CID A-A-1936 - Adhesive, Contact, Neoprene Rubber; Federal Specifications and Standards; Revision A, 1996.
- G. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.
- H. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress; National Hardwood Lumber Association; 2011.
- I. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2005.

1.03 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - 1. Minimum Scale of Detail Drawings: 1-1/2 inch to 1 foot.
 - 2. Provide the information required by AWI/AWMAC/WI Architectural Woodwork Standards.
- C. Product Data
 - 1. Hardware accessories.
 - 2. Plastic Laminate
 - 3. Solid surfacing materials
- D. Samples:
 - 1. Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.
 - 2. Plastic Laminate: 2- by 2-inch piece of each type, pattern, and color.
 - 3. Solid surfacing materials: 3 by 3-inch piece of each type, pattern, and color.

1.04 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from moisture damage.

1.06 FIELD CONDITIONS

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 CABINETS

- A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI//AWMAC/WI Architectural Woodwork Standards for Custom Grade.
- B. Breakroom Cabinets: Custom grade; Flush overlay doors and drawer fronts.
 - 1. Plywood or Medium Density Fiberboard
 - 2. Exposed surfaces: Plastic laminate;
 - 3. Interior exposed surfaces: Melamine.

2.02 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.
- B. Provide wood harvested within a 500 mile radius of the project site.

2.03 LAMINATE MATERIALS

- A. Manufacturers:
 - 1. Acceptable manufacturers include but are not limited to the following subject to the requirements of the specifications and the drawings.
 - a. Avonite.
 - b. Nevamar.
 - c. WilsonArt
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.

2.04 SOLID SURFACE MATERIALS

- A. Manufacturers:
 - 1. Acceptable manufacturers include but are not limited to the following subject to the requirements of the specifications and the drawings.
 - a. Avonite; Avonite, Inc.
 - b. Corian; DuPont Polymers.
 - c. Fountainhead; Nevamar Corp.
 - d. Gibraltar; Ralph Wilson Plastics Co.
 - e. Swanstone; The Swan Corporation.
 - f. WilsonArt Solid Surface
- B. Homogenous solid sheets of filled plastic resin; ASTM Z124.3, Type 5 or 6 without precoated finish

2.05 HARDWARE

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards or multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch spacing adjustments; AWI 400A-T-11.
- C. Drawer and Door Pulls: "U" shaped wire pull, steel with chrome finish, 4 inch centers.
- D. Catches: Magnetic.

- E. Drawer Slides:
 - 1. Type: Extension types as scheduled.
 - 2. Static Load Capacity: Commercial grade.
 - 3. Mounting: Side mounted.
 - 4. Stops: Integral type.
 - 5. Features: Provide self closing/stay closed type.
 - 6. Manufacturers: Acceptable manufacturers include but are not limited to the following subject to the requirements of the specifications and the drawings.
 - a. Accuride International, Inc: www.accuride.com.
 - b. Grass America Inc: www.grassusa.com.
 - c. Hettich America, LP; Quadro: www.hettichamerica.com.
 - d. Knape & Vogt Manufacturing Company: www.knapeandvogt.com.
- F. Hinges: Frameless concealed self-closing type, steel with polished finish.
 - 1. Basis of Design: Amerock; Frameless Concealed, 165° Full Overlay, Clip On.
 - 2. Manufacturers: Acceptable manufacturers include but are not limited to the following subject to the requirements of the specifications and the drawings.
 - a. Amerock, a Newell/RubberMaid Company: www.amerock.com.
 - b. Grass America Inc: www.grassusa.com.
 - c. Hardware Resources: www.hardwareresources.com.
 - d. Hettich America, LP; Sensys: www.hettichamerica.com.
 - e. Julius Blum, Inc: www.blum.com.
 - 3. Installation Requirement: AWI 400B-T-8.

2.06 FABRICATION

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- B. Drawer construction:
 - 1. Drawer Front: Solid lumber or MDF;
 - 2. Drawer Sides and Back: Solid lumber with opaque finish, or 7-ply Veneer Core Plywood with HDPL finish and edge banding.
 - 3. Drawer Bottom: Veneer core panel product with "B" face hardwood veneer, or hardboard; AWI 400A-T-8.
 - 4. Drawer Construction: Dovetail, Dowel, Lock Shoulder; AWI 400B-T-7.
- C. Case Body Construction: AWI 400B-T-10; Stop dado/glued with pressure; dowelled/glued with pressure; or fully concealed interlocking mechanical system.
- D. Plastic Laminate Countertops: Self-edged HPDL; AWI 400C-G-1 Type B edge.
 - 1. Material Grades and Size Requirements: AWI 400C-T-1.
 - 2. Workmanship: AWI 400C-T-2.
 - 3. Joint Tolerances: AWI 400C-C-1.
- E. Solid Surface Countertops: AWI 400C-G-1, Type E edge.
- B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length. AWI-400A-C6; AWI 400B-T-3; AWI 400B-T-4; AWI 400B-T-5.
- C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting. AWI 400B-C-1.
- D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. AWI 400B-T-1
- E. Mechanically fasten back splash to countertops as recommended by laminate manufacturer at 16 inches on center.

- F. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

2.07 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. For opaque finishes, apply wood filler in exposed nail and screw indentations and sand smooth.
- C. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.
- D. Finish work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards, Section 5 - Finishing for Grade specified and as follows:
 - 1. Transparent:
 - a. System - 1, Lacquer, Nitrocellulose.
 - b. Stain: As selected by Architect.
 - c. Sheen: Flat.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

- A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- E. Secure cabinets to floor using appropriate angles and anchorages.
- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.03 ADJUSTING

- A. Adjust installed work.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07140

FLUID-APPLIED WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fluid applied membrane waterproofing.
- B. Cant strips and other accessories.
- C. Drainage panels and Protection boards.

1.02 REFERENCE STANDARDS

- A. ASTM C836/C836M - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use With Separate Wearing Course; 2012.
- B. ASTM C1306 - Standard Test Method for Hydrostatic Pressure Resistance of a Liquid-Applied Waterproofing Membrane; 2008.
- C. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers- Tension; 2006a.
- D. ASTM D429 - Standard Test Methods for Rubber Property--Adhesion to Rigid Substrates; 2008.
- E. ASTM D624 - Standard Test Method For Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers; 2000 (Reapproved 2012).
- F. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2006 (Reapproved 2011).
- G. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact; 2007.
- H. ASTM D2240 - Standard Test Method For Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).
- I. ASTM D2370 - Standard Test Method for Tensile Properties of Organic Coatings; 1998 (Reapproved 2010).
- J. ASTM D2939 - Standard Test Methods for Emulsified Bitumens Used As Protective Coatings; 2003.
- K. ASTM D3468 - Standard Specification for Liquid-Applied Neoprene and Chlorosulfonated Polyethylene Used in Roofing and Waterproofing; 1999 (Reapproved 2006).
- L. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers; 2009.
- M. ASTM D5385 - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes; 1993 (Reapproved 2006).
- N. ASTM E96/E96M - Standard Test Methods For Water Vapor Transmission of Materials; 2010.
- O. ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover; 2008a.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for membrane.

- C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.
- D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

1.05 FIELD CONDITIONS

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until cured.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Contractor shall correct defective Work within a five year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no cost to Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hot-Applied Rubberized Asphalt Waterproofing Manufacturers:
 - 1. American Hydrotech, Inc; www.hydrotechusa.com.
 - 2. Barrett Company; www.barrettroofs.com.
 - 3. Carlisle Coatings & Waterproofing, Inc; www.carlisle-ccw.com.
 - 4. W.R. Meadows, Inc; www.wrmeadows.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MEMBRANE AND FLASHING MATERIALS

- A. Hot-Applied Rubberized Asphalt Waterproofing: Elasticized rubberized asphaltic compound, hot-applied and quick setting.
 - 1. Cured Thickness: 0.03 inches, minimum.
 - 2. Suitable for installation over concrete substrates.
 - 3. Tensile Strength: 15 psi, measured in accordance with ASTM D412.
 - 4. Ultimate Elongation: 500 percent, measured in accordance with ASTM D412.
 - 5. Hardness: 60, measured in accordance with ASTM D2240, using Type A durometer.
 - 6. Tear Strength: 150 lbf/inch, measured in accordance with ASTM D624.
 - 7. Water Vapor Permeability: 0.014 perm inch, measured in accordance with ASTM E96/E96M.
 - 8. Adhesion: Greater than 150 psi, measured in accordance with ASTM D4541.
 - 9. Brittleness Temperature: -40 F, measured in accordance with ASTM D746.

2.03 ACCESSORIES

- A. Surface Conditioner: compatible with membrane compound; as recommended by membrane manufacturer.
- B. Protection Board: Type capable of preventing damage to waterproofing due to backfilling and construction traffic.
 - 1. Use one of the following:
 - a. Polystyrene foam board, 1 inch thick.
 - b. Recycled or reclaimed closed-cell foam plastic with non-woven filter fabric cover; 1 inch thick.
 - c. Semi-rigid glass fiber board; unaffected by water, freeze-thaw, fungus, or soil bacteria; containing no formaldehyde, phenol, acrylic, or artificial color; 3/4 inch thick, nominal.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify substrate surfaces are free of frozen matter, dampness, loose particles, cracks, pits, projections, penetrations, or foreign matter detrimental to adhesion or application of waterproofing system.

- C. Verify that substrate surfaces are smooth, free of honeycomb or pitting, and not detrimental to full contact bond of waterproofing materials.
- D. Verify that items that penetrate surfaces to receive waterproofing are securely installed.

3.02 PREPARATION

- A. Protect adjacent surfaces not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions. Vacuum substrate clean.
- C. Do not apply waterproofing to surfaces unacceptable to manufacturer.
- D. Seal cracks and joints with sealant using methods recommended by sealant manufacturer.
- E. Install cant strips at inside corners.

3.03 INSTALLATION

- A. Apply waterproofing in accordance with manufacturer's instructions to specified minimum thickness.
- B. Apply primer or surface conditioner at a rate recommended by manufacturer. Protect conditioner from rain or frost until dry.
- C. At joints and cracks less than 1/2 inch in width including joints between horizontal and vertical surfaces, apply 12 inch wide strip of joint cover sheet.
- D. At joints from 1/2 to 1 inch in width, loop joint cover sheet down into joint between 1-1/4 and 1-3/4 inch. Extend sheet 6 inches on either side of expansion joint.
- E. Center joint cover sheet over joints. Roll sheet into 1/8 inch coating of waterproofing material. Apply second coat over sheet extending minimum of 6 inches beyond sheet edges.
- F. Apply extra thickness of waterproofing material at corners, intersections, and angles.
- G. Install flexible flashings where required and seal into waterproofing material. Seal items penetrating through membrane with flexible flashings.
- H. Seal membrane and flashings to adjoining surfaces. Install termination bar at all edges. Install counterflashing over all exposed edges.

3.04 INSTALLATION - PROTECTION BOARD

- A. Place protection board directly against cured membrane; butt joints. Scribe and cut boards around projections, penetrations, and interruptions.

3.05 FIELD QUALITY CONTROL

- A. Flood to minimum depth of 1 inch with clean water. After 48 hours, inspect for leaks.
- B. If leaking is found, remove water, repair leaking areas with new waterproofing materials as directed by Architect; repeat flood test. Repair damage to building.
- C. When area is proven watertight, drain water and remove dam.

3.06 PROTECTION

- A. Do not permit traffic over unprotected or uncovered membrane.

END OF SECTION 07140

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07160 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Substrate preparation.
 - 2. Bituminous dampproofing for new foundation walls.
 - 3. Edge and penetration detailing materials.

1.02 SUBMITTALS

- A. Product Data: Technical product information and installation instructions which demonstrate that products comply with project requirements.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Deliver dampproofing materials to project site in factory-sealed containers.
- B. Store materials in dry, well-ventilated space.

1.04 SITE CONDITIONS

- A. Install dampproofing only when site weather conditions are acceptable per manufacturer's recommendations.
- B. Ventilation: Provide sufficient ventilation during application and curing of dampproofing to prevent buildup of toxic or flammable fumes.

PART 2 - PRODUCTS

2.01 BITUMINOUS DAMPPROOFING MATERIALS

- A. Cold-Applied Cut-Back Semimastic Asphalt: Solvent-based asphaltic dampproofing mastic of brushing (medium) consistency, fibrated, meeting the requirements of ASTM D 4479, Type I; asbestos free.

2.02 INSTALLATION ACCESSORIES

- A. Reinforcing Fabric: Woven or nonwoven glass fiber, treated with organic binders and coated for compatibility with dampproofing bitumen.
- B. Detailing Mastic: Asphalt-based plastic roof cement, trowel consistency, meeting the requirements of ASTM D 4586.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are smooth, sound, clean, and dry, and that elements which will penetrate dampproofing have been completed and are rigidly installed. Verify that annular openings at penetrations are tightly, rigidly, and permanently sealed.

3.02 PREPARATION

- A. Remove honeycomb, aggregate pockets, fins, ridges, and projecting rough areas.
- B. Fill cracks, holes, depressions, and irregularities with latex patching mortar or detailing mastic as recommended by membrane manufacturer.
- C. Form fillets (cants) at inside corners and around projecting elements using latex patching mortar or detailing mastic.

3.03 INSTALLATION - GENERAL

- A. Comply with dampproofing manufacturer's instructions for handling, preparation, application, and protection of dampproofing materials.

3.04 BELOW-GRADE DAMPPROOFING

- A. Form flashings at outside corners, changes in plane, and penetrations. Apply coating of dampproofing or detailing mastic, embed layer of fiberglass reinforcing extending at least 12 inches onto dampproofing surface, and topcoat with another layer of dampproofing or detailing mastic.
- B. Apply a uniform coat of semimastic dampproofing using spray applicator, brush, or mop. Coverage, 4-1/2 to 5-1/2 gallons per 100 square feet to provide minimum 30-mil dry film thickness.
- C. Apply a "touch-up" coating over areas where coating is thin or has not formed a smooth lustrous surface.
- D. Install protection board over finished dampproofing at Inspection Pit before backfilling;
 - 1. Minimum 1/8" thick premolded, semi-rigid board.
 - 2. Manufacturers including but not limited to:
 - a. PC-2 Protection Course: W. R. Meadows, Inc
 - b. Protection Sheet: Pecora Corp.
 - c. Tremboard: Tremco, Inc.

3.05 INSPECTION

- A. Before covering or backfilling dampproofing, notify the Engineer that the dampproofing is ready for inspection.

3.06 PROTECTION AND CLEANING

- A. Take measures required to protect completed dampproofing after installation.
- B. Install protection board per manufacturer's instructions. Verify that protection board is secure before backfilling. Do not permit backfilling operations to dislodge or dislocate boards.
- B. Clean spillage and soiling from adjacent surfaces using cleaning agents and procedures recommended by the manufacturer of the surface.

END OF SECTION 07160

SECTION 07210 - BUILDING INSULATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Extruded polystyrene board.
 - 2. Glass fiber blanket/batt.

1.02 DEFINITIONS

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

1.03 SUBMITTALS

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

1.04 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Provide manufacturer's standard preformed insulation units, sized for proper fit in indicated applications.
- B. Blanket/Batt Insulation: Where installation of blanket/batt insulation is indicated, glass fiber blanket/batt complying with requirements below.
- C. Extruded Polystyrene Board Insulation for wall cavities: Manufactured by extrusion process with integral high density skin:
 - 1. Type IV (ASTM C 578): 25.0 psi compressive strength.
 - 2. Total R-value: 5.0 per inch minimum.
 - 3. Manufacturers: Products of the following manufacturers or approved equal, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Amoco Foam Products Company.
 - b. Dow U.S.A.
 - c. DiversiFoam Products Company.
 - d. UC Industries, Inc.
- D. Glass Fiber Insulation-Blanket/Batt:
 - 1. Kraft-faced blanket/batt: Type II, Class C (ASTM C 665).
 - 2. Total R-value: 13 at exterior walls; 38 at ceilings.
 - 3. Products of the following manufacturers or approved equal, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. CertainTeed Corporation.
 - b. Manville Roofing Systems, a Division of Schuller International, Inc.
 - c. Owens-Corning Fiberglas Corporation.

2.02 ACCESSORIES

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

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Comply with insulation manufacturer's recommendations and installation sequence. Provide permanent placement and support of insulation.

- B. Install materials in a manner which will maximize continuity of thermal envelope. Use a single layer of insulation wherever possible to achieve indicated requirements, unless otherwise indicated.
- C. Insulation Boards:
 - 1. Extruded polystyrene insulation:
 - a. Foundation installation: Provide installation capable of sustaining subsequent construction work without damage or displacement.
 - 1. Adhesive: Use insulation manufacturer's recommended adhesive to attach insulation boards to foundation. Maximize contact between board surface and substrate.
 - b. Cavity wall insulation: Provide continuous insulation attached or adhered to building sheathing. Tape joints
- D. Insulation Blankets/Batts:
 - 1. Application: Wood-framed construction:
 - a. Kraft-faced insulation: Friction-fit insulation between framing members; staple flanges to face of wood studs and trusses.
 - b. Verify that all kraft-faced insulation is covered by gypsum wall board

END OF SECTION 07210

SECTION 07411-PREFORMED METAL WALL & ROOF PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Architectural roofing and fascia system of preformed aluminum panels.
- B. Fastening system.
- C. Factory finishing.
- D. Accessories and miscellaneous components.

1.02 RELATED REQUIREMENTS

- A. Section 06100 – Rough Carpentry: Roof sheathing.
- B. Section 07900 - Joint Sealers: Field-installed sealants.

1.03 REFERENCE STANDARDS

- A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2005.
- B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.
- C. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2007.
- D. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2006.
- E. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; 2006.

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. Storage and handling requirements and recommendations.
 - 2. Installation methods.
 - 3. Specimen warranty.
- C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
 - 1. Show work to be field-fabricated or field-assembled.
- D. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.
- E. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in NCDOT's name and are registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in the manufacture of roofing systems similar to those required for this project, with not less than 5 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

1.07 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 20 year period from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable manufacturers or approved equal are:
 - 1. Architectural Building Components: www.archmetalroof.com.
 - 2. Construction Metal Products, Inc., (704) 871-8704 www.constructionmetalproducts.com.
 - 3. Petersen Aluminum Corporation*: www.pac-clad.com.

2.02 ARCHITECTURAL ROOF AND FASCIA PANELS

- A. Performance Requirements: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.
- B. Metal Roofing: Factory-formed panels with factory-applied finish.
 - 1. Aluminum Panels:
 - a. Alloy: Aluminum conforming to ASTM B 209/B 209M; temper as required for forming.
 - b. Thickness: Minimum 0.032 inch (0.8 mm).
 - 2. Profile: Standing seam, with minimum 1.75 inch seam height; lapped seam in standing seam profile with concealed floating steel clip allowing free expansion and contraction of panels while holding panels permanently in place.
 - 3. Texture: Smooth.
 - 4. Length: Full length of roof slope, without lapped horizontal joints.
 - 5. Width: Maximum panel coverage of 16 inches with minor stiffening beads.

2.03 ATTACHMENT SYSTEM

- A. Concealed System: Provide manufacturer's standard stainless steel or nylon-coated aluminum concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

2.04 PANEL FINISH

- A. Fluoropolymer Coating System: Manufacturer's standard multi-coat thermocured coating system, including minimum 70 percent fluoropolymer color topcoat with minimum total dry film thickness of 0.9 mil (0.023 mm).
- B. Colors:
 - 1. Wall panels, Eaves, Soffits, Downspouts, Corner Trim, Miscellaneous trim: Basis of Design: Peterson Aluminum Company (www.pac-clad.com) "Champagne".
 - 2. Roof Panels, Gutters, Rake Trim: Basis of Design: Peterson Aluminum Company (www.pac-clad.com) "Hunter Green".

2.05 ACCESSORIES AND MISCELLANEOUS ITEMS

- A. Miscellaneous Sheet Metal Items: Provide ridge caps, flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, and equipment curbs of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.
 - 1. Gutters and Downspouts: Englert LeafGuard, Dixie GutterGuard, or Gutter Shutter Co.: Prefinished Aluminum Sheet: ASTM B 209, manufacturer's standard alloy and temper for indicated applications.
 - 1. Minimum thickness: 0.027 inch thick, unless indicated otherwise.
 - 2. Finish: 70 percent "Kynar 500" or "Hylar 5000" resin finish over epoxy primer; minimum system thickness 1.0 mil. Provide manufacturer's standard prime coat on underside.
 - a. Color: "Lt. Gray".
 - 3. Provide strippable plastic protective film on prefinished surface.
- B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of closed-cell synthetic rubber, neoprene, or PVC.
- C. Soffit: As specified in Section 06200 – Finish Carpentry.
- D. Sealants: As specified in Section 07900.
 - 1. Exposed sealant must cure to rubber-like consistency.
 - 2. Concealed sealant must be non-hardening type.
 - 3. Seam sealant must be factory-applied, non-skinning, non-drying type.
- E. Underlayment for Wood Substrate: ASTM D 226 roofing felt, perforated type; covered by water-resistant rosin-sized building paper.
- F. Snow Guards: Approved equal to Sno Gem polycarbonate snow guards with adhesive fastening to the standing seam panel and manufacturer's instructions.

2.06 FABRICATION

- A. Panels: Fabricate and finish panels and accessory items at factory, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.
- B. Joints: Factory-install captive gaskets, sealants, or separator strips at panel joints to provide weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

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

PART 3 EXECUTION

3.01 PREPARATION

- A. Broom clean wood sheathing prior to installation of roofing system.
- B. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.
- C. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by roof panel manufacturer.
- D. Where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.02 INSTALLATION

- A. Overall: Install roofing system in accordance with panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
 - 1. Install roofing system with concealed clips and fasteners.
 - 2. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.
 - 3. Install panels square and true to line. Seams shall be installed straight, smooth, and free of waves, dents, and scrapes.
- B. Accessories: Install all components required for a complete roofing assembly, including flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.
- C. Underlayment: Install roofing felt and building paper slip sheet on roof deck before installing preformed metal roof panels. Secure by methods acceptable to roof panel manufacturer, minimizing use of metal fasteners. Apply from eaves to ridge in shingle fashion, overlapping horizontal joints a minimum of 2 inches (50 mm) and side and end laps a minimum of 3 inches (75 mm). Offset seams in building paper and seams in roofing felt.
- D. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.
- E. Provide expansion joints in gutters at spacing not to exceed 30 feet.
- F. Provide sheet metal baffles 6 inches high with legs 18 inches long at gutter corners below roof valleys.

3.03 CLEANING

- A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

3.04 PROTECTION

- A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.
- B. Touch-up, repair, or replace damaged roof panels or accessories before date of Substantial Completion.

END OF SECTION

SECTION 07900 - JOINT SEALERS

PART 1 - GENERAL

1.01 SUMMARY

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

1.02 DEFINITIONS

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

1.03 SUBMITTALS

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

1.04 PROJECT CONDITIONS

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

1.05 WARRANTY

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

PART 2 - PRODUCTS

2.01 MATERIALS - GENERAL

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

2.02 ELASTOMERIC SEALANTS

- A. Elastomeric Sealants - General: Chemically curing elastomeric sealants of types indicated, complying with ASTM C 920, including specific Type, Grade, Class, and Uses indicated, as well as all other requirements specified.

1. Where movement capability exceeding that measured by ASTM C 920 is specified, sealant shall withstand the total movement indicated while remaining in compliance with the other requirements specified, when tested in accord with ASTM C 719, with base joint width measured at the time of application.
 2. For M-type substrates: Comply with requirements for Use M.
 3. For G-type substrates: Comply with requirements for Use G.
 4. For A-type substrates: Comply with requirements for Use A.
 5. For O-type substrates: Comply with requirements for Use M (minimum) and Use O for the particular substrate.
- B. Medium Movement Silicone Sealant: One- or two-part non-acid-curing, Grade NS, Class 25, Use NT, plus movement capability of more than 25 percent but less than 50 percent in both extension and compression.
- C. Mildew-Resistant Silicone Sealant: One-part, Type S, Grade NS, Class 25, Use NT, formulated with fungicide, for interior use on nonporous substrates, color to match grout in glazed wall tile.

2.03 SILICONE-LATEX SEALANTS

- A. Silicone-Latex Emulsion Sealant: One-part, nonsag, mildew-resistant, paintable at hollow metal frames; complying with ASTM C 834 use at fiber-cement panel joints.

2.04 SEALANT BACKERS

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

PART 3 - EXECUTION

3.01 PREPARATION

- A. Do not begin joint sealer work until unsatisfactory conditions have been corrected.
- B. Masking Tape: Use masking tape to keep primers and sealers off of adjacent surfaces which would be damaged by contact or by cleanup. Remove tape as soon as practical.

3.02 INSTALLATION

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

3.03 SCHEDULE OF JOINT SEALERS

- A. Exterior Joints at fiber-cement panel joints.
1. Use Silicone-Latex sealants, paintable type.
 2. Joint shape: Concave joint configuration.
- B. Interior inside corners of all glazed tile walls; Mildew-Resistant Silicone Sealant color to match tile grout.
- C. Interior Joints for Which No Other Sealer Is Indicated:
1. Use one of the following sealants:
 - a. Use Silicone-Latex sealants, paintable type.
 - b. Mildew-resistant silicone sealant at all ceramic tile corners and at fixtures.
 2. Joint shape: Concave joint configuration.

END OF SECTION 07900

DIVISION 8 - DOORS AND WINDOWS

SECTION 08110 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Standard steel frames.
 - 2. Insulated doors.

1.02 REFERENCES

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

1.03 SUBMITTALS

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

1.04 QUALITY ASSURANCE

- A. Quality Standard: Comply with SDI 100.
- B. Coordination: Transmit copy of final shop drawings to wood door manufacturer to allow prefitting of wood doors to steel frames.
- C. Wind loading shall comply with the 2012 NC State Building Code and ASCE-7-05.

1.05 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - 1. Benchmark Commercial Door Products.
 - 2. Curries Company/Essex Industries, Inc.
 - 3. Republic Builders Products Division/DESCO.
 - 4. Steelcraft Manufacturing Company/Masco Industries.
 - 5. D & D Specialties (864) 427-0368.

2.02 MATERIALS

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

2.03 FABRICATION

- A. Exposed Panel Faces: Fabricate from cold-rolled steel.
- B. Exposed Door Faces: Fabricate from cold-rolled steel.
- C. Frames: Fabricate from cold-rolled or hot-rolled steel.
- D. Exterior Doors: Fabricate from electrolytic galvanized steel.
- E. Weld all door edges and grind smooth.
- F. Exterior Frames: Fabricate from galvanized steel.
- G. Exposed Screws and Bolts: Where required, provide only countersunk, flat Phillips-head fasteners.
- H. Insulated Assemblies: At locations scheduled, provide insulating door and frame assemblies which have been tested in accordance with ASTM C 236 for thermal resistance.
 - 1. U-value: 0.24 BTU per hour per square foot per degree F, minimum.
- I. Hardware Preparation: Comply with DHI A115 series specifications.
 - 1. Locations: Comply with final shop drawings.
- J. Shop Painting:
 - 1. Primer: Apply primer evenly to achieve full protection of all exposed surfaces.

2.04 STEEL DOORS

- A. General: Fabricate steel doors in accordance with requirements of SDI 100.
- B. Exterior Doors:
 - 1. Grade III - Extra Heavy-Duty, Model 1 - Full Flush, 16 gage.
- C. Fixed Panels:
 - 1. Provide fixed panels of same fabrication as doors.

2.05 STEEL FRAMES

- A. General: Fabricate steel frames for scheduled openings, in styles and profiles as shown, using concealed fasteners.
 - 1. Minimum thickness: 16 gage interior; 14 gage exterior.
 - 2. Construction: Mitered and welded corners. Grind smooth.
- A. Guards: Weld protective covers to back of hardware openings at locations where grout, plaster, or other materials might interfere with hardware operation.
- B. Foam Insulation: Fill exterior frame voids with foam insulation, non-expansive type by DAP Inc. or Dow or Foamseal Inc.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Install steel doors, frames, and accessories to comply with manufacturer's recommendations.
 - 1. Comply with detailed installation requirements of final shop drawings.
- B. Frame Installation:
 - 1. General: Adhere to provisions of SDI 105.
 - 2. Anchors: Provide 3 wall anchors per jamb at hinge and strike levels and minimum 18 gage base anchors.
- C. Door Installation:
 - 1. General: Comply with requirements and clearances specified in SDI 100.
- D. Fixed Panel Installation: Install fixed panels with concealed fasteners.

3.02 ADJUST AND CLEAN

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

END OF SECTION 08110

SECTION 08211 - SOLID CORE FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 SUBMITTALS

- A. Product data.
- B. Shop Drawings:
 - 1. Dimensions and location of each product specified.
 - 2. Construction details for each distinct product type.
 - 3. Dimensions and location of blocking for hardware.
 - 4. Fire ratings.

1.02 QUALITY ASSURANCE

- A. Flush Doors: Comply with the following, hereinafter referred to as referenced standard(s):
 - 1. "Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program," including Section 1300, "Architectural Flush Doors," Architectural Woodwork Institute (AWI).
 - 2. Acceptable testing and inspection agencies:
 - a. Underwriters Laboratories Inc.

1.03 WARRANTIES

- A. Warranty:
 - 1. Solid core wood-faced interior doors: 5 years.

PART 2 - PRODUCTS

2.01 SOLID CORE WOOD-FACED DOORS

- A. Description:
 - 1. Faces: Veneers for transparent finish.
 - a. Species: Red Oak.
 - b. Cut: Rotary cut.
 - 2. Finish: Transparent finish specified elsewhere.
 - 3. Grade: Custom.
 - 4. Construction: 5 ply or 7 ply.
 - 5. Core: Particleboard; manufacturer's standard construction.
- B. Manufacturers:
 - 1. Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Algoma Hardwoods, Inc.
 - b. Fenestra Corporation.
 - c. GlenMar Door Manufacturing Company.
 - d. Graham Manufacturing Corporation.
 - e. Mohawk Flush Doors, Inc.
 - f. Weyerhaeuser Company
 - g. Approved equal.

2.02 FABRICATION

- A. Doors: Fabricate to provide consistent clearances as indicated.
 - 1. Hinge and lock edges: Provide standard (1/8-inch in 2 inches) bevel at edges, unless standard bevel would not precisely match hardware bevel; provide proper bevel for hardware.
 - 2. Make neat mortises and cutouts for door hardware indicated.
 - 3. Prefitting: Fabricate and trim doors to size at factory to coordinate with frame shop drawings and floor finishes as indicated in the finish schedule.
 - 4. Premachining: Make all mortises and cutouts required for hardware at the factory to conform to approved hardware schedule, hardware templates, and door frame shop drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install doors in accordance with manufacturer's recommended procedures and requirements of referenced standard.
- B. Prefit Doors: Minimize field fitting to those procedures that are necessary to complete work unfinished during factory prefitting and to provide trouble free operation.
- C. Fitting of Doors:
 - 1. Accurately align and fit doors for trouble free operation throughout range of door swing.
- D. Clearances:
 - 1. Clearance between door edge and head: 1/8 inch.
 - 2. Clearance between door edge and jamb: 1/8 inch.
 - 3. Clearance between door bottom edge and top surface of threshold: 1/4 inch.
 - 4. Clearance between door bottom edge and floor covering surface or finish (where threshold is not indicated): 1/8 inch.
 - 5. Clearance between meeting edges at pairs of doors: 1/8 inch.

END OF SECTION 08211

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Overhead sectional doors, electrically operated, emergency manual chain hoist.
- B. Operating hardware and supports.
- C. Electrical controls.

1.02 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry: Rough wood blocking for door opening.

1.03 REFERENCES

- 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; 1999a.
- B. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference; 1997.
- C. DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors; Door & Access Systems Manufacturers' Association, International; 1996.
- D. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 1998.
- E. NFPA 70 - National Electrical Code; National Fire Protection Association; 1999.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, installation details and lift clearances.
- C. Product Data: Provide component construction, anchorage method, hardware, and operation manual.
- D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified.

1.06 WARRANTY

- A. Correct defective Work within a one year period after Project Acceptance.
- B. Provide five year manufacturer warranty for electric operating equipment.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. **Overhead Door Co.; Product Series 424.**
- B. Other Acceptable Manufacturers:
 - 1. Fimbel Door Corp.
 - 2. Wayne-Dalton Corp.
 - 3. Rayanor
 - 4. Substitutions: See Section 01600 - Product Requirements.

2.02 STEEL DOOR COMPONENTS

- A. Steel Doors: Flush steel, 24 gage, non-insulated ribbed door panels; high lift operating style with track and hardware; complying with DASMA 102, Commercial application.
 - 1. Performance: Withstand positive and negative wind loads equal to lateral wind loads specified by the NC State Building Code using the coefficients for components and cladding without damage or permanent set, when tested in accordance with ASTM E 330, using 10 second duration of maximum load. Comply with requirements of ASCE 7-98, for components and cladding.
 - 2. Door Nominal Thickness: 2 inches thick.
 - 3. Exterior Finish: Prime paint for finish specified in Section 09900.
 - 4. Interior Finish: Pre-finished with baked-on epoxy of white color.

(I-4928) 41188.1.1 / Gaston County I-85 Weigh Station 447

5. Glazed Lights: Full panel width, 3- row; set in place with resilient glazing channel.
6. Operation: Electric.
- B. Door Panels: Flush steel construction; outer steel sheet of 16 gauge minimum, v-grooved profile; inner steel sheet of 16 gauge minimum, flat profile; core reinforcement of 1-3/4 inch thick sheet steel roll formed to channel shape, rabbeted weather joints at meeting rails; insulated.
- C. Glazing: Double strength clear glass, manufacturer's standard full glazing panels.

2.03 DOOR COMPONENTS

- A. Hinge and Roller Assemblies: Heavy duty hinges and adjustable roller holders of galvanized steel; floating hardened steel bearing rollers, located at top and bottom of each panel, each side.
- B. Lift Mechanism: Torsion spring on cross head shaft, with braided galvanized steel lifting cables.
 1. For Manual Chain Operation: Requiring maximum exertion of 25 lbs force to open.
- C. Sill Weatherstripping: Resilient hollow rubber strip, one piece; fitted to bottom of door panel, full length contact.
- D. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.
- E. Head Weatherstripping: EPDM rubber seal, one piece full length.
- F. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.
- G. Lock: Inside center mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; interior and exterior handle.
- H. Bottom sensing edge.

2.04 MATERIALS

- A. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A 653/A 653M, with G60/Z180 coating, plain surface.
- B. Insulation: Polyurethane foam, bonded to facing; Minimum thermal resistance R-8.74.
- C. Metal Primer Paint: Zinc molybdate type.

2.05 ELECTRICAL OPERATION

- A. Electrical Characteristics:
- B. Motor: NEMA MG1, Type 1.
- C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.
- D. Disconnect Switch: Factory mount disconnect switch in control panel.
- E. Electric Operator: ¾ Horsepower; side mounted on cross head shaft, adjustable safety friction clutch; brake system actuated by independent voltage solenoid controlled by motor starter; enclosed gear driven limit switch; enclosed magnetic cross line reversing starter; mounting brackets and hardware.
- F. Safety Edge: At bottom of door panel, full width; electro-mechanical sensitized type, wired to reverse door upon striking object; hollow neoprene covered to provide weatherstrip seal.
- G. Control Station: Standard three button (open-close-stop) momentary type control for each electric operator.
 1. 24 volt circuit.
 2. Surface mounted.
 3. Locate at inside door jamb.
- H. Coordinate electrical power requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- B. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

- A. Install door unit assembly in accordance with manufacturer's instructions.
- B. Anchor assembly to wall construction and building framing without distortion or stress.
- C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- D. Fit and align door assembly including hardware.
- E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

F. Install perimeter trim.

3.03 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 1/16 inch.
- B. Maximum Variation from Level: 1/16 inch.
- C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.
- D. Maintain dimensional tolerances and alignment with adjacent work.

3.04 ADJUSTING

- A. Adjust door assembly for smooth operation and full contact with weatherstripping.
- B. Have manufacturer's field representative present to confirm proper operation and identify adjustments to door assembly for specified operation.

3.05 CLEANING AND PROTECTION

- A. Clean doors, frames and glazing.
- B. Remove temporary labels and visible markings.
- C. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes the insulated translucent sandwich panel system and accessories as shown and specified. Work includes providing and installing:
 - 1. Factory prefabricated structural insulated translucent sandwich panels
 - 2. 2 ¼" Aluminum framing system
 - 3. Aluminum sill flashing

1.02 RELATED SECTIONS

- A. Pre-engineered Metal Buildings: Section 13610
- B. Preformed Wall & Roof Panels: Section 07411
- C. Sealants: Section 07900.

1.03 SUBMITTALS

- A. Submit manufacturer's product data. Include construction details, material descriptions, profiles and finishes of components.
- B. Submit shop drawings. Include elevations and details.
- C. Submit manufacturer's color charts showing the full range of colors available for factory-finished aluminum. When requested, submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below. If finishes involve normal color variations, include sample sets consisting of two or more units showing the full range of variations expected.
 - 1. Sandwich panels: 12" x 12" units
 - 2. Factory finished aluminum: 5" long sections
- D. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.

1.04 REFERENCE STANDARDS

- A. Flame Spread and Smoke Developed (UL 723)
- B. Burn Extent (ASTM D 635)
- C. Color Difference (ASTM D 2244)
- D. Impact Strength (UL 972)
- E. Bond Tensile Strength (ASTM C 297 after aging by ASTM D 1037)
- F. Bond Shear Strength (ASTM D 1002)
- G. Beam Bending Strength (ASTM E 72)
- H. Insulation U-Factor (NFRC 100)
- I. NFRC System U-Factor Certification (NFRC 700)
- J. Solar Heat Gain Coefficient (NFRC or Calculations)
- K. Condensation Resistance Factor (AAMA 1503)
- L. Air Leakage (ASTM E 283)
- M. Structural Performance (ASTM E 330)
- N. Water Penetration (ASTM E 331)

1.04 QUALITY ASSURANCE

- A. Manufacturer's Qualifications
 - 1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can

show evidence of those materials being satisfactorily used on at least six projects of similar size, scope and location. At least three of the projects shall have been in successful use for ten years or longer.

2. Panel system must be listed by an ANSI accredited Evaluation Service, which requires quality control inspections and fire, structural and water infiltration testing of sandwich panel systems by an accredited agency.
3. Quality control inspections shall be conducted at least once each year and shall include manufacturing facilities, sandwich panel components and production sandwich panels for conformance with AC177 "Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems" as issued by the ICC-ES.

- B. Installer's Qualifications: Installation shall be by an experienced installer, which has been in the business of installing specified panel systems for at least three consecutive years and can show evidence of satisfactory completion of projects of similar size, scope and type.

1.05 PERFORMANCE REQUIREMENTS

- A. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system.
1. When requested, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 2. Standard panel system shall have less than 0.01 cfm/ft² air leakage by ASTM E 283 at 6.24 PSF (50 mph) and no water penetration by ASTM E 331 at 15 PSF; and structural testing by ASTM E 330.
 3. Structural Loads; Provide system capable of handling the following loads:
 - a. Positive Wind Load: +14.5 PSF
 - b. Negative Wind Load: -19.4 PSF
 - c. Seismic Design Criteria: Seismic Design Category C
 1. S_s = 31.4%
 2. S₁ = 10.4%
 3. Site Class D

1.06 DELIVERY STORAGE AND HANDLING

- A. Deliver panel system, components and materials in manufacturer's standard protective packaging.
- B. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

1.07 WARRANTY

- A. Submit manufacturer's and installer's written warranty agreeing to repair or replace panel system work, which fails in materials or workmanship within one year of the date of delivery. Failure of materials or workmanship shall include leakage, excessive deflection, deterioration of finish on metal in excess of normal weathering and defects in accessories, insulated translucent sandwich panels, or other components of the work.
- B. Extended Warranty: five years for failure of materials and workmanship as defined above.

PART 2 - PRODUCTS

2.01 PANEL COMPONENTS

- A. Face Sheets
1. Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.
 - a. Thermoplastic (e.g. polycarbonate, acrylic) faces are not acceptable.
 - b. Face sheets shall not deform, deflect or drip when subjected to fire or flame.

2. Interior face sheets:
 - a. Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than 25 and smoke developed no greater than 250 when tested in accordance with UL 723.
 - b. Burn extent by ASTM D 635 shall be no greater than 1".
 3. Exterior face sheets:
 - a. Color stability: Full thickness of the exterior face sheet shall not change color more than 3 CIE Units DELTA E by ASTM D 2244 after 5 years outdoor South Florida weathering at 5° facing south, determined by the average of at least three white samples with and without a protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.
 - b. Strength: Exterior face sheet shall be uniform in strength, impenetrable by hand held pencil and repel an impact minimum of 70 ft. lbs. without fracture or tear when impacted by a 3-1/4" diameter, 5 lb. free-falling ball per UL 972.
- B. Appearance:
1. Exterior face sheets: Smooth 0.070" thick, and Crystal in color.
 2. Interior face sheets: Smooth .045" thick, and White in color.
 3. Face sheets shall not vary more than $\pm 10\%$ in thickness and be uniform in color.
- C. Grid Core
1. Aluminum I-beam grid core shall be of 6063-T6 or 6005-T5 alloy and temper with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I-beam shall be no less than 7/16".
 2. I-beam Thermal break: Minimum 1", thermoset fiberglass composite.
- D. Laminate Adhesive
1. Heat and pressure resin type adhesive engineered for structural sandwich panel use, with minimum 25-years field use. Adhesive shall pass testing requirements specified by the International Code Council "Acceptance Criteria for Sandwich Panel Adhesives".
 2. Minimum tensile strength of 750 PSI when the panel assembly is tested by ASTM C 297 after two exposures to six cycles each of the aging conditions prescribed by ASTM D 1037.
 3. Minimum shear strength of the panel adhesive by ASTM D 1002 after exposure to four separate conditions:
 - a. 50% Relative Humidity at 68° F: 540 PSI
 - b. 182° F: 100 PSI
 - c. Accelerated Aging by ASTM D 1037 at room temperature: 800 PSI
 - d. Accelerated Aging by ASTM D 1037 at 182° F: 250 PSI

2.02 PANEL CONSTRUCTION

- A. Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking I-beams. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.
1. Thickness: 2-3/4"
 2. Light transmission: 20%
 3. Solar heat gain coefficient 0.28.
 4. Panel U-factor by NFRC certified laboratory: 2-3/4" aluminum grid 0.29.
 5. Grid pattern: Nominal size 12" x 24"; pattern: Shoji.
- B. Standard panels shall deflect no more than 1.9" at 30 PSF in 10' 0" span without a supporting frame by ASTM E 72.

- C. Standard panels shall withstand 1200° F fire for minimum one hour without collapse or exterior flaming.

2.03 PERIMETER CLOSURE SYSTEM

- A. Closure system: Concealed fasteners extruded aluminum 6063-T6 and 6063-T5 alloy and temper clamp-tite screw type closure system.
- B. Translucent Panel frame: Manufacturer's standard non-thermal aluminum extrusion with integral gasketing and sized and configured specifically for the translucent panel.
- B. Sealing tape: Manufacturer's standard, pre-applied to closure system at the factory under controlled conditions.
- C. Fasteners: 300 series stainless steel screws for aluminum closures, excluding final fasteners to the building.
- D. Finish:
 - 1. Light Bronze anodized.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Installer shall examine substrates, supporting structure and installation conditions.
- B. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Metal Protection:
 - 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

3.03 INSTALLATION

- A. Install the panel system in accordance with the manufacturer's installation recommendations and approved shop drawings.
- B. Anchor component parts securely in place by permanent mechanical attachment system.
- C. Accommodate thermal and mechanical movements.
- D. Set perimeter framing in a full bed of sealant compound, or with joint fillers or gaskets to provide weather-tight construction.
- E. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturer's installation instructions.

3.04 CLEANING

- A. Clean the panel system inside and outside, immediately after installation.
- B. Refer to manufacturer's written recommendations.

END OF SECTION

SECTION 08520 - ALUMINUM WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Extruded aluminum windows with fixed sash, operating sash, and infill panels.
- B. Factory glazing.
- C. Operating hardware.
- D. Insect screens.

1.02 RELATED REQUIREMENTS

- A. Section 06100 - Rough Carpentry: Rough opening framing.
- B. Section 06100 - Rough Carpentry: Wood perimeter shims.
- C. Section 07260 - Weather Barriers: Perimeter air and vapor seal between window frame and adjacent construction.
- D. Section 07900 - Joint Sealers: Perimeter sealant and back-up materials.
- E. Section 08800 - Glazing.

1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 2012.
- B. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; American Architectural Manufacturers Association; 2009.
- C. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 2012.
- D. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; 2011.
- E. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2010.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2012.
- G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2012.
- H. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- I. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2002 (Reapproved 2010).
- J. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).
- K. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2000 (Reapproved 2008).
- L. FS L-S-125 - Screening, Insect, Nonmetallic; Federal Specifications and Standards; Revision B, 1972.

1.04 PERFORMANCE REQUIREMENTS

- A. Performance Requirements: As specified in PART 2, with the following additional requirements:

- B. Design and size windows to withstand the following load requirements, when tested in accordance with ASTM E 330 using test loads equal to 1.5 times the design wind loads with 10 second duration of maximum load:
 - 1. Design Wind Loads: Comply with requirements of ASCE 7-05.
- C. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
- D. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, or migrating moisture occurring within system.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.06 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, anchorage and fasteners, glass, internal drainage details.
- C. Shop Drawings: Indicate opening dimensions, framed opening tolerances, method for achieving air and vapor barrier seal to adjacent construction, anchorage locations, and installation requirements.
- D. Samples: Submit two samples, 12 x 12 inch in size illustrating typical corner construction, accessories, and finishes.
- E. Certificates: Certify that windows meet or exceed specified requirements.
- F. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.

1.07 QUALITY ASSURANCE

- A. Comply with requirements of AAMA/WDMA/CSA 101/I.S.2/A440-05:
 - 1. AW-80 (Operable)
 - 2. AW-100 (Fixed)

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of AAMA CW-10.
- B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.09 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F.
- B. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.10 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. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Include coverage for degradation of color finish.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Aluminum Windows: Basis of Design: YKK-AP Model YSW 400T.
 - 1. EFCO, A Pella Company: www.efcocorp.com.

2. Peerless Products, Inc: www.peerlessproducts.com.
3. TRACO: www.traco.com.
4. Wausau Window and Wall Systems: www.wausauwindow.com.
5. YKK-AP: www.ykkap.com
5. Substitutions: See Section 01600 - Product Requirements.

2.02 WINDOWS

- A. Windows: Tubular aluminum sections, factory fabricated, factory finished, thermally broken, vision glass, related flashings, anchorage and attachment devices.
 1. Frame Depth: 4".
 2. Air Infiltration: Limit air infiltration through assembly to 0.10 cu ft/min/sq ft of wall area, measured at a specified differential pressure across assembly in accordance with ASTM E283.
 3. Water Infiltration Test Pressure Differential: 15.0 pounds per square foot.
- B. Standard Glazing – U Value: 0.27.
- C. Fixed, Non-Operable Type:
 1. Construction: Thermally broken.
 2. Glazing: See Glass Schedule, Drawing A5.
 3. Exterior Finish: Class I natural anodized.
 4. Interior Finish: Class I natural anodized.
- D. Horizontal Sliding Type:
 1. Construction: Thermally broken.
 2. Provide screens.
 3. Glazing: See Glass Schedule, Drawing A5.
 4. Exterior Finish: Class I natural anodized.
 5. Interior Finish: Class I natural anodized.
- E. Horizontal Sliding Type:
 1. Construction: Non-thermal.
 2. Provide screens.
 3. Glazing: See Glass Schedule, Drawing A5.
 4. Exterior Finish: Class I natural anodized.
 5. Interior Finish: Class I natural anodized.

2.03 ACCESSORIES

- A. Sill Flashing: Match material & finish of window; design shall permit proper installation of backer rod & sealant along bottom and at sides.
- B. Insect Screen Frame: Rolled aluminum frame of rectangular sections; fit with adjustable hardware; nominal size similar to operable glazed unit.
- C. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to achieve effective weather seal.
- D. Fasteners: Stainless steel.
- E. Glass and Glazing Materials: As specified in Section 08800.
- F. Sealant and Backing Materials: As specified in Section 07900.

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

2.05 HARDWARE

- A. Sash lock: Lever handle with cam lock.
- B. Operator: Lever action handle fitted to projecting sash arms with limit stops.
- C. Bottom Rollers: Stainless steel, adjustable.

ALUMINUM WINDOWS

- D. Limit Stops: Resilient rubber.

2.06 FABRICATION

- A. Fabricate components with smallest possible clearances and shim spacing around perimeter of assembly that will enable window installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices.
- D. Arrange fasteners and attachments to ensure concealment from view.
- E. Prepare components with internal reinforcement for operating hardware.
- F. Provide steel internal reinforcement in mullions as required to meet loading requirements.
- G. Provide internal drainage of glazing spaces to exterior through weep holes.
- H. Assemble insect screen frames with mitered and reinforced corners. Secure wire mesh tautly in frame. Fit frame with four, spring loaded steel pin retainers.
- I. Double weatherstrip operable units.
- J. Factory glaze window units.

2.07 FINISHES

- A. Class I Light Bronze Anodized Finish.
- B. Apply 1 coat of bituminous coating to concealed aluminum and steel surfaces in contact with dissimilar materials.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall openings and adjoining air and vapor seal materials are ready to receive aluminum windows.

3.02 INSTALLATION

- A. Install windows in accordance with manufacturer's instructions.
- B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- D. Install sill and sill end angles.
- E. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- F. Coordinate attachment and seal of perimeter air barrier and vapor retarder materials.
- G. Install operating hardware not pre-installed by manufacturer.
- H. Install glass and infill panels in accordance with requirements specified in Section 08800.
- I. Install perimeter sealant in accordance with requirements specified in Section 07900.

3.03 TOLERANCES

- A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.04 ADJUSTING

- A. Adjust hardware for smooth operation and secure weathertight closure.

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3.05 CLEANING

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- A. Remove protective material from factory finished aluminum surfaces.
- B. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION

PART 1 - GENERAL

1.01 SUBMITTALS

- A. Product Data.
- B. Final Hardware Schedule.
- C. Keying Schedule: Separate schedule showing how each lock is keyed.

PART 2 - PRODUCTS

- A. Latching and Locking Devices: Mortise locks, unless otherwise indicated, with appropriate locking function; provide on every door.

2.01 MATERIALS - GENERAL

- A. Manufacturers:
 - 1. Where a particular manufacturer's product is specified, products of other manufacturers will be considered for substitution.
- B. Fasteners: Provide hardware prepared by the manufacturer with fastener holes for machine screws, unless otherwise indicated.
 - 1. Provide all fasteners required for secure installation.
 - 2. Select fasteners appropriate to substrate and material being fastened.
 - 3. Use wood screws for installation in wood.
 - 4. Use fasteners impervious to corrosion outdoors and on exterior doors.
 - 5. Exposed screws: Match hardware finish.
- C. Finish on All Exposed Metal Items: Satin chrome plated (626).
 - 1. Exceptions:
 - a. Plates and bars: Satin stainless steel (630).
 - b. Hinges: Where steel hinges are acceptable, use matching plated finish.
 - c. As indicated for specific items.

2.02 LOCKS, LATCHES, AND BOLTS

- A. Mortise Locksets and Latchsets:
 - 1. Comply with requirements of BHMA A156.13, Operational Grade 2.
 - a. Security Grade 1.
 - 2. Trim: Cast lever with escutcheon plate.
- B. Strikes: Provide strike for each latch bolt and lock bolt.
 - 1. Finish to match other hardware on door.
 - 2. Use wrought box strikes with curved lips unless otherwise indicated.
 - 3. Open strike plates may be used on interior wood door frames.

2.03 LOCK CYLINDERS AND KEYING

- A. Keying: Obtain the owner's keying instructions.
 - 1. Match existing master key system.
 - 2. Provide standard cylinders for locks on all doors, unless otherwise indicated.
- B. Cylinders: Minimum 7-pin pin tumbler cylinders.
 - 1. Construction: All parts brass, bronze, nickel silver or stainless steel.
 - 2. Cylinders made by manufacturers other than the lockset manufacturer will not be acceptable.
- C. Keys: Nickel silver.
 - 1. Stamp each key with manufacturer's change symbol.
 - 2. Provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.
 - 3. Provide 3 of each change key. Master key system shall match existing: 5 master keys.

2.04 DOOR CONTROL DEVICES

- A. Closers - General:
 - 1. Use closers of sizes recommended by manufacturer, unless a larger size is specified.
 - 2. Size closer or adjust closer opening force to comply with applicable codes.

- B. Surface-Mounted Closers:
 - 1. Comply with requirements of BHMA A156.4, Grade 2.
 - a. Provide the following features:
 - 1. PT 4D: Adjustable hydraulic back check.
 - 2. PT 4F: Delayed action.
 - 2. Style: CO2021.
 - 3. Parallel arms: Provide for all closers; use larger size than normal.
 - 1. Finish: Metallic paint finish, color similar to metal hardware on same door.
- B. Recessed-Mounted Closers: Replace existing closers at the 2-Welcome Center entry doors.
- C. Wall/Floor-Mounted Stops/holders: Comply with requirements of ANSI A156.16.
 - 1. Floor-mounted stops: Style: L12121.
 - 2. Resilient bumpers: Gray.

2.05 SEALS AND THRESHOLDS

- A. Weatherstripping:
 - 1. At jambs and head: Replaceable bumper in surface-mounted extruded aluminum housing.
 - a. Bumper: Solid neoprene, hollow bulb or loop.
 - 2. At bottom: Replaceable sweep in surface-mounted extruded aluminum housing.
 - a. Sweep: Solid neoprene.
 - 3. Housing finish: Natural anodized.
- B. Thresholds: Ribbed aluminum.
 - 1. Select style to suit changes in elevation and to fit door hardware and frames.
 - 2. Interlocking hook type threshold: Hook strip on bottom of door, interlocking with top lip of threshold.
 - a. At doors that swing in, provide internal drain and drain pan.
- C. Sealant for Setting Thresholds: Butyl-rubber or butyl-polyisobutylene sealant.

2.06 ARCHITECTURAL DOOR TRIM

- A. Manufacturers:
 - 1. Architectural door trim: Products of the following manufacturers, or approved equal, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Yale Security, Inc.
 - b. Hiawatha, Inc.
 - c. H. B. Ives, a Harrow Company.
 - d. Rockwood Manufacturing Company.
 - e. Triangle Brass Manufacturing Company, Inc.
- B. Push / pulls:
 - 1. Decorative pulls: 1 inch round bars, radius ends, vertical(pull side) and horizontal(push side), 12 & 32 inches long respectively.
 - 2. Pull handles which are not mounted on plates: Fasten with through-bolts concealed under plate on opposite side.
 - 3. Where matching handles or bars are installed on each side of door, mount back-to-back with concealed fasteners.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Factory- or shop-prepare all work for installation of hardware.

3.02 INSTALLATION

- A. Follow hardware manufacturer's recommendations and instructions.
- B. Mount at heights specified in the Door and Hardware Institute's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 1. Exception(s): As required by applicable regulations.
- C. Install hardware in correct location, plumb and level.
- D. Reinforce substrates as required for secure attachment and proper operation.
- E. Thresholds: Apply continuous bead of sealant to all contact surfaces before installing.

3.03 ADJUSTMENT

- A. Adjust each operable unit for correct function and smooth, free operation.
- B. Adjust door closers to overcome air pressure produced by HVAC systems.
- C. If hardware adjustment is completed more than one month before substantial completion, readjust hardware not more than one week before substantial completion.

3.04 CONTRACT CLOSEOUT

- A. Deliver all keys to the owner.

END OF SECTION 08710

SET #02

3 Hinges	5BB1 4 1/2 x 4 1/2	630	IV
1 Lockset	L9050HD 03A	630	SC
1 Cylinder Core	80-037	626	SC
1 Wall Bumper	409	US32D	RO
3 Door Silencer	SR64		IV

SET #03

3 Hinges	5BB1 4 1/2 x 4 1/2	630	IV
1 Lockset	L9080HD 03A	630	SC
1 Cylinder Core	80-037	626	SC
1 Closer	4040 XP EDA	AL	LC
1 Wall Bumper	409	US32D	RO
3 Door Silencer	SR64		IV

SET #04

3 Hinges	5BB1 4 1/2 x 4 1/2	630	IV
1 Lockset	L9080HD 03A	630	SC
1 Cylinder Core	80-037	626	SC
1 Closer	4040 XP REG	AL	LC
1 Kickplate	8400 10" x 34"	US32D	IV
1 Wall Bumper	409	US32D	RO
3 Door Silencer	SR64		IV

SET #05

3 Hinges	5BB1 4 1/2 x 4 1/2	630	IV
1 Privacy Set	L9040 03A L583-363	630	SC
1 Closer	4040 XP REG	AL	LC
1 Kickplate	8400 10" x 34"	US32D	IV
1 Wall Bumper	409	US32D	RO
1 Coat & Hat Hook	574 B	26D	IV
3 Door Silencer	SR64		IV

SET #06

3 Hinges	5BB1 4 1/2 x 4 1/2	630	IV
1 Privacy Set	L9040 03A L583-363	630	SC
1 Closer	4040 XP EDA	AL	LC
1 Kickplate	8400 10" x 34"	US32D	IV
1 Wall Bumper	409	US32D	RO
1 Coat & Hat Hook	574 B	26D	IV
3 Door Silencer	SR64		IV

SET #07

3 Hinges	5BB1 4 1/2 x 4 1/2	630	IV
1 Lockset	L9080HD 03A	630	SC
1 Cylinder Core	80-037	626	SC
1 Closer	4040 XP CUSH	AL	LC
1 Kickplate	8400 10" x 34"	US32D	IV
3 Door Silencer	SR64		IV

END OF SECTION 08711

PART 1 - GENERAL

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1.01 SUMMARY

- A. Section Includes:
 - 1. Insulating glass units.
 - 2. Non-insulating glass units.
 - 2. Glazing accessories.
- B. Types of work in this section include work for:
 - 1. Single pane glass in interior aluminum windows.
 - 2. Single pane glass in interior doors.
 - 3. Insulating glass units in exterior aluminum windows.
 - 4. Insulating glass units in exterior doors.

1.02 PERFORMANCE REQUIREMENTS

- A. Exterior Glazing: Provide glazing assemblies which will withstand normal conditions without failure, loss of weathertightness, or deterioration.
- B. Deterioration includes:
 - 1. For insulating glass:
 - a. Moisture or dirt between panes.
 - b. Development of condensation between panes.
 - c. Damage to internal coating, if any.
 - d. Development of other visible indication of seal failure.

1.03 SUBMITTALS

- A. Product Data.
- B. Insulating Unit Warranty.

1.04 WARRANTY

- A. Warranty on Insulating Glass: Fabricator's standard warranty for 5 years.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers:
 - 1. Products of the following manufacturers or approved equal, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Guardian Industries Corporation: www.guardian.com
 - b. Oldcastle Building Envelope: www.oldcastlebe.com
 - c. Pittsburgh Paint and Glass:
 - d. Viracon, Inc.: www.viracon.com

2.02 GLASS TYPES

- A. Glass Types - General: Provide glass types fabricated of the glass products indicated.
 - 1. Single lite glass thickness: 6 mm (1/4 inch nominal), unless otherwise indicated.
 - 2. Where safety glazing is required by governing authorities, provide certified safety glazing.
- B. Glass Type G1: Insulating units at sliding and fixed windows.
 - 1. Total thickness: 1 inch insulating, nominal.
 - 2. Exterior: Basis of Design: PPG Solarban 60 clear on clear
 - a. Two-ply.
 - b. Thickness of plies: 1/4" (6 mm).
 - c. Color: Outer and inner plies: Clear.
 - d. Shading Coefficient: 0.45.
 - e. Solar Heat Gain Coefficient: 0.39.
 - f. visible light transmission=70%.
 - g. Winter U-value: 0.29 or better.
 - h. Summer U-value: 0.27 or better.
 - i. Air Space: 1/2" thick.

(I-4928) 41188.1.1 / Gaston County I-85 Weigh Station

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- C. Glass Type G2: Insulating units at exterior doors. **464**
1. Total thickness: 1 1/16 inch insulating, nominal.
 2. Exterior: Basis of Design: PPG Solarban 60 clear on clear
 - a. Two-ply.
 - b. Thickness of plies: 1/4" (6 mm).
 - c. Color: Outer and inner plies: Clear.
 - d. Shading Coefficient: 0.45
 - e. Solar Heat Gain Coefficient: 0.39.
 - f. visible light transmission=70%.
 - g. Winter U-value: 0.29 or better.
 - h. Summer U-value: 0.27 or better.
 - i. Air Space: 3/16" thick.
- D. Glass Type G3: 1" Fully Tempered Insulating glass units. Thermal requirements same as Type G1.
- E. Glass Type G4: 1/4" Clear Fully Tempered Float Glass.

2.03 BASIC GLASS PRODUCTS

- A. Sealed Insulating Units: Factory-assembled multiple panes separated by and sealed to spacers forming air-tight, dehydrated air space(s).
1. ASTM E 774, Class B.
 2. Spacer seals: Manufacturer's standard.
- B. Fully tempered float Glass: Quality q3, unless otherwise indicated.
1. ASTM C 1048, Kind FT, Condition A, Type 1, Class 1. Minimized distortion.
- C. Clear Float Glass: Quality q3, unless otherwise indicated.
1. ASTM C 1036, Type 1, Class 1 (Clear).

2.04 INSTALLATION MATERIALS

- A. Installation Materials - General: Select products which have appropriate performance characteristics as recommended by glass and glazing materials manufacturers and which are compatible with all materials with which they will come into contact.
- B. Heel and Toe Bead Sealant: Non-curing, non-skinning, minimum 75 percent solids, butyl or polyisobutylene rubber, complying with 802.3, Type II ductile back bedding compound, as described in AAMA 800.

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

- A. Comply with recommendations for installation contained in the FGMA "Glazing Manual" and "Sealant Manual" except when specifically not recommended or prohibited by the glass or glazing material manufacturer; comply with manufacturer's recommendations.
- B. Protect glazing from edge damage during handling and installation.
- C. Do not install glass that has edge damage or defects that reduce glass strength or performance or diminish appearance.

3.02 GLAZING IN FRAMES

- A. Use continuous heel or toe bead at all exterior glazing.
- B. Do not block weep holes.
- C. Structural Adhesive Glazing: Perform glazing in strict accordance with instructions of structural glazing adhesive manufacturer and additional requirements elsewhere in the contract documents.

3.03 PROTECTION AND CLEANING

- A. Protect glass from contact with contaminating substances resulting from construction operations including weld splatter.
- B. Wash glass on both faces not more than four (4) days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION 08800

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal louvers, frames, and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 6200 - Sheet Metal Flashing and Trim.
- B. Section 07 9005 - Joint Sealers.

1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 2012.
- B. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; Air Movement and Control Association International, Inc.; 2012.
- C. AMCA 511 - Certified Ratings Program for Air Control Devices; Air Movement and Control Association International, Inc.; 2010.
- D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2010.
- E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2012.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.
- D. Samples: Submit two samples 2 by 2 inches in size illustrating finish and color of exterior and interior surfaces.
- E. Test Reports: Independent agency reports showing compliance with specified performance criteria.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide twenty year manufacturer warranty against distortion, metal degradation, and failure of connections.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wall Louvers:
 1. Airolite Company, LLC; www.airolite.com.
 2. American Warming and Ventilating; www.awv.com.

3. Construction Specialties, Inc; www.c-sgroup.com.
4. Approved equal.

2.02 LOUVERS

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified under AMCA 511.
 1. Wind Load Resistance: Design to resist positive and negative wind load of 25 psf without damage or permanent deformation.
 2. Intake Louvers: Design to allow maximum of 0.01 oz/sq ft water penetration at calculated intake design velocity based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
 3. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
 4. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.
- B. Stationary Louvers: Horizontal blade, extruded aluminum construction.
 1. Free Area: 50 percent, minimum.
 2. Blades: straight.
 3. Frame: 4 inches deep, channel profile; corner joints mitered and mechanically fastened, with continuous recessed caulking channel each side.
 4. Metal Thickness: Frame 0.081 inch; blades 0.081 inch.
 5. Finish: Clear anodized; finish welded units after fabrication.
- C. Operable Louvers: Operable horizontal blades, extruded aluminum construction.
 1. Free Area: 50 percent, minimum.
 2. Operation: Gravity balanced, 90 degree opening with adjustment device to permit setting for varying differential static pressure.
 3. Movable Blades: Straight, pivoted at center, with vinyl, rubber, or polyethylene blade edge and jamb seals; rattle-free linkage.
 4. Frame: 4 inches deep, channel profile; corner joints mitered and mechanically fastened, with continuous recessed caulking channel each side.
 5. Metal Thickness: Frame 0.081 inch; blades 0.081 inch.
 6. Finish: Clear anodized; finish welded units after fabrication.

2.03 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M),
 1. Clear Anodizing: AAMA 611 Class I, AA-M12C22A41.
- B. Bird Screen: Interwoven wire mesh of steel, 0.063 inch diameter wire, 1/2 inch open weave, diagonal design.
- C. Insect Screen: 18 x 16 size aluminum mesh.

2.04 ACCESSORIES

- A. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.
- B. Fasteners and Anchors: Galvanized steel.
- C. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared openings and flashings are ready to receive work and opening dimensions are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Install louvers level and plumb.
- C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- D. Secure louver frames in openings with concealed fasteners.
- E. Install perimeter sealant and backing rod in accordance with Section 07 9005.

3.03 ADJUSTING

- A. Adjust operable louvers for freedom of movement of control mechanism. Lubricate operating joints.

3.04 CLEANING

- A. Strip protective finish coverings.
- B. Clean surfaces and components.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09260 - GYPSUM BOARD SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Gypsum wallboard and ceiling board.
 - 2. Drywall finishing.
 - 3. Cementitious backer boards.

PART 2 - PRODUCTS

2.01 GYPSUM BOARD

- A. Gypsum Wallboard and Ceiling Board: ASTM C 36; maximum lengths available to minimize end-to-end butt joints in each area receiving finished gypsum board.
 - 1. Edges: Tapered.
 - 2. Thickness: 5/8 inch, except as otherwise shown.
- B. Cementitious Backer Boards: ANSI A118.9
 - 1. 1/2" thick boards for shower walls with full height wall tile
- C. Gypsum Wallboard suspension system:
- D. Water resistant gypsum wall board: For use in shower ceilings and behind wall tile except for shower walls.
 - 1. Thickness: 5/8".
 - 2. Glass-mat faced gypsum panels as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
 - 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
- D. Manufacturers: Products of the following manufacturers or approved equal, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - 1. Domtar Gypsum.
 - 2. Georgia-Pacific Corporation.
 - 3. Gold Bond Building Products, a National Gypsum Division.
 - 4. USG Corporation.

2.02 TRIM AND ACCESSORIES

- A. General: Except as otherwise specifically indicated, provide trim and accessories by manufacturer of gypsum board materials, made of galvanized steel or zinc alloy and configured for concealment in joint compound.

2.03 JOINT TREATMENT

- A. General: Provide products by manufacturer of gypsum boards. Comply with ASTM C 475 and with manufacturer's recommendations for specific project conditions.
- B. Joint Tape: Manufacturer's standard fiberglass mesh reinforcing tape.
- C. Setting Type Joint Compound: Chemical hardening type, for the following applications:
 - 1. Exterior use: Prefilling and topping.
- D. Drying Type Joint Compound: Vinyl-based type for interior use, and as follows:
 - 1. All-purpose type, for both embedding tape and as topping.

2.04 MISCELLANEOUS MATERIALS

- A. General: Provide miscellaneous materials as produced or recommended by manufacturer of gypsum products.

B. Gypsum Wallboard Suspension system

1. Commercial quality, cold-rolled steel, hot dipped galvanized finish:
2. Main Tees: Heavy Duty classification 1.617" high x 144" long, integral reversible splice with knurled face. (15/16" Face and 1-1/2" high)
3. Cross Members: knurled face. Cross Tees: 1-1/2" high x 48" long with 1-1/2" wide face; quick release cross tee ends for positive locking and removability without tools.
4. Accessory Cross Tees: Cross tees must have knurled faces and quick release cross tee ends for positive locking and removability without tools.
5. Provide 9-gauge steel hanger wire.
6. Suspension System shall meet or exceed load compliance specifications per ASTM C635. Loads are limited to L/240 of each span per ASTM C645.

PART 3 - EXECUTION

3.01 INSTALLATION OF GYPSUM BOARD ASSEMBLIES

- A. General: Comply with ASTM C 840 and GA-216 except where exceeded by other requirements.
 1. Wherever possible, install gypsum board to minimize butt end joints.
 2. Apply ceiling boards prior to installation of wallboards. Arrange to minimize butt end joints near center of ceiling area.
 3. Install wallboards in a manner which will minimize butt end joints in center of wall area. Stagger vertical joints on opposite sides of walls.
 4. Cut gypsum board accurately to fit closely around penetrating construction.
 5. Apply fasteners so that screwheads bear tightly against face of board and board bears tightly to framing but do not cut into face paper.
 6. Install cementitious backer boards in compliance with ANSI A 108.11.
 7. Install ceiling boards first; then install boards on walls tight to ceiling, leaving a one-half inch gap between wall board and floor.
- B. Metal Framing for Suspended Gypsum Board: Install in accordance with ASTM C754 and manufacturer's instructions.
 1. Level suspension system to tolerance of 1/1200.
- C. Installation on Wood Framing:
 1. Single-layer application: Install gypsum board by the following method:
 - a. Screw attachment.
 - b. Comply with attachment requirements as indicated by Structural drawings, where gypsum wall board is used for structural wall diaphragm.

3.02 FINISHING

- A. General: Comply with ASTM C 840 and GA-216 except where exceeded by other requirements.
- B. Treat cut edges and holes in moisture resistant gypsum board with sealant.
- C. Finish gypsum board in accordance with the following level of finish per GA-214, except where indicated otherwise on the drawings:
 1. Level 4: Provide for wall and ceiling surfaces to receive wall paper or flat paint finishes. Embed tape in joint compound at all joints and interior angles. Provide two separate coats of compound at all joints, angles, fastener heads, and accessories. Provide smooth surfaces free of tool marks and ridges.
 2. Level 5: Provide for wall and ceiling surfaces to receive semi-gloss or gloss paint finishes.

END OF SECTION 09260

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Porcelain wall tiles.
 - 2. Floor paver tiles.

1.03 SUBMITTALS

- A. Samples for Verification: Submit each tile type selected mounted on a minimum 12 inch square board with joints filled using selected grout.

1.04 MAINTENANCE

- A. Extra Materials: Furnish not less than 1 percent of total product installed maintenance stock for each type, color, pattern, and size of tile product installed.

PART 2 - PRODUCTS

2.01 MATERIALS - GENERAL

- A. Colors, Textures, and Patterns, Tile, Grout, and Other Products: As manufactured by the Dal-Tile Corporation, American Olean Tile, Florida Tile, or approved equals.

2.02 TILE PRODUCTS

- A. Basis of Design:
 - 1. Wall Tile: Dal-tile "Torreon" "Colorbody" Porcelain.
 - 2. Floor Tile: Dal-tile "Quarry Textures" quarry tile.
- B. Wall Tile: compliant with ANSI A137.1, and as follows:
 - 1. Porcelain Wall Tile.
 - 2. Moisture Absorption: ASTM C373; less than 0.5 percent.
 - 3. Size and Shape: 12 inch square.
 - 4. Edges: Eased.
 - 5. Surface Finish: High gloss.
 - 6. Colors: As selected by Architect from manufacturer's full range of colors. Provide up to four (4) colors for all tile shapes.
 - 7. Trim Units: Matching bead and bullnose shapes in sizes indicated and other shapes as required.
- C. Quarry Tile Pavers: compliant with ANSI A137.1, and as follows:
 - 1. Moisture Absorption: ASTM C373: less than or equal to 3.0 percent.
 - 2. Size: 6" x 6".
 - 3. Thickness: 1/2"
 - 4. Face: Plain.
 - 5. Edges: Cushioned.
 - 6. Coefficient of Friction: ASTM C1028:
 - a. Wet: greater than or equal to 0.70;
 - b. Dry: greater than or equal to 0.80.
 - 7. Colors: As selected by Architect from manufacturer's full range of colors. Provide up to two (2) colors.
 - 8. Trim Units: Matching bullnose and cove base shapes:
 - a. Bullnose: Size 4"x12".
 - b. Cove Base: 5"x6".
- D. Marble Thresholds: ASTM C 503; minimum hardness 10.0 per ASTM C241; white with honed finish. Shape as indicated or as required for accessibility.

2.03 SETTING MATERIALS

- A. Acceptable Manufacturers:
 - 1. Bonsal: www.bonsalamerican.com.
 - 2. Bostik Inc: www.bostik-us.com.

3. Custom Building Products: www.custombuildingproducts.com.
4. Approved equal.
- B. Thick-set Mortar bed materials: Portland cement, sand, latex additive, and water; complying with ANSI A118.1A or A118.1B, for floors and walls.
- C. Mortar bond coat materials: Dry-set Portland cement type, ANSI A118.1.

2.04 GROUTING MATERIALS

- A. Toilet Room Walls: Un-Sanded-Portland Cement Grout: ANSI A108.10.
 1. Basis of Design: Bostik Quartzlock2, #224 "Mushroom".
- B. Toilet Room Floors and Shower Walls: Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
 1. Basis of Design: Bostik Quartzlock2, #255 "Solid Buff".
 1. All components premeasured and prepackaged.
 2. Color(s): As selected by Architect from manufacturer's full range of colors; up to two (2) colors may be selected.
- C. Acceptable Manufacturers:
 1. Bostik, Inc: www.bostik-us.com
 2. Laticrete: Laticrete SpectraLock PRO premium grout; www.laticrete.com
 3. Merkrete, by Parex USA, Inc; Merkrete Pro Epoxy: www.merkrete.com.
 4. ProSpec, an Oldcastle brand; B-7000 Epoxy Mortar and Grout: www.prospec.com.
 5. Approved equal.

2.05 SEALANTS

- A. Compatibility: Provide elastomeric sealants, joint fillers, and other related materials that are compatible with each other and with joint substrates for project performance conditions; color shall match wall tile grout color.
- B. Masonry / Silicone Sealant: Impregnating masonry sealer for interior and exterior manufactured stone surfaces and grout or ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and O (for nonporous substrates) with added fungicide.

2.06 MISCELLANEOUS MATERIALS

- A. Cementitious Backer Units: see Specification Section 09260 – Gypsum Board Systems.
- B. Tile Cleaner: Product specifically acceptable to tile manufacturer and grout manufacturer for application indicated and as recommended by National Tile Promotion Federation or Ceramic Tile Institute.

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

- A. Tile Installation Standard: ANSI A108 series, for setting and grouting materials listed.
- B. Installation Methods: Comply with TCA "Handbook for Ceramic Tile Installation" for type of applications indicated.
- C. Cementitious Backer Units: Install in accordance with ANSI A108.11.

3.02 TILE APPLICATIONS

- A. Interior Floor, Thick-Set:
 1. Tile: Quarry tile paver.
 2. Installation method:
 - a. Concrete subfloor: TCA F112-12.
 - b. Bond coat: Latex-portland cement mortar, ANSI A108.5.
 - c. Joints shall be 1/4" wide.
 3. Grout: Sand-portland cement.
- B. Interior Wall, Thin-Set:
 1. Tile: Glazed wall.
 2. Installation method:
 - a. Cementitious backer units on studs: TCA W244.
 - b. Bond coat: Latex-portland cement mortar, ANSI A108.5.
 7. Grout: Latex-portland cement.
- C. Tolerances: Maximum variation in floor and wall finished surface/sub-structures shall not exceed 1/8" in 10'-0" from the required tile surface plane. All individual tile edges shall align with adjacent tile edges and no greater than a 1/64" offset variation shall be acceptable.

- D. Shower Receptor Tile Installation Method: TCA B415-12 with cement backer board.
 - 1. Provide waterproof membrane (ANSI A118.10) on all walls of shower and drying area.
 - 2. Environmental Classification Com3:
 - a. Provide epoxy bond coat per ANSI A118.3.
 - b. Provide epoxy grout per ANSI A118.3.
 - 3. Slope shower pan membrane 1/4" per foot to weep holes in drain; turn shower pan up 6" above floor on shower walls. Provide pea gravel at drain weep holes to prevent blockage by mortar.
- E. Plan floor and wall tile layout before installing tiling materials.
 - 1. Center floor tile in center of room.
 - 2. Floor tiles at wall shall be one-half tile in width or greater.
 - 3. Saw-cut tiles with smooth, straight edges. Tiles cut with flaked, broken, or spalled edges are not acceptable.
 - 4. Align joints of cove base with floor tile joints.
 - 5. Align joints of wall tiles with base tiles.
 - 6. Floor joints shall be parallel and perpendicular to walls; wall joints shall be straight, plumb, and level.
- F. Provide grout release if using dark pigmented grout to prevent finely powdered pigments from lodging in surface pores.
- G. Provide marble thresholds at Toilet Room doors. Separate tile floors between Toilet Room, Drying Area, and Shower with marble thresholds.

3.03 CLEANING AND PROTECTION

- A. Clean tile surfaces after installation is complete.
- B. Protection: Apply neutral protective cleaner to tile after installation if recommended by tile manufacturer. Overlay completed tile installation with Kraft paper for protection from subsequent construction activities.

3.04 MAINTENANCE

- A. Extra Materials: At time of completing installation, deliver stock of maintenance materials to the owner. Furnish products matching those actually installed, packaged for storage and clearly labeled.
 - 1. Floor tile: 2 percent of each variety installed and/or a minimum of 10 units of each field and accent color or trim units, whichever is the greater quantity.
 - 2. Wall Tile: 2 percent of each variety installed and/or a minimum of 10 units of each field and accent color or trim units, whichever is the greater quantity.

END OF SECTION 09300

SECTION 09511 - ACOUSTICAL LAY-IN CEILINGS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Exposed suspension system.
 - 2. Acoustical lay-in panels.

1.02 SUBMITTALS

- A. Product data.
- B. Samples: Submit the following:
 - 1. Verification samples:
 - a. Acoustical units: 6-inch-square samples of each type required.
 - b. Exposed suspension and trim elements:
12-inch-long samples of each type and finish required.

1.03 PROJECT CONDITIONS

- A. In a timely manner, furnish to affected installers, attachment devices for incorporation into other work.
- B. Do not begin installation of ceiling system until building's normal operating temperature and humidity levels have been reached and will be maintained.

PART 2 - PRODUCTS

2.01 ACOUSTICAL CEILING UNITS - GENERAL

- A. Standard for Acoustical Ceiling Units: Provide units conforming to applicable requirements of ASTM E 1264 and ASTM E 84 for Class A materials.
- B. Basis of Design: USG Corporation - "Eclipse Clima Plus", SLT, Model 76775HRC.
- C. Manufacturers: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - 1. Mineral fiber acoustical units:
 - a. Armstrong World Industries, Inc.
 - b. Celotex Corporation.
 - c. USG Corporation

2.02 CEILING SUSPENSION SYSTEMS - GENERAL

- A. Attachment Devices for Suspension System:
 - 1. Anchors and intermediate support members: Provide sizes capable of sustaining 5 times the load-carrying capabilities shown in ASTM C 635, Table 1, "Direct Hung" column.
 - 2. Hanger clips: Fabricate from hot-dip galvanized steel.
 - 3. Hanger wire: Zinc-coated (galvanized) carbon steel wire, ASTM A 641, soft temper, with Class 1 coating, minimum 12 gage (0.106 inch diameter).
- B. Basis of Design: Donn DX/DXL metal suspension system.
- B. Edge Moldings and Trim:
 - 1. Factory-formed lapping wall angle: Basis of Design: Donn M7
 - 2. Factory-formed wall angle corners: inside and outside corners specifically designed for use with wall angles and suspension system.
- C. Manufacturer: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - 1. Exposed steel suspension system:
 - a. Armstrong World Industries, Inc.
 - b. Chicago Metallic Corporation.
 - c. USG Corporation.

2.03 LAY-IN ACOUSTICAL CEILING SYSTEM

- A. Acoustical Panels: Water felted, rigid mineral fiber boards:
ACOUSTICAL LAY-IN CEILINGS

1. Size: 24 by 24 by $\frac{3}{4}$ inches.
 2. Ceiling sound transmission class: Minimum CSTC 35.
 - a. Provide foil or other noncombustible backing on panels if standard with manufacturer or if required to achieve specified CSTC value.
 3. Noise reduction coefficient: Minimum NRC 0.70.
 4. Light Reflectance: Minimum LR 0.86.
 4. Edge profile: Manufacturer's standard profile tegular edge.
 5. Equal to USG Model Number 76775HRC.
 6. Finish: Manufacturer's factory standard.
 7. Color: White.
 8. Face texture/pattern: Stippled (lightly textured); (ASTM E 1264, Type III, Form 1, Pattern EI).
 9. Classification: Class A.
 10. Flame spread: 25.
 11. Smoke Developed: 50.
- B. Exposed Grid: Formed, hot-dip galvanized steel with special corrosion-resistant painted finish.
1. Profile: Single-web tee, 15/16 inch wide.
 2. Structural classification (ASTM C 635): Intermediate-Duty System.
 3. Color and texture: White color to match ceiling panels; standard smooth texture.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that products furnished as work of this section, but not installed under this section, have been properly installed by the entity performing the installation.

3.02 SUSPENSION SYSTEM INSTALLATION

- A. General:
1. Ceiling grid shall be suspended according to ASCE 7-05 and ASTM C580 seismic requirement.
 2. Install hangers plumb and supported solely by building structure or carrying channels. Do not allow hangers to contact any objects or materials in ceiling plenum which are not actual components of ceiling system.
 3. Install extra hangers as required to support light fixtures, diffusers, grilles, etc. without sag or other distortion of grid.
 4. Level ceiling suspension system to tolerance of 1/8 inch in 12 feet, with cumulative tolerance not to exceed $\frac{1}{4}$ inch. Bending or kinking of hangers is not allowed.

3.03 TRIM INSTALLATION

- A. Install edge moldings and trim units at acoustical ceiling borders, at locations indicated, and where required to cover acoustical unit edges.
1. Face-riveting of trim and moldings is not allowed.

3.04 LAY-IN PANEL INSTALLATION

- A. Panel Installation: Install acoustical panels for accurate fit with suspension system and trim members. Scribe and cut panels at ceiling perimeter and at obstructions to provide neat, precise fit.
1. Tegular-edge panel installation: Provide installation with panel edges which fit snugly and neatly into suspension system. Neatly and accurately duplicate edge profile for all cut panels for uniform appearance.

3.05 MAINTENANCE

- A. Extra Materials: At time of completing installation, deliver stock of maintenance materials to the owner. Furnish products matching those actually installed, packaged for storage and clearly labeled.
1. Ceiling Tile: 2 percent of variety installed and/or a minimum of 10 units, whichever is the greater quantity.

END OF SECTION 09511

SECTION 09660 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Resilient tile flooring.
 - 2. Resilient base.

1.02 REFERENCE STANDARDS

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.

1.03 SUBMITTALS

- A. Product Data: Submit technical data from each manufacturer of resilient products required.
- B. Initial Samples: Submit manufacturer's standard color selection samples for resilient products required, including all available colors and patterns.
- C. Verification Samples: Submit samples of each type, color, and pattern of resilient product required, as follows:
 - 1. Actual tiles.
 - 2. Cut sections of resilient flooring accessories, not less than six inches in length.
 - 3. Other materials requested by architect.

1.04 PROJECT CONDITIONS

- A. Environmental Requirements: At least 48 hours prior to beginning work, move resilient flooring materials to areas of installation and maintain at minimum 70 degrees F until 48 hours after completing installation and at minimum 55 degrees F thereafter.
- B. Sequencing: Do not begin installation of resilient flooring products until painting has been completed for each area.
- C. Existing Conditions: Do not install resilient flooring on concrete substrates until testing has been conducted to assure that moisture levels are acceptable.

1.05 MAINTENANCE

- A. Extra Materials: At time of completing installation, deliver stock of maintenance materials to the owner. Furnish products matching those actually installed, packaged for storage and clearly labeled.
 - 1. Resilient tile: 2 percent of each variety installed.
 - 2. Resilient base: 2 percent of each variety installed.

PART 2 - PRODUCTS

2.01 TILE FLOORING MATERIALS

- A. Vinyl Composition Tile
 - 1. Basis of Design: Mannington Commercial, "Progressions":
 - a. Field: #55505 "Deep Sage".
 - b. Border and Accent: #55122 "Glacier".
 - 2. Acceptable Manufacturers: Products of the following manufacturers or approved equal will be among those considered acceptable, provided they comply with requirements of the contract documents:
 - a. Armstrong World Industries;
 - b. Azrock by Tarkett;
 - c. Mannington Commercial.
 - 3. Size and gage: 12" x 12" x 1/8".

2.02 RESILIENT BASE MATERIALS

- A. Rubber Wall Base: FS SS-W-40, Type I, and as follows:
 - 1. Basis of Design: Roppe #P197 "Iceberg".

2. Manufacturers: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Burke Flooring - Corner Ready Rubber Myte.
 - b. Flexco Company.
 - c. Johnsonite, Inc.
 - d. Roppe Corporation.
3. Height: 4 inches.
4. Style: Standard cove/toe base.
5. Corners: At contractor's option, provide prefabricated units matching base in color and finish, or site-fabricate corners, using heat-forming tool acceptable to manufacturer.
6. Colors:
 - a. As selected by Architect from manufacturer's full color range. Up to three (3) colors may be selected.

2.03 MISCELLANEOUS ACCESSORIES

- A. Resilient Edge Strips: Solid rubber or vinyl edging, in tapered or rounded profile, nominally 1 inch in width and 1/8 inch in thickness.
 1. Color: Matching flooring.
- B. Concrete Slab Primer: Type recommended by manufacturer of resilient product.
- C. Adhesive: Type recommended by manufacturer of resilient product for specific substrate conditions.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

- A. Before beginning tile installation, verify that floor slab is level and smooth. Use leveling compound where required for level substrate. Patch all imperfections that would otherwise telegraph through resilient materials.
- B. Comply with manufacturer's published recommendations for installation in each area, extending resilient flooring into spaces which are partially concealed.
- B. Cut and fit tightly to fixtures, pipes, and other obstructions, as well as to walls and partitions.
- B. Tightly adhere resilient flooring to substrate with no open joints or cracks, and without raised or blistered areas. Spread adhesive evenly, so that final installation will be without telegraphed markings from adhesive or substrate.

3.02 TILE INSTALLATION

- A. Layout: Establish center of each space and lay tile from center point, so tiles at each edge will be not less than 1/2 tile and will be equal in width.
- B. Matching: In each space, use tiles from same production run, and lay tiles in same sequence as removed from cartons. Discard broken, chipped, or otherwise damaged tiles.
 1. Lay tile square to room axis.
 2. Lay tile with pattern in adjacent tiles oriented in perpendicular directions.

3.03 INSTALLATION OF RESILIENT BASE

- A. Apply resilient base securely in locations indicated, using maximum lengths available.
- B. Install pre-formed interior and exterior corners.

3.04 INSTALLATION OF MISCELLANEOUS ACCESSORIES

- A. Resilient Edge Strips: At locations shown on drawings, or where otherwise required to protect edge of resilient flooring, install resilient edge strips securely with recommended adhesive, to achieve tightly butted joint.

3.05 CLEANING

- A. Initial Cleaning: Remove excess and waste materials promptly, and sweep or vacuum clean resilient flooring as soon as installation has been completed in each area. After adhesive has had adequate time to set, mop each area with damp mop and mild detergent.

- B. Final Cleaning: Remove scuff marks, excess adhesive, and other foreign substances, using only cleaning products and techniques recommended by manufacturer of resilient products.
 - 1. Polish: Apply protective polish to clean resilient flooring surfaces, unless manufacturer of resilient product recommends otherwise.
 - 2. Schedule work of other trades to avoid further work after completion of resilient tile installation. If other work is unavoidable, protect resilient flooring with kraft paper or other protective covering.

END OF SECTION 09660

SECTION 09680 - CARPET

PART 1 - GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2006 (Reapproved 2011).
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2010e1.
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
- D. CRI (CIS) - Carpet Installation Standard; Carpet and Rug Institute; 2009.
- E. CRI 104 - Standard for Installation of Commercial Textile Floorcovering Materials; Carpet and Rug Institute; 2002.

1.02 SUBMITTALS

- A. Product Data: Submit technical data for each distinct type of carpeting material and accessory indicated.
- B. Initial Selection Samples: For each carpet type indicated, submit manufacturer's standard samples showing full range of colors, textures, and patterns available.

1.03 PERFORMANCE CHARACTERISTICS

- A. Fire Performance: Provide carpet materials capable of meeting the following requirements when tested in accordance with methods indicated, by UL (Underwriters Laboratories Inc.) or other independent testing agency acceptable to governing authorities.
 - 1. Methenamine pill test (ASTM D 2859): Passes.
 - 2. Fire hazard classification (ASTM E 84/UL 723/NFPA 255):
 - a. Class A: Flame spread 0-25, smoke developed 0-450.
 - 3. Average critical radiant flux (ASTM E 648/NFPA 253): Minimum 0.45 watt per square centimeter.
 - 4. Smoke density with flame (ASTM E 662): Less than 450.
 - 5. Smoke density without flame (ASTM E 662): Less than 450.
- B. Physical Properties: Provide carpet materials capable of meeting the following requirements when tested in accordance with methods indicated.
 - 1. Static electricity generation (AATCC 134): 3.5 kilovolts when tested at 20 percent relative humidity and 70 degrees F.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Take measures as required to ensure materials are not damaged or deformed. Store products in flat position in properly ventilated, dry space. Use suitable means to prevent materials from lying in direct contact with the ground.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Tufted Carpet: Basis of Design: Patcraft Commercial Carpet, Product name: Socrates II , Product number: 10126, Color/texture/pattern: "Croce", # 00314.
- B. Acceptable manufacturers: Provide products complying with requirements of the contract documents and made by one of the following:
 - 1. Lees Commercial Carpets Division/Burlington Industries, Inc.
 - 2. Mohawk Carpet Corporation.
 - 3. Patcraft Commercial Carpet

2.02 MATERIALS

A. Carpet:

1. Location: Conference Room and Office areas noted in the Color-Finish Schedule.
2. Installation method: Direct glue-down.
3. Edge guard: Rubber to match color of base.
4. Additional requirements:
 - a. Face yarn: SD nylon.
 - b. Dye system: Solution Dyed (stain resistant).
 - c. Face weight: 28 oz. per sq. yd.
 - d. Backing construction: ActionLock, Unibond, or equal.
 - e. Primary & secondary back: woven polypropylene (ActionLock).

2.03 ACCESSORIES

- A. Provide accessories recommended by carpet manufacturer.
- B. Rubber Edge Guard: Minimum width of anchorage flange 2 inches, size and shape indicated, colors selected by the architect from manufacturer's full range of colors.
- C. Carpet Installation Adhesive: Manufacturer's recommended water-resistant, low VOC, adhesive manufactured for use with type of carpet and substrates indicated, and complying with fire performance requirements indicated for carpet.

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

- A. Perform installation in accordance with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
 1. Maximize consistency of carpet appearance, particularly in terms of lay of pile and its direction. Follow manufacturer's recommendations for placement of seams.
 2. Continue carpet into recessed spaces such as closets, and underneath obstacles with open bases.
- B. At door openings, orient carpet seam perpendicular to traffic direction; doorway seam shall be located directly underneath door in closed position.

3.02 INSTALLATION - GLUE-DOWN CARPET

- A. Before applying adhesive to substrate, prefit carpet in areas where it is to be installed. Where cutting is necessary, provide properly prepared, straight, and unfrayed edges.
- B. Install prefitted carpet; butt edges snugly at seams and against vertical obstructions.
 1. Stretch carpet tightly over substrate, so that it lies flat, is uniformly smooth, and free of bulges.
- C. Install edge guards at exposed carpet edges unless indicated otherwise; provide secure attachment to substrate.
- D. Immediately remove adhesive from surface of carpet by method which will not damage carpet.

END OF SECTION 09680

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Painting and finishing of exposed exterior items and surfaces.
 - 2. Painting and finishing of exposed interior items and surfaces.

1.02 DEFINITIONS

- A. DFM (dry film mils): Thickness, measured in mils, of a coat of paint in the cured state.

1.03 SUBMITTALS

- A. Product Data: Manufacturer's technical data sheets for each coating.
- B. Color and Texture Samples:
 - 1. Provide for each coating system, color, and texture and applied to representative substrate samples.
 - a. Prepare samples to show bare, prepared surface and each successive coat.
 - b. Label each sample with coating name and color.
 - 2. Miscellaneous substrates: 12-by-12-inch hardboard.
 - 3. Wood: 8-inch square samples for surfaces; 8-inch long samples for trim.
 - 4. Metal: 5-by-7-inch samples.

1.04 QUALITY ASSURANCE

- A. Materials: All coating materials required by this section shall be provided by a single manufacturer, unless otherwise required or approved.
- B. Applicator: Firm with successful experience in painting work similar in scope to work of this project.
 - 1. Maintain throughout duration of the work a crew of painters who are fully qualified to satisfy requirements of the specifications.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original containers bearing coating name and color, material composition data, date of manufacture, legal notices if applicable, and mixing, thinning, and application instructions.

1.06 PROJECT CONDITIONS

- A. Apply coatings only under the following environmental conditions:
 - 1. Provide continuous ventilation and heating to prevent accumulation of hazardous fumes and to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and for 48 hours after application of finishes, or longer if required to obtain full cure as indicated by manufacturer's instructions.

1.07 COORDINATION

- A. Coordination: Where special coatings will be applied over shop coatings specified in other sections, coordinate work of such other sections to ensure that only approved, compatible primers are applied.

1.08 MAINTENANCE STOCK

- A. At time of completing application, deliver stock of maintenance material to the owner. Furnish not less than one properly labeled and sealed 1-gallon can of each type of finish coat of each color, taken from lots furnished for the work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: The brand-name products listed in the schedule at the end of this section and made by the following manufacturer are the basis of the contract documents:
 - 1. The Glidden Company – Lifemaster paints.

- B. Products of the following manufacturers or approved equal, provided they comply with requirements of the contract documents, will be among those considered in accordance with standard substitution procedures:
 - 1. Benjamin Moore & Company - Natura.
 - 2. The Glidden Company - Lifemaster
 - 3. Sherwin Williams Company - Harmony.
 - 4. Devoe Paint.

2.02 PRODUCTS

- A. Colors:
 - 1. For multicoat systems, apply each coat using a successively darker tint or shade, unless approved otherwise.
 - 2. Top coat colors: As shown on drawings and schedules.
- B. Interior Paints: Primers and paints for use inside buildings shall be Low VOC or No VOC content specifically formulated for the substrates indicated.
- C. Lead Content:
 - 1. Not more than 0.06 percent lead by weight (calculated as lead metal) in the total nonvolatile content of the paint or the equivalent measure of lead in the dried film.
 - 2. Exception: Where permitted by applicable regulations.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that surfaces and conditions are ready for work in accordance with coating manufacturer's recommendations.

3.02 SURFACE PREPARATION

- A. Apply coatings to surfaces that are clean and properly prepared in accordance with manufacturer's instructions. Remove dirt, dust, grease, oils, and foreign matter. Prepare surface for proper texture necessary to optimum coating adhesion and intended finished appearance. Plan cleaning, preparation, and coating operations to avoid contamination of freshly coated surfaces.
 - 1. Do not apply coatings to labels that identify equipment, fire-resistance ratings, etc.
 - 2. Remove hardware, cover plates, and similar items before applying coatings.
 - 3. Provide protection for non-removable items not scheduled for coating. After application of coatings, install removed items. Use only skilled workmen for removal and replacement of such items.
 - 4. Protect surfaces not scheduled for coating. Clean, repair, or replace to the satisfaction of the Architect/Engineer any surfaces inadvertently spattered or coated.
 - 5. Allow substrate to dry thoroughly. Test for moisture in accordance with coating manufacturer's recommendations before applying coatings.
 - 6. Intricate fabricated shapes may be pickled in lieu of hand or power tool cleaning.
 - 7. Before hand or power tool cleaning, remove visible oil, grease, soluble welding residue, and salts by solvent cleaning. After hand or power tool cleaning, re-clean surfaces if necessary.
 - 8. Before touching up coatings damaged by handling or welding, re-prepare damaged surfaces.

3.03 MIXING AND THINNING

- A. Remove and discard any skin formed on surface of coatings in containers. Discard any containers where skin comprises 2 percent or more of the remaining material. Do not add thinner except as specifically recommended (not merely permitted) by the coating manufacturer for proper coating application under the circumstances prevailing at the project site when application equipment recommended by the coating manufacturer is employed. Use only the quantities and the types of thinner recommended.

3.04 APPLICATION

- A. General:
 - 1. Apply coatings in accordance with coating manufacturer's instructions and using application method best suited for obtaining full, uniform coverage of surfaces to be coated.
 - 2. Apply each coat to achieve the dry film thickness per coat recommended by the coating manufacturer. Application rates in excess of those recommended and fewer numbers of coats than specified will not be accepted.

3. Completed coatings shall be free of defects such as runs, sags, variations in color, lap or brush marks, holidays, and skips.
 4. Apply coatings according to the schedule at the end of this section and as otherwise indicated. Coat all similar surfaces not specifically mentioned unless specifically exempted.
 5. Coat front and back of miscellaneous items such as covers, access panels, and grilles. Apply fully finish coats behind movable items of furniture and equipment before installation. Apply prime coat only behind non-movable items of furniture and equipment before installation.
 6. Sand gloss coats before applying subsequent coatings.
- B. Remove coatings not in compliance with this specification, re-clean and re-prepare surfaces as specified, and apply coatings to comply with the contract documents.
- C. Scheduling:
1. Apply first coat of material to properly prepared surfaces without delay.
 - a. Apply successive coats within the time limits recommended by the manufacturer.

3.05 PRIME COATS

- A. General:
1. Field apply bottom coats scheduled except where the contract documents require shop coating of ferrous metals.
 2. Ferrous metals that have not been shop primed shall be field primed promptly after arrival at the site or shall be stored away from the effects of weather.
 3. Re-prepare and retouch damaged prime coats using approved, compatible primer.
- B. Primers for Wood and Wood Products:
1. Apply first coat to wood upon receipt at the site and before wood is exposed to sun or rain.
 2. Thoroughly back-prime concealed surfaces and cut edges of exterior wood trim prior to installation.

3.06 FINISH COATS

- A. Number of Coats and Minimum Coating Thickness:
1. Apply not less than the number of coats indicated.
 2. Apply each coat to achieve not less than the dry film thicknesses indicated per coat.
 3. Apply additional coats at no additional cost to the owner when necessary to achieve complete hiding, uniform texture, or uniform sheen and appearance.

3.07 CLEANING AND PROTECTION

- A. Cleaning:
1. Clean work area on a daily basis; dispose of spent materials and empty containers. If requested, turn over the Architect/Engineer all empty coatings containers used during the course of each day.
 2. Remove all trace of coatings from adjacent surfaces not scheduled to be coated. Remove by appropriate methods that do not damage surfaces.
- B. Protection:
1. Protect work against damage until fully cured. Provide signs identifying wet surfaces until surfaces are adequately cured.
 2. Shortly before final completion of the project, examine surfaces for damage to coatings and restore coatings to new, undamaged condition.
 3. Touch-up of minor damage will be acceptable where result is not visibly different from surrounding surfaces. Where result is different either in color, sheen, or texture, recoat entire surface.

3.08 SCHEDULE OF COATINGS FOR INTERIOR NONTRAFFIC SURFACES

- A. **Gypsum Wallboard: Walls & ceilings.**
1. Latex, egg-shell.
 - a. Bottom coat: Ultra-Hide PVA Primer-Sealer 5019; 1.1DFM.
 - b. Intermediate coat: Same as top coat.
 - c. Top coat: Lifemaster 2000 Flat without petroleum based solvents 9300 Series (color # 43YY 78/053, "Antique White RM"; 1.4 DFM.
- B. **Wood: Doors, windows, and trim, and cabinetry.**
3. Varnish, satin (stained wood).
 - a. Stain: Woodmaster Oil Wood Stain 1600 Series (color ICI "Natural").
 - b. Bottom and intermediate coats: Woodmaster Clear Finish, Gloss 81.
 - c. Top coat: Woodmaster Clear Finish, Satin 82.

C. Ferrous Metal: Hollow metal frames.

1. Lifemaster Pro HB Acrylic Coating, semigloss:
 - a. Bottom coat: Glid-Guard Tank & Structural Primer 5205 Series.
 - b. Intermediate coat: Same as top coat.
 - c. Top coat: Lifemaster Pro HB Acrylic Coating, Semigloss, 5440 Series (4 mils dry thickness, 148 s.f. / gal.); (Color: # 50GY 12/032, "Black Smith").

3.09 SCHEDULE OF COATINGS FOR EXTERIOR NONTRAFFIC SURFACES

A. Fiber-Cement: Wall panel siding, lap siding & trim touch up by James-Hardie or equal;

1. Acrylic / Latex, flat.
 - a. Bottom coat: Same as top coat.
 - b. Top coat: Ultra-Hide Duras 2210 Exterior Acrylic Flat Finish; 1.5 DFM.
(Siding & trim color shall match the fiber-cement ColorPlus colors "Khaki Brown" 1.4 DFM).

B. Ferrous Metal: Hollow metal doors and frames.

1. Lifemaster Pro HB Acrylic Coating, semigloss:
 - a. Bottom coat: Glid-Guard Tank & Structural Primer 5205 Series.
 - b. Intermediate coat: Same as top coat.
 - c. Top coat: Lifemaster Pro HB Acrylic Coating, Semigloss, 5440 Series (4 mils dry thickness, 148 s.f. / gal.); (Color: 50YR 09/244, "Redbrick" at metal doors & frames at Storage Building).

END OF SECTION 09900

DIVISION 10 - SPECIALTIES

SECTION 10270 - ACCESS FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Structural floor system supported by metal pedestals.
- B. Integrally designed metal stringers.
- B. Removable 24"x24" floor panels with bare metallic face to receive vinyl composition tile.

1.02 RELATED REQUIREMENTS

- A. Section 09660 - Resilient Flooring: Finish for access flooring panels.

1.03 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2010b.
- B. NFPA 75 - Standard for the Protection of Information Technology Equipment; National Fire Protection Association; 2009.
- C. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.
- D. CISCA (Ceilings & Interior Systems Construction Association) - "Recommended Test Procedures for Access Floors" shall be used as a guideline when presenting load performance product information.

1.04 SUBMITTALS

- A. Product Data: Provide data for grid system, panels, and accessories; electrical resistance characteristics and ground connection requirements.
- B. Shop Drawings: Indicate floor layout, interruptions to grid, panels requiring drilling or cut-out for services, appurtenances or interruptions, edge details, elevation differences.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum three years of documented experience.

1.06 ENVIRONMENTAL CONDITIONS FOR STORAGE AND INSTALLATION

- A. Area to receive and store access floor materials shall be enclosed and maintained at ambient temperatures between 35° to 95° F and relative humidity levels between 20 to 80%. All floor panels shall be stored at ambient temperatures between 50° to 90° F for at least 24 hours before installation begins. All areas of installation shall be enclosed and maintained at ambient temperature between 50° to 90° F and at relative humidity levels between 20% to 80% and shall remain within these environmental limits throughout occupancy.

1.07 PERFORMANCE REQUIREMENTS

- 2 Design Load: Panel supported on actual understructure system shall be capable of supporting a point load of 1000 lbs applied on a one square inch area at any location on the panel without experiencing permanent set as defined by CISCA. The loading method used to determine design (allowable) load shall be in conformance with CISCA Concentrated Load test method but with panel tested on actual understructure instead of steel blocks.
- 3 Safety Factor: Panel supported on actual understructure system shall withstand a point load of no less than

- 4 (2) two times the design load rating on a one square inch area anywhere on the panel without failure when tested in accordance with CISCA A/F, Section 2 "Ultimate Loading". Failure is defined as the point at which the system will no longer accept the load.
- 5 Ultimate Load: Panel supported on actual understructure system shall be capable of supporting a point load of at least 2000 lbs applied through a load indenter on a one square inch area at any location on the panel without failure (i.e. minimum safety factor of 2) when tested in accordance with CISCA A/F, Section 2, "Ultimate Loading".
- 6 Rolling Load: Panel supported on actual understructure system shall be able to withstand the following rolling loads at any location on the panel without developing a local and overall surface deformation greater than 0.040 inches when tested in accordance with CISCA A/F, Section 3, "Rolling Loads". Note: wheel 1 and wheel 2 tests shall be performed on two separate panels.

CISCA Wheel 1:	Size: 3" dia x 1 13/16" wide	Load: 800 lbs.	Passes: 10
CISCA Wheel 2:	Size: 6" dia x 2" wide	Load: 600 lbs.	Passes: 10,000

- 7 Impact Load: Panel supported on actual understructure (the system) shall be capable of supporting an impact load of 150 lbs. dropped from a height of 36 inches onto a one square inch area (using a round or square indenter) at any location on the panel when tested in accordance with CISCA A/F Section 8, "Drop Impact Load Test".
- 8 Panel Drop Test: Panel shall be capable of being dropped face up onto to a concrete slab from a height of 36", after which it shall continue to meet all load performance requirements as previously defined.
- 9 Panel Cutout: Panel with an 8" diameter interior cutout supported on actual understructure shall be capable of maintaining its design load strength with a minimum safety factor of 2 anywhere on the panel without the use of additional supports.
- 10 Flammability: System shall meet Class A Flame spread requirements for flame spread and smoke development. Tests shall be performed in accordance with ASTM-E84-1998, Standard Test Method for Surface Burning Characteristics for Building Materials.
- 11 Combustibility: All components of the access floor system shall qualify as noncombustible by demonstrating compliance with requirements of ASTM E 136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 deg C.
- 12 Recycled Content: Panel and understructure system shall be required to have a minimum post-consumer recycled content of 18% and a minimum total recycled content of 49%
- 13 Axial Load: Pedestal support assembly shall provide a minimum 6000 lb. axial load without permanent deformation when tested in accordance with CISCA A/F, Section 5, "Pedestal Axial Load Test".
- 14 Overturning Moment: Pedestal support assembly shall provide an average overturning moment of 1000 in-lbs. when glued to a clean, sound, uncoated concrete surface when tested in accordance with CISCA A/F, Section 6, "Pedestal Overturning Moment Test".. ICBO number for the specific system or structural calculations shall be required attesting to the lateral stability of the system under seismic conditions.
- 15 Stringer Concentrated Load: Stringer shall be capable of withstanding a concentrated load of 450 lbs. placed in its midspan on a one square inch area using a round or square indenter without exceeding a permanent set of 0.010" after the load is removed when tested in accordance with CISCA A/F, Section 4, "Stringer Load Testing".

1.08 DESIGN REQUIREMENTS:

- A. Access floor system, where indicated on the design documents, shall consist of modular and removable fully encased cementitious filled welded steel panels fastened onto, and supported by, adjustable height

pedestal assemblies. Pedestal head and panel corner design must provide a positive location and lateral engagement of the panel to the understructure support system without the use of fasteners.

- B. Panel shall be easily removed by one person with a suction cup lifting device and shall be interchangeable except where cut for special conditions.
- C. Quantities, finished floor heights (FFH) and location of accessories shall be as specified on the contract drawings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Tate Access Floors, Inc., ConCore® 1000 Access Floor Panel, PosiLock™ Understructure.
- B. Access Flooring:
 - 1. ASM Products: www.asmproducts.com;
 - 2. Haworth: www.haworth.com;
 - 3. Tate Access Floors, Inc.: www.tateaccessfloors.com;
 - 4. approved equal.

2.02 PEDESTALS

- A. Pedestal assemblies shall be corrosive resistant, all steel welded construction, and shall provide an adjustment range of +/- 1" for finished floor heights 6" or greater. Zinc electroplating shall be prohibited on all pedestal components, including head plate, threaded rod, adjustment nut, pedestal tube, base plate, and all fasteners.
- B. Pedestal assemblies shall provide a means of leveling and locking the assembly at a selected height, which requires deliberate action to change height setting and prevents vibration displacement.
- C. Hot dip galvanized steel pedestal head shall be welded to a threaded rod which includes a specially designed adjusting nut. The nut shall provide location lugs to engage the pedestal base assembly, such that deliberate action is required to change the height setting.
- D. Hot dip galvanized pedestal base assembly shall consist of a formed steel plate with no less than 16 inches of bearing area, welded to a 7/8" square steel tube and shall be designed to engage the head assembly.

2.03 STRINGERS

- A. Stringers shall support each edge of panel.
- B. Steel stringer shall have conductive galvanized coating. Zinc electroplating shall be prohibited on stringers and stringer fasteners.
- C. Stringers shall be individually and rigidly fastened to the pedestal with one machine screw for each foot of stringer length. Bolts shall provide positive electrical contact between the stringers and pedestals. Connections depending on gravity or spring action are unacceptable.
- D. Stringer grid shall be as recommended by manufacturer for arrangement indicated.

2.04 FLOOR PANELS

- A. Panels shall consist of a top steel sheet welded to a formed steel bottom pan filled internally with a lightweight cementitious material. Mechanical or adhesive methods for attachment of the steel top and bottom sheets are unacceptable.

- B. Floor panels shall be protected from corrosion by electro-deposited epoxy paint. The use of zinc electroplating shall be prohibited.
- C. Cementitious fill material shall be totally encased within the steel welded shell except where cut for special conditions. Note: This greatly reduces the potential for dust in the environment from exposed cement materials.
- D. Panel shall have an electrically conductive epoxy paint finish.
- E. Perforated Airflow Panels: Perforated steel airflow panels designed for static loads of 1000 lbs. shall be interchangeable with standard field panels and shall have 25% open surface area with the following air distribution capability:
 - 1. Panel without damper: 746 cfm at 0.1-inch of H₂O (static pressure).
 - 2. Panel with damper at 100% open position: 515 cfm at 0.1-inch of H₂O (static pressure).
- F. Corner of panel shall have a locating tab and integral shape design to interface with the pedestal head for positive lateral retention and positioning with or without fasteners.
- G. Fastening of panels to pedestal heads shall be accomplished by the use of a machine screw which is specially designed to be self capturing within the body of the panel. Note: This prevents the inadvertent loss of panel fastening screws when accessing the underfloor space and potential damage to objects by screws which extend beyond the depth of the panel.
- H. Top surface of the panel shall have an option for four positioning location holes to engage positioning buttons on the PosiTile® carpet tile for precise matching of the carpet tile to the panel.
- I. Fit between the pedestal head, panel, and screw shall enable an installation with an average panel to panel gap of 0.015".

2.05 FINISHES

- A. Floor Panel Factory Finish: Suitable for receiving field-installed vinyl tile.
- B. Floor Panel Field Finish:
 - 1. Vinyl tile 1/8 inch thick, as specified in 09660; color as selected.

2.06 SOURCE QUALITY CONTROL

- A. Fabrication Tolerances:
 - 1. Floor Panel Flatness: Plus or minus 0.02 inch in any direction.
 - 2. Floor Panel Width or Length From Specified Size: Plus or minus 0.02 inch.
 - 3. Floor Panel Squareness: Plus or minus 0.03 inch difference between opposite diagonal dimensions.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify field measurements are as shown on shop drawings. Verify that field conditions are acceptable for installation of assembly.

3.02 PREPARATION

- A. Vacuum clean substrate surfaces.

3.03 INSTALLATION

- A. Install components in accordance with manufacturer's instructions.
- B. Secure pedestal base plate to subfloor with mechanical anchors.
- D. Install floor panels on pedestals with full bearing.

- E. Cut 10-28 holes in floor panels to accommodate NCDOT equipment. Coordinate with owner. Provide cable cut-out protection.
- F. Provide positive electrical earth grounding of entire floor assembly in accordance with NFPA 75.
- G. Pedestal locations shall be established from approved shop drawings so that mechanical and electrical work can be installed without interfering with pedestal installation.
- H. Installation of access floor shall be coordinated with other trades to maintain the integrity of the installed system. All traffic on access floor shall be controlled by access floor installer. No traffic but that of access floor installers shall be permitted on any floor area for 24 hours to allow the pedestal adhesive to set. Access floor panels shall not be removed by other trades for 72 hours after their installation.
- I. Floor system and accessories shall be installed under the supervision of the manufacturer's authorized representative and according to manufacturer's recommendations.
- J. No dust or debris producing operations by other trades shall be allowed in areas where access floor is being installed to ensure proper bonding of pedestals to subfloor.
- K. Access floor installer shall keep the subfloor broom clean as installation progresses.
- L. Partially complete floors shall be braced against shifting to maintain the integrity of the installed system where required.
- M. Understructure shall be aligned such that all uncut panels are interchangeable and fit snugly but do not bind when placed in alternate positions.
- N. Finished floor shall be level, not varying more than 0.062" in 10 feet or 0.125" overall.
- O. Inspect system prior to application of floor covering and replace any floor panels that are cracked, broken and structurally damaged and do not comply with specified requirements.

3.04 TOLERANCES

- A. Maximum Out of Level Floor Panel Tolerance: 1/16 inch in 10 ft, non-cumulative.

3.05 ADJUSTING

- A. Adjust pedestals to achieve a level floor and to assure adjacent floor panel surfaces are flush.

3.06 PROTECTION

- A. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 10425 - SIGNS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Plastic plaque signs.
- B. Provide signage as indicated on the signage schedules.

1.02 SUBMITTALS

- A. Product Data: Submit for each type of sign specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Shop drawings:
 - 1. Show fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, layout, reinforcement, accessories, and installation details.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Accusign, Inc.
- B. Plastic Signs:
 - 1. Accusign, Inc.; (919) 872-2008 or approved equal.
 - 2. AdHenderson Printing Products, Inc.
 - 3. Best Manufacturing Co.
 - 4. Mohawk Sign Systems, Inc.

2.02 RAISED LETTER SIGNS

- A. Base Color: Light Teal, # 348 solid color acrylic plastic:
 - 1. Total Thickness: 1/8 inch.
 - 2. Height: 2 inches.
 - 3. Edges: Square
- B. Raised Character Size and Style: Acrylic plastic, character adhered to base material:
 - 1. Comply with applicable provisions of 2012 NC Building Code, Chapter 11, Accessibility, including International Symbol of Accessibility (restrooms, Family), and ANSI/ICC A117.1, including Tactile Characters and Braille.
 - 2. Character Color: White.
 - 3. Character Thickness: 1/8 inch.
 - 4. Height: 5/8 inch.
 - 5. Edges: Square.
 - 6. Character Font: Helvetica.
 - 7. Character Case: Upper case only.

2.03 ACCESSORIES

- A. Mounting Hardware: Chrome screws.
- B. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Mount signs per ANSI A117.1. Otherwise, position sign 2" from strike side of door frame; center of sign plaque 60" AFF on the wall surface; level. If the strike side wall is not available center on the door or if the door and strike side wall is not available the adjacent wall may be considered for mounting.

3.02 SCHEDULES

A. Sign plaques shall read as follows:

- 1. TRUCKER LOBBY @ door 04
- 2. OFFICE 1 @ room 102
- 3. OFFICE 2 @ room 103
- 4. OFFICE 3 @ room 104
- 5. OFFICE 4 @ room 105
- 6. OFFICE 5 @ room 106
- 7. STOCK ROOM @ room 107
- 8. IT ROOM @ room 108
- 9. MECHANICAL @ room 109
- 10. TRAINING ROOM @ room 110
- 11. JANITOR @ room 112
- 12. UNISEX @ room 114
- 13. UNISEX TOILET & SHOWER @ room 115
- 14. UNISEX @ room 116
- 15. CALIBRATION @ room 117

B. Handicap Parking Signs shall be furnished, 1-required, including \$250 Penalty sign, type R7-8d (Van Accessible) and shall be painted metal with green copy mounted 84" to the top in accordance with GS20-30.6.

C. Project sign: see following page.

GASTON COUNTY WEIGH STATION

6" HIGH COPY

NC DEPARTMENT OF TRANSPORTATION

2" HIGH COPY

ARCHITECT / ENGINEER:

1-1/2" HIGH COPY

FACILITIES DESIGN

2" HIGH COPY

Facilities Management Division, NCDOT

2" HIGH COPY

CONTRACTORS:

1 1/2" HIGH COPY

GENERAL CONTRACTOR

2" HIGH COPY

PLUMBING Subcontractor

HVAC Subcontractor

ELECTRICAL Subcontractor

4' x 6' x 3/4" exterior plywood, painted light grey color #30GY 76/017, "N.B.C. White" (Glidden) background W/ 2 - 4" x 4" treated wood posts (3' below grade), bottom of sign panel 3' above grade, all copy Helvetica Medium Style, color # 30GG 22/079-"Bicentennial".

END OF SECTION

SECTION 10505 - METAL LOCKERS

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Standard duty metal lockers.
- B. Work Not Included:
 - 1. Padlocks: Provided by the owner.

1.02 DEFINITIONS

- A. Standard Duty: This term is used to designate a particular type of locker specified in this section, regardless of individual manufacturer designations.

1.03 SUBMITTALS

- A. Product Data: Manufacturer's data and installation instructions.
- B. Shop Drawings: Show layouts, dimensions, trim, fillers, and accessories.
 - 1. Indicate installation and anchoring methods.
 - 2. Show verified field measurements.
 - 3. Show locker numbering scheme.
- B. Samples for Color Verification: Actual finish samples on similar sheet metal.

1.04 PROJECT CONDITIONS

- A. Fit lockers neatly to actual construction; take field measurements before fabrication, unless taking of such measurements will delay the work. In that case, provide trim and filler panels as required.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver lockers until spaces to receive lockers are clean and dry.
- B. Protect lockers from damage.

PART 2 – PRODUCTS

2.01 LOCKER CONFIGURATIONS AND COMPONENTS

- A. Lockers:
 - 1. Location: Lockers 113.
 - 2. Standard duty.
 - 3. Single-tier.
 - 4. Height: 72 inches.
 - 5. Width: 12 inches.
 - 6. Depth: 18 inches.
 - 7. Doors: Solid with mini-louvers.
 - 8. Sides and vertical dividers: Solid.
 - 9. Shelves: Solid.
 - 10. Top: Sloped.
 - 11. Door handles.
 - 12. Shelf.
 - 13. Ceiling hook.
 - 14. Two wall hooks.

2.02 STANDARD DUTY LOCKERS

- A. Provide all standard duty lockers and accessories by one manufacturer.
 - 1. Basis of Design: Penco Products.
 - 2. Manufacturers: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Lyon Metal Products, Inc.;
 - b. Penco Products;

- c. Republic Storage Systems Company, Inc.;
 - d. Approved equal.
- B. Components:
- 1. Frame: 16 gage steel channels or 13 gage steel angles, minimum.
 - 2. Tops: 24 gage steel sheet, minimum.
 - 3. Bottoms: 24 gage steel sheet, minimum.
 - 4. Horizontal dividers: 24 gage steel sheet, minimum.
 - 5. Sides and vertical dividers: 24 gage steel sheet, minimum.
 - 6. Backs: 24 gage steel sheet, minimum.
 - 7. Solid doors: 16 gage steel sheet, minimum.
 - 8. Louvers: Manufacturer's standard style, size, and quantity.
 - 9. Door handles: Standard type.
 - 10. Latching mechanism: Concealed in door, designed so that door can be closed while locked, with spring-loaded latches engaging beveled strikes on frame.
 - a. Doors over 36 inches high: Three-point latching, minimum.
- C. Miscellaneous Components and Trim: 18 gage steel sheet, minimum.
- D. Fabrication: Weld all joints between frame members.
- 1. Weld hinges to frame and fasten to door with at least 2 fasteners which are either tamperproof or concealed when door is closed.

2.03 MATERIALS

- A. Steel Sheet: Cold-rolled, leveled mild steel.
- B. Fasteners: Zinc-, cadmium-, or nickel-plated steel or stainless steel.
 - 1. Exposed bolt heads: Tamperproof type.
 - 2. For fastening moving components: Use lock washers or self-locking nuts.
- C. Hinges: 5-knuckle, nonremovable-pin hinges, of loop style with 2 full thicknesses in each leaf; minimum 2 inches high.
 - 1. Minimum of 2 hinges per door.
 - 2. Doors over 42 inches high: Three hinges.
- D. Standard Door Handles: Die-cast zinc alloy or chrome-plated steel latch lifter and padlock hasp, designed so that door can be closed while locked; pry-resistant.
- E. Interior Fittings: Cadmium- or zinc-plated steel or cast aluminum, except shelves.
- F. Number Plates: Aluminum, zinc alloy, or stainless steel; raised or recessed numerals at least 3/8 inch high.
 - 1. Number lockers as directed by the Architect.
 - 2. Fasten to doors, centered near the top, using 2 fasteners.

2.04 FABRICATION - ALL LOCKERS

- A. Factory-fabricate and fully assemble lockers; do not knock down for shipping.
- B. Make lockers square with rigid joints, without dents or warped surfaces.
 - 1. Exposed metal edges: Smooth off sharp edges and corners.
 - 2. Exposed welds: Grind flush.
 - 3. Door and frame fronts: No exposed bolts or rivet heads.
 - 4. Where exposed holes for built-in locks are not used, cover holes neatly using permanent materials.
- C. Doors: Fabricate with flanged edges, reinforced if required for stiffness, and designed to open and close without springing.
 - 1. Fabricate sheet steel doors of one piece.
 - 2. Provide extra stiffeners for doors more than 15 inches wide.
- D. Miscellaneous Components: Provide all parts, filler panels, closures, clips, and fasteners required for a complete installation.
- E. Finishing: Pretreat and finish all surfaces, both exposed and concealed, except stainless steel, chrome, and aluminum.
 - 1. Factory-finish all accessory components to match.
 - 2. Pretreatment: Remove scale, rust, and contaminants; chemically degrease and phosphatize.
 - 3. Finish: Manufacturer's standard baked-on enamel.
 - 4. Custom Color: **No. 952, "Turquoise Teal" by Penco.**

PART 3 – EXECUTION

3.01 PREPARATION

- A. Clean debris from under and behind lockers before installation.

3.02 INSTALLATION

- A. Install lockers on curb as indicated.
- B. Install lockers plumb and level.
- C. Anchor lockers securely to substrates in manner recommended by manufacturer.
 - 1. Use reinforcing plates and spacers as required to prevent metal distortion.
 - 2. Provide anchors at not more than 48 inches on center.
 - 3. Conceal fasteners wherever possible.
- D. Install accessory components with flush, tight joints using concealed fasteners.

3.03 ADJUSTING

- A. Adjust doors and latches for smooth operation.

3.04 CLEANING

- A. Clean and touch up finishes; if finish cannot be restored to original appearance, replace locker.
- B. Use only cleaning and touch-up materials recommended by manufacturer.

END OF SECTION 10505

SECTION 10522 - FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Semi-recessed cabinet mounted fire extinguisher (provide 1-unit).

1.02 SUBMITTALS

- A. Product Data.
- B. Operating and Maintenance Data.

1.03 QUALITY ASSURANCE

- A. Labels: Provide only fire extinguishers which are listed and labeled by Underwriters Laboratories Inc. or Factory Mutual System.

PART 2 - PRODUCTS

2.01 FIRE EXTINGUISHERS

- A. Manufacturers: Products of the following manufacturers, provided they comply with requirements of contract documents, will be among those considered acceptable:
 - 1. Fire extinguishers:
 - a. Buckeye Fire Equipment Co.
 - b. Fire-End & Croker Corporation.
 - c. General Fire Extinguisher Corporation.
 - d. Walter Kidde, The Fire Extinguisher Co.
- B. Fire Extinguisher FE - 1:
 - 1. Rating: 4A:60B:C.
 - 2. Type: Multipurpose dry chemical (ammonium phosphate).
 - a. Stored pressure type.
 - 3. Wall mounted.

2.02 CABINETS AND CABINET ACCESSORIES

- A. Manufacturers: Products of the following manufacturers, provided they comply with requirements of contract documents, will be among those considered acceptable:
 - 1. Cabinets and accessories:
 - a. J.L. Industries.
 - b. Larsen's Manufacturing Company.
 - c. Potter-Roemer Division/Smith Industries, Inc.
- B. Cabinets:
 - 1. To house one extinguisher.
 - a. Extinguisher: FE-1.
 - 2. Size: Inside box dimensions: 27"h. x 9"w. x 6"d.; 4" deep into wall.
 - 3. Style: Semi-recessed mounted, protruding not more than 1-1/2 inches from face of wall.
 - a. Rolled edge trim.
 - 4. Single flat door.
 - a. Frameless acrylic.
 - 1. Clear.
 - b. Door material: Aluminum, satin anodized.
 - 1. Color: Clear.
 - c. Surface mounted door handle, finished to match door.
 - d. Friction or roller catch.
 - 5. Trim (box flange or frame): Same material and finish as door.
 - 6. Manufacturer's standard vertical lettering identifying contents of cabinet.
 - a. Letters silk screen painted; Red.
 - 7. Box: Aluminum sheet.
- C. Hinges: Provide hinges for each door; concealed or continuous type; allow full 180 degree opening of door.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Prepare openings for recessed cabinets.

3.02 INSTALLATION

- A. Perform installation in accordance with the manufacturer's instructions except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
- B. Install brackets for wall mounted extinguishers at height necessary to place the top of the extinguisher at 48 inches above finish floor.
- C. Install cabinets at locations indicated.
- D. Install handle of the cabinet 48" above the finish floor.

END OF SECTION 10522

SECTION 10800 - TOILET, BATH, AND LAUNDRY ACCESSORIES**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Accessories for toilet rooms, shower, and utility rooms.
- B. Grab bars.

1.02 REFERENCES

- A. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 1998.
- B. ASTM C 1036 - Standard Specification for Flat Glass; 1991 (Reapproved 1997).
- C. FS DD-M-411 - Mirrors, Glass; Federal Specifications and Standards; Revision C, 1990.

1.03 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.

1.04 COORDINATION

- A. Coordinate the work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS**2.01 MANUFACTURERS**

- A. Basis of Design: American Specialties, Inc.
- B. Manufacturers: Products of the following manufacturers, provided they comply with requirements of contract documents, will be among those considered acceptable:
 - 1. American Specialties, Inc;
 - 2. Bobrick Washroom Equipment, Inc.;
 - 3. Bradley Corp.

2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Keys: Provide 2 keys for each accessory to NC Department of Transportation.
- C. Stainless Steel Sheet: ASTM A 666, Type 304.
- D. Mirror Glass: Float glass, Type I, Class 1, Quality q2 (ASTM C 1036), with silvering, copper coating, and suitable protective organic coating to copper backing in accordance with FS DD-M-411.
- E. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof, security type.

2.03 FINISHES

- A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.

2.04 TOILET ROOM ACCESSORIES

- A. Double Roll Toilet Tissue Dispenser: Heavy-duty cast aluminum, satin matte silver-gray finish. No waste rocking action spindles of cyclac ABS thermoplastic. Holds 2 rolls up to 6" (150 mm) diameter (2000 sheets).
 - 1. Product: No. 0264-1 manufactured by American Specialties.
- B. Waste Receptacle: recessed, stainless steel, continuously welded bottom pan and seamless exposed flanges, 11-gallon capacity.
 - 1. Product: No. 20458 manufactured by American Specialties.
- C. Paper Towel Dispenser: Wall Mounted stainless steel; 400 C-fold capacity; seamless wall flanges, continuous piano hinges.
 - 1. Product: No. 200210 manufactured by American Specialties.

- D. Soap Dispenser: All-purpose soap valve dispenses liquid, lotion and detergent-type soap. Unbreakable refill window, concealed fastening and hinged filler-top for vandal resistance. Capacity: 48 fluid ounces.
- E. Mirrors: Stainless steel framed, 6 mm thick float glass mirror.
 - 1. Frame: 0.05 inch channel shapes, with mitered and welded and ground corners, and tamperproof hanging system; No.4 finish.
 - 2. Sizes:
 - a. 20"x36";
 - b. 20"x60".
 - 3. Product: 0620 manufactured by American Specialties.
- F. Toilet Seat Cover Dispenser: Dispenses 250 seat covers. Fabricated of 20 gauge type 304 stainless steel with a satin finish.
 - 1. Product: No. 20477-SM manufactured by American Specialties.
- G. Grab Bars: Stainless steel, 1-1/4 inches outside diameter, minimum 0.05 inch wall thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
 - 1. Lengths: 18, 24, 36 & 42 inches.
 - 2. Product: 3700-P manufactured by American Specialties.

2.05 UTILITY ROOM ACCESSORIES

- A. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, with 1/2 inch returned edges, 0.06 inch steel wall brackets, 3 mop holders/4 utility hooks 34" (860 mm) long.
 - 1. Product: 1308-3 manufactured by American Specialties.

2.06 SHOWER ROOM ACCESSORIES

- A. Towel Shelf with Towel Bar: Polished stainless steel, 3/4" bars.
 - 1. Size: 18" long.
 - 2. Projects 3 1/4" from wall.
 - 3. Product: Model 7310 by American Specialties.
- B. Shower Curtain Rod: Stainless steel tube, 1-1/4 inch outside diameter, 18-gage wall thickness, satin-finished, with 2-1/2 inch square stainless steel flanges, for installation with exposed fasteners.
 - 1. Product: Model 1214 by American Specialties.
- C. Shower Curtain: Opaque vinyl, 0.008 inch thick, matte finish, with antibacterial treatment, flameproof and stain-resistant.
 - 1. Size: Min. 60x72 inches, hemmed edges.
 - 2. Grommets: Stainless steel; pierced through top hem on 6 inch centers.
 - 3. Color: White.
 - 4. Shower curtain hooks: Chrome-plated or stainless steel spring wire designed for snap closure.
 - 5. Product: Model 1200-V & 1200-SHU by American Specialties.
- I. L-Shaped Four Leg Fold-Up Shower Seat: Ivory colored solid phenolic seat with stainless steel frame and legs.
 - 1. Size: 33-1/2" long x 14"/21" x 17"-18-1/4" high.
 - 2. Product: Model 8202 by American Specialties.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that field measurements are as indicated on drawings.

3.02 PREPARATION

- A. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings.

END OF SECTION

SECTION 11310 - RESIDENTIAL APPLIANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Kitchen appliances.

1.02 REFERENCE STANDARDS

- A. UL (EAUED) - Electrical Appliance and Utilization Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.03 SUBMITTALS

- A. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.
- B. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in NCDOT's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Electric Appliances: Listed and labeled by UL and complying with NEMA standards.

1.05 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five (5) year manufacturer warranty on refrigeration system of refrigerators.
- C. Provide five (5) year manufacturer warranty on magnetron tube of microwave ovens.

PART 2 PRODUCTS

2.01 KITCHEN APPLIANCES

- A. All Equipment Eligible for Energy Star Rating: Energy Star Rated.
- B. Refrigerator: Free-standing, side-by-side, frost-free.
 - 1. Capacity: Total minimum storage of 18 cubic ft; minimum 15 percent freezer capacity.
 - 2. Energy Usage: Minimum 20 percent more energy efficient than energy efficiency standards set by DOE.
 - 3. Features: Include glass shelves, automatic icemaker, light in freezer compartment, and in-door water and ice dispenser.
 - 4. Finish: Porcelain enameled steel, color white.
 - 5. Manufacturers:
 - a. Frigidaire Home Products: www.frigidaire.com.
 - b. GE Appliances: www.geappliances.com.
 - c. Whirlpool Corp: www.whirlpool.com, or approved equal.
- C. Microwave: Over counter.
 - 1. Capacity: 1.3 cubic ft.
 - 2. Power: 1000 watts.
 - 3. Features: Include turntable and 2-speed exhaust fan.
 - 4. Finish: White.
 - 5. Manufacturers:
 - a. Frigidaire Home Products: www.frigidaire.com.
 - b. GE Appliances: www.geappliances.com.
 - c. Whirlpool Corp: www.whirlpool.com, or approved equal.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify utility rough-ins are present and correctly located.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Anchor built-in equipment in place.

3.03 ADJUSTING

- A. Adjust operating equipment to efficient operation.

3.04 CLEANING

- A. Remove packing materials from equipment.
- B. Wash and clean equipment.

END OF SECTION

DIVISION 13 – SPECIAL CONSTRUCTION

SECTION 13121 - PRE-ENGINEERED METAL BUILDINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Manufacturer-engineered, shop-fabricated structural steel building frame.
- B. Metal wall and roof panels including soffits.
- C. Building insulation systems

1.02 RELATED REQUIREMENTS

- A. Section 07900 - Joint Sealers.
- B. Section 08110 - Steel Doors and Frames.
- C. Section 08360 - Overhead Doors.
- D. Section 08450 - Translucent Windows.
- E. Section 08800 - Glazing.

1.03 REFERENCE STANDARDS

- A. AISC 360 - Specification for Structural Steel Buildings; American Institute of Steel Construction, Inc.; 2010.
- B. AISC "Specifications for the Design of Cold-Formed Steel Structural Members"
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2008.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- E. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength; 2010.
- F. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2010.
- G. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric); 2009.
- H. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2010a.
- I. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2007.
- J. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2005 (Reapproved 2009).
- K. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2011.
- L. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010.
- M. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011.
- N. ASTM C991 - Standard Specification for Flexible Glass Fiber Insulation for Metal Buildings; 2008e1.
- O. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2011.
- P. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2012.
- Q. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2012.

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- R. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.
- S. IAS AC472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems; 2012.
- T. MBMA "Low Rise Building Systems Manual".
- U. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).
- V. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.04 DESIGN REQUIREMENTS

- A. Installed Thermal Resistance of Wall System: See Drawing T3.
- B. Design building structure and enclosure to withstand the structural design criteria and loads specified on plans. Structural design criteria are given on sheet T3, Building Code Summary, and on sheet S6.
- C. Design Standards: Comply with the applicable requirements of:
 - 1. AISC "Specification for Structural Steel Buildings – Allowable Stress Design and Plastic Design."
 - 2. AISI "Specifications for the Design of Cold-Formed Steel Structural Members."
 - 3. MBMA "Low Rise Building Systems Manual."
 - 4. ASCE 7-05 "Minimum Design Loads for Buildings and Other Structures."
 - 5. 2012 North Carolina State Building Code.
- D. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.
- E. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.
- F. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.06 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on profiles, component dimensions, fasteners.
- C. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections; wall and roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, installation; framing anchor bolt settings, sizes, locations from datum, and foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature.
- D. Samples: Submit two samples of precoated metal panels for each color selected, 16x16 inch in size illustrating color and texture of finish.
- E. Manufacturer Qualification Statement: Provide documentation showing metal building manufacturer is accredited under IAS AC472. Include statement that manufacturer designs and fabricates metal building system as integrated components and assemblies, including but not limited to primary structural members, secondary members, joints, roof, and wall cladding components specifically designed to support and transfer loads and properly assembled components form a complete or partial building shell.
- F. Manufacturer's Instructions: Indicate preparation requirements, anchor bolt placement.

- G. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.
- H. Project Record Documents: Record actual locations of concealed components and utilities.

1.07 QUALITY ASSURANCE

- A. Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of this Work.
 - 1. Design Engineer Qualifications: Licensed in the State of North Carolina.
 - 2. Conform to applicable code for submission of design calculations as required for acquiring permits.
 - 3. Cooperate with regulatory agency or authority and provide data as requested.
- B. Perform work in accordance with AISC 360 - Specification for Structural Steel Buildings.
 - 1. Maintain one copy on site.
- C. Perform welding in accordance with AWS D1.1.
- D. Manufacturer Qualifications: Company specializing in the manufacture of products similar to those required for this project.
 - 1. Not less than 5 years of documented experience
 - 2. Accredited by IAS according to IAS AC472.
- E. Erector Qualifications: Company specializing in performing the work of this section with minimum five years' experience.

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.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Buildings:
 - 1. Butler Manufacturing Company: www.butlermfg.com/speclink.
 - 2. Ceco Building Systems: www.cecobuildings.com.
 - 3. Nucor Building Systems: www.nucorbuildingsystems.com
 - 4. VP Buildings: www.vp.com.
 - 5. Approved equal.

2.02 METAL BUILDING

- A. Single span rigid frame.
- B. Bay Spacing: 20 ft.
- C. Primary Framing: Rigid frame of rafter beams and columns, canopy beams, and wind bracing.
- D. Secondary Framing: Purlins, and other items detailed.
- E. Wall System: Preformed metal panels of vertical profile, with sub-girt framing/anchorage assembly, and accessory components.
- F. Roof System: Preformed metal panels oriented parallel to slope, with sub-girt framing/anchorage assembly, insulation, and liner panels, and accessory components. Floating steel roofing clips allowing roof panels to expand and contract without causing panel warping, distortion, or any permanent deformity.
- G. Roof Slope: 1 inch in 12 inches.

2.03 MATERIALS - FRAMING

- A. Structural Steel Members: ASTM A 572/A 572M, Grade 50.
- B. Structural Tubing: ASTM A 500, Grade B cold-formed.
- C. Plate or Bar Stock: ASTM A 529/A 529M, Grade 50.

- D. Anchor Bolts: ASTM A307, galvanized to ASTM A153/A153M.
- E. Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, galvanized to ASTM A153/A153M, Class C.
- F. Welding Materials: Type required for materials being welded.
- G. Primer: SSPC-Paint 20, zinc rich.
- H. Grout: ASTM C1107/C1107M, Non-shrink type, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents, capable of developing minimum compressive strength of 2400 psi in two days and 7000 psi in 28 days.

2.04 MATERIALS - WALLS AND ROOF

- A. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, SS Grade 33/230, with G90/Z275 coating.
- B. Steel Sheet: ASTM A792/A792M aluminum-zinc alloy coated to AZ50/AZM150.
- C. Insulation: ASTM C665 Type II Class A; R-19 minimum.
 - 1. Vapor Retarder: Sheet polypropylene/metallized polyester with fiberglass reinforcing scrim, 0.0015 inch thick minimum, white; ASTM C1136, Type II.
- D. Joint Seal Gaskets: Manufacturer's standard type.
- E. Fasteners: Manufacturer's standard type, galvanized to comply with requirements of ASTM A153/A153M, finish to match adjacent surfaces when exterior exposed.
- F. Bituminous Paint: Asphaltic type.
- G. Roof Curbs: Insulated metal same as roofing, designed for imposed equipment loads, anchor fasteners to equipment, counterflashed to metal roof system.
- H. Trim, Closure Pieces, Caps, Flashings, Rain Water Diverter: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
- I. Thermal Blocks: Manufacturer's standard. Thermal value: R-5 minimum.
- J. Snow Guards: Provide snow guards specifically designed to fit profile of roof panels provided. Install snow guards per manufacturer's instructions to be permanently attached without penetrating the standing seam or the panel. Finish shall match roof panel.

2.05 FABRICATION - FRAMING

- A. Fabricate members in accordance with AISC Specification for plate, bar, tube, or rolled structural shapes.
- B. Anchor Bolts: Formed with bent shank, assembled with template for casting into concrete.

2.06 FABRICATION - WALL AND ROOF PANELS

- A. Siding: Minimum 24 gauge metal thickness minimum, ribbed profile indicated, 1 1/2 inch deep, lapped edges fitted with continuous gaskets.
- B. Roofing: Minimum 24 gauge metal thickness minimum, standing seam profile, male/female edges fitted with continuous gaskets.
- C. Liner: Minimum 0.015 inch metal thickness, V crimped profile, male/female edges fitted with continuous gaskets.
- D. Soffit Panels: Minimum 24 gauge metal thickness, flat profile indicated, unperforated.
- E. Girts/Purlins: Rolled formed structural shape to receive siding, roofing and liner sheet.
- F. Internal and External Corners: Same material thickness and finish as adjacent material, profile brake formed to required angles. Back brace mitered internal corners.
- G. Flashings, Closure Pieces, Fascia: Same material and finish as adjacent material, profile to suit system.
- H. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive type.

2.07 FABRICATION - GUTTERS AND DOWNSPOUTS

- A. Fabricate of same material and finish as roofing metal.

- B. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.
- C. Fabricate support straps of same material and finish as roofing metal, color as selected.

2.08 FINISHES

- A. Framing Members: Clean, prepare, and shop prime. Do not prime surfaces to be field welded.
- B. Exterior Surfaces of Wall Components and Accessories: Precoated enamel on steel of modified silicone finish, color as selected by Architect from manufacturer's standard range.
- C. Interior Surfaces of Wall Components and Accessories: Precoated enamel on steel of modified silicone finish, color as selected by Architect from manufacturer's standard range.
- D. Colors
 - 1. Wall Panels, Eaves, Soffits, Downspouts, Corner Trim, Miscellaneous Trim: Finish color of wall panels shall match Basis of Design.
 - a. Basis of Design color: Peterson Aluminum Company www.pac-clad.com) "Champagne".
 - 2. Roof Panels, Rake Trim, Gutters: Finish color of wall panels shall match Basis of Design.
 - a. Basis of Design: Peterson Aluminum Company (www.pac-clad.com) "Hunter Green".

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position

3.02 ERECTION - FRAMING

- A. Erect framing in accordance with AISC 360 - Specification for Structural Steel Buildings.
- B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.
- C. Set column base plates with non-shrink grout to achieve full plate bearing.
- D. Do not field cut or alter structural members without approval.
- E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.03 ERECTION - WALL AND ROOF PANELS

- A. Install in accordance with manufacturer's instructions.
- B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.
- C. Fasten cladding system to structural supports, aligned level and plumb.
- D. Locate end laps over supports. End laps minimum 2 inches. Place side laps over bearing.
- E. Provide expansion joints where indicated.
- F. Use concealed fasteners.
- G. Install insulation and vapor retarder. Place wire mesh under vapor retarder for support between framing members.
- H. Install sealant and gaskets to prevent weather penetration.

3.04 ERECTION - GUTTERS AND DOWNSPOUTS

- A. Rigidly support and secure components. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.
- B. Apply bituminous paint on surfaces in contact with cementitious materials.

- C. Slope gutters minimum 1/8 inch/ft.

3.05 INSTALLATION - ACCESSORIES

- A. Install door frames, doors, overhead doors, and windows and glass in accordance with manufacturer's instructions.

3.06 TOLERANCES

- A. Framing Members: 1/4 inch from level; 1/8 inch from plumb.
- B. Siding and Roofing: 1/8 inch from true position.

END OF SECTION

(I-4928) 41188.3.1 / Gaston County I-85 Weigh Station

DIVISION 14 – CONVEYING EQUIPMENT

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(NOT USED)

DIVISION 15A - PLUMBING

15010	Basic Plumbing Requirements
15140	Hangers and Supports
15190	Plumbing Identification
15250	Plumbing Piping Insulation
15410	Plumbing Piping
15430	Plumbing Specialties
15440	Plumbing Fixtures
15450	Water Heaters

PART I - GENERAL

1.1 GENERAL CONDITIONS

- A. The stipulations and conditions stated in this Section, together with all provisions of the "Instructions to Bidders", "General Conditions", "Supplemental General Conditions", and "Special Conditions", hereinbefore set forth, shall apply to this and the other Sections of Division 15A.

1.2 GENERAL REQUIREMENTS

- A. The General Requirements hereinafter listed apply to the Plumbing Work Division. If there is any conflict between the General Requirements and the General Conditions, the General Conditions shall take precedence.

1.3 ALTERNATES

- A. Carefully examine all alternates at the back of this specification to determine if any work described under the Plumbing Section will be affected thereby.

1.4 INTENT

- A. The intent of these drawings and specifications are to describe the installation of a complete, fully adjusted and operational system. Therefore, any items shown on drawings and not specifically called for in the specifications, or any items specified and not specifically indicated or detailed on the drawings, or any items neither specified or shown, but which are reasonably incidental to and commonly required to make a complete job, will be furnished and installed by the Plumbing Contractor at his own expense.

1.5 DEFINITIONS

- A. The Plumbing Contractor shall provide all supervision, labor, material equipment, machinery, plant, and any and all other items necessary to complete the plumbing systems. All items of equipment are specified in the singular; however, the Plumbing Contractor shall provide the number of items of equipment as indicated on the drawings, and as required for complete systems.

Where the word "provide" is used, it shall mean "furnish and install complete and ready to use".

1.6 VISIT TO THE SITE

The Plumbing Contractor shall visit the site before submitting his bid so as to be thoroughly familiar with the job conditions and/or peculiarities. No extra payment will be allowed for anything which could have been anticipated from a visit to the site.

1.7 REGULATORY REQUIREMENTS

- A. All work under this Section shall be accomplished in strict accordance with State codes. Where these plans and specifications conflict with such codes, the codes shall govern. The Plumbing Contractor shall notify the Architect or Engineer of such conflicts in writing prior to receipt of bids.

1.8 PERMITS AND FEES

- A. The Plumbing Contractor shall make all necessary arrangements, obtain all necessary approval, obtain all permits and pay fees required for the installation of any of the work covered under the Plumbing Work Division of the Specifications. Any fees required by any utility companies or municipal authorities for the final connections for these services shall be paid by the Plumbing Contractor under whose work such services appear. Before the job is certified as substantially complete, a **Certificate of Approval** from all authorities involved must be obtained and turned over to the Architect/Engineer.

1.9 DRAWINGS AND SPECIFICATIONS

- A. The Plumbing Drawings and Specifications are intended to cover all the work enumerated under the respective headings. The drawings are diagrammatic only. No Contractor shall take advantage of conflict or error between Drawings and Specifications, or between General Drawings and Mechanical, Plumbing and/or Electrical Drawings, but shall request a clarification of such from the Architect/Engineer, should this condition exist. If there is insufficient time to issue an Addendum for this clarification, the Plumbing Contractor shall figure on the most expensive of the items in conflict.
- B. The Plumbing Contractor shall refer to the Architectural and Structural Drawings and Specifications for the general construction of the building, for floors and ceiling heights, for locations of walls, partitions, beams, etc., and shall be guided accordingly for setting of all sleeves, inserts and equipment. The Plumbing Contractor shall not under any circumstances scale drawings for the location of equipment. The Plumbing Contractor shall verify the locations of all utility services.
- C. The Plumbing Contractor shall keep at least one set of corrected Shop and Design Drawings at the site. Drawings are to be current, denoting approved modifications and actual installed departure. Submit drawings to Architect/Engineer before final payment is made.

1.10 SUPERVISION

- A. The Plumbing Contractor performing the work specified shall be required to employ a qualified Superintendent or Foreman to continuously supervise the installation of their work, with authorization to act as agent. Contractors: He shall be capable of checking layouts, coordinating and supervising the work, establishing grades and levels, and locating chases, openings, hangers, inserts, sleeves, etc.

PART II - PRODUCTS

2.1 STANDARD PRODUCTS

- A. Unless otherwise indicated in writing by the Architect/Engineer, the materials to be provided under this Specification shall be standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest design. All items of the same type or rating shall be identical.

2.2 SUBMITTAL

- A. The Plumbing Contractor shall submit, for approval, detailed shop drawings on all major equipment and where requested. No materials or equipment may be delivered to the job site or installed until the Plumbing Contractor has in his possession the approved shop drawing for the particular material or equipment. The Plumbing Contractor shall furnish the number of copies required by the General or Special Conditions of the contract, but no case less than six (6) copies.
- B. Submitted material shall be properly labeled indicating specific service for which material or equipment to be used, section and article number of specifications governing, Contractor's name and name of job.
- C. Approval of equipment will not relieve the Plumbing Contractor of compliance with the Specifications even if such approval is made in writing, unless the attention of the Engineer is called to the non-complying features by letter accompanying the submittal data. Approval of Submittal Data by the Engineer shall not be construed as a complete check of approval of detailed dimensions, weights, gauges, and similar details with the proposed articles. The conformance with the necessary coordination between the various other Contractors and suppliers shall be solely the responsibility of the Plumbing Contractor and with no additional expense to the Owner.

2.3 SUBSTITUTIONS

- A. Manufacturer's lists are to establish a standard of quality and not intended to limit the selection to these manufacturers. All materials and equipment which are essential and have not been specified or shown, shall be new and of the highest grade and quality and free from defect or other imperfections. It should be understood that where the words "furnished and installed" are used, it is intended that the Plumbing Contractor shall purchase and install all materials required.
- B. All materials and equipment proposed as substitutes for these specified shall require a ten (10) day prior approval from the Engineer prior to the bid date. No substitutions will be allowed after the ten (10) day period before the bid date.

2.4 PRODUCT HANDLING

- A. Equipment and materials shall be properly stored, adequately protected, and carefully handled to prevent damage before and during installation. Equipment and materials shall be handled, stored and protected in accordance with the manufacturer's recommendations and as approved by the Architect/Engineer. Equipment installed with a factory finish shall be fully protected during construction and shall be maintained free of dust, dirt, and foreign matter. Dents and other surface damage shall be repaired or replaced to the satisfaction of the Architect/Engineer at no additional cost to the Owner.
- B. The Plumbing Contractor shall clean up and remove from the job site all waste materials, packaging, crating, and refuse resulting from his work on a daily basis.

2.5 MATERIALS AND WORKMANSHIP

- A. The Plumbing Contractor shall perform a first class job, both in material and workmanship. None other will be accepted. Deviations from either will be corrected by the Plumbing Contractor at the Plumbing Contractor's expense.

- B. The material used throughout the work, except when otherwise noted, shall be new and of the best of its kind. No substitutes shall be used unless approved by the Architect/Engineer. All work shall be executed with a maximum speed consistent with safety and good workmanship.
- C. Any equipment furnished by the Plumbing Contractor that is larger than those indicated on the drawings and described in these Specifications or have different electrical characteristics, the increase in cost to the Electrical Contractor for larger wires, conduit, circuit breakers, switches, etc. or for changes in work already installed shall be borne by the instigating Contractor.

PART III - EXECUTION

3.1 EXCAVATION AND BACKFILL

- A. The Plumbing Contractor shall perform any and all trench and pit excavation and backfilling required for the installation of his work. Trenches shall be made with the sides vertical and shall be shored where necessary for the protection of men and equipment. All excavation work shall be done in a careful manner to avoid damage to footers and foundations. The backfilling shall be placed in layers not exceeding 4 inches in depth, wetting each layer as it is placed, and thoroughly compacting each layer with mechanical tamper or other approved means. Any damage done during excavation and backfilling operations to roads, sidewalks, curbs, shrubs, sod, footers, foundations, etc. shall be replaced to its condition prior to construction at no expense to the Owner.

3.2 SCAFFOLDING, RIGGING AND HOISTING

- A. The Plumbing Contractor shall furnish all necessary scaffolding, staging, rigging and hoisting required for the completion of his work. All such scaffolding, etc., shall be removed from the premises when its use is no longer required on the job.

3.3 CUTTING AND PATCHING

- A. The Plumbing Contractor shall provide all cutting and patching necessary to install the work specified in this section. The patching shall match adjacent surfaces.
- B. No structural member shall be cut without the approval of the Engineer, and all such cutting shall be done in a manner directed by him.

3.4 EQUIPMENT SPACE AND ARRANGEMENT

- A. The equipment shall fit into the space allotted and shall allow adequate clearance for entry, installation, replacement, servicing, and maintenance. The Plumbing Contractor shall coordinate the work to ensure that equipment may be moved into place without altering building components or other installations. Access space shall not be less than the equipment manufacturer's requirements.
- B. These drawings indicate the extent and general arrangement of equipment, piping, and ductwork. If any departures are deemed necessary by the Plumbing Contractor, details of such departures and the reasons therefore shall be submitted to the Architect/Engineer for approval as soon as practicable and within 30 days after award of the contract. No departure shall be made without written approval of the Architect/Engineer.

3.5 DAMAGE TO WORK ALREADY IN PLACE

- A. The Plumbing Contractor shall assume full responsibility for any damage done by him, his agents or employees, to any work already in place. Any such damage done shall be repaired at the Contractor's expense by mechanics skilled at their respective trades to the approval of the Architect/Engineer.

3.6 JURISDICTION OF WORK

- A. It may become necessary for the Plumbing Contractor to furnish labor or materials which is not generally accepted as part of this trade. In cases of this type, he shall contract the work or shall furnish materials and employ workmen of the trade involved in order not to cause any delay or stoppage of work caused by infringement of trade agreements as to jurisdiction, alleged or actual.

3.7 COORDINATION WITH OTHER TRADES

- A. All work shall be coordinated with other trades involved in the construction project. All work shall be carefully laid out in advance to coordinate Architectural, Structural, Mechanical, Plumbing and Electrical features of construction. The Plumbing Contractor shall verify at the site all locations, grades, elevations, and utility service connections indicated. Any conflicts due to lack of proper coordination shall be brought to the attention of the Architect/Engineer for resolution. The Plumbing Contractor shall make required changes or relocations at no additional cost to the Owner.
- B. Installation, inspection, and testing of work above ceilings shall be completed and approved by the Architect/Engineer prior to installation of the specified finished ceilings. However, ceiling suspension system may be installed as required for coordination.
- C. The Plumbing Contractor shall consult with the other trades at the start of the work and periodically thereafter, as required to properly coordinate the various items of work, and to avoid interferences. Should any interferences of any nature develop as the work progresses, such interferences shall be resolved and eliminated as directed. The cost of any work directed shall be borne by the Subcontractor or Contractors directed to do this work.

3.8 DIVISION OF WORK

- A. This paragraph is intended to show exactly the point of division of work between the Electrical Division and the Plumbing Division.
- B. All equipment covered in the Plumbing Division of the specifications shall be furnished, mounted, and aligned under the Plumbing Division. All individual motor starters, unless indicated as part of a motor control center, for this equipment shall be furnished and installed by the Plumbing Contractor.
- C. All final electrical connections to equipment covered in the Plumbing Division of the specifications shall be completed under the Plumbing Division.
- D. The Electrical Contractor shall provide a disconnect switch or junction box for each item of equipment under Division 16.
- E. Electrical equipment and wiring that is provided by the Plumbing Contractor shall be in accordance with the Electrical specification.

3.9 EQUIPMENT INSTALLATION

- A. Final connections to equipment, including pipe, duct, and controls, shall be provided under applicable sections of this Division, unless otherwise specified or indicated.
- B. Manufacturer's Instructions: Equipment shall be installed as recommended by the manufacturer to conform to the requirements of the particular application, in accordance with these drawings and specifications.

3.10 OPERATION AND MAINTENANCE MANUALS

- A. One complete manual as outlined herein shall be submitted for approval before conducting instruction sessions in operation, before systems or equipment tests are performed, and before final or beneficial occupancy.
- B. Manuals shall have rigid covers and index tabs for each major piece of equipment, auxiliaries, and systems. The following shall be inscribed on the cover: the words "OPERATION AND MAINTENANCE MANUAL", the name and location of the building, the name of the Section, such as "Plumbing" and the name of the Plumbing Contractor. Two copies of each approved manual shall be submitted to the Owner and one copy shall be submitted to the Architect/Engineer.
- C. Each piece of equipment shall be listed and identified with the same name, mark, number, or other identification as noted or scheduled in the Contract Documents.
- D. Manuals shall include the following:
 - 1. Complete operating installations, covering start-up and shutdown for all components installed.
 - 2. Legible copies of all shop drawings. Any comments incorporated in "as noted" approvals of shop drawings shall be recorded on the drawings included in the manuals.
 - 3. All equipment Maintenance and Service Manuals.
- E. A complete parts list for each piece of equipment.
- F. All descriptive literature for the equipment.
- G. Operating characteristics, performance data, ratings, and curves for each piece of equipment.
- H. Internal wiring and control diagrams.
- I. All other information pertinent to the maintenance and servicing of equipment and systems provided in the project.
- J. Name, address, and telephone number for service on each manufacturer's equipment.

3.11 OPERATING INSTRUCTIONS

- A. After all equipment and services are in operation, and the Operation and Maintenance Manuals are available, an instruction and training session shall be conducted for the Owner's operating personnel.

- B. Instruction sessions shall be conducted during the Owner's normal working periods, and at times and locations satisfactory to the Owner.

3.12 EQUIPMENT START-UP

- A. No equipment shall be placed in operation until it has been inspected by a qualified representative of the manufacturer and Certified to be ready for operation. The manufacturer's representative shall supervise the start-up operation and shall be responsible for all adjustments required to meet design conditions. Such services shall be at no additional cost to the Owner.

3.13 GUARANTEE

- A. The Plumbing Contractor shall present to the Owner a written guarantee covering his work, including all equipment, material and workmanship. This guarantee shall be against all defects in any of the above work, and shall run for a period of one (1) year from the date of written acceptance of the Contractor's work.
- B. Any defective work, equipment, material and/or workmanship that develops within the guarantee period, which is not caused by ordinary wear or abuse by other persons, shall be replaced by the Plumbing Contractor without cost to the Owner.

3.14 FINAL INSPECTION

- A. When the entire Contract has been completed and the work is ready for final inspection, the Architect/Engineer or his duly authorized representative will make the inspection. At the time of inspection, the Plumbing Contractor shall demonstrate to the Architect/Engineer that the various systems and pieces of equipment have been adjusted to operate in accordance with the requirements of the Contract.

3.15 FINAL PAYMENTS

- A. All final payments are contingent upon all necessary Certificates and/or Approvals cited above, together with the written Guarantee being presented to the Owner.

END OF SECTION 15010

SECTION 15140 - HANGERS AND SUPPORTS**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawing and General Provisions of the Contract, including the General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes Hangers and Supports for Plumbing Systems Piping and Equipment.

PART II - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

- A. Hangers: Galvanized carbon steel, adjustable, clevis
- B. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
- C. Vertical Support: Steel riser clamp
- D. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- E. Shield for Insulated Piping 2 Inches and Smaller: 18 gauge galvanized steel shield over insulation in 180 degree segments, minimum 12 inches long at pipe support.
- F. Shields for Insulated Piping 2½ Inches and Larger: Hard block non-conducting saddles in 90 degree segments, 12 inch minimum length, block thickness same as insulation thickness.
- G. Sheet metal saddles must be ½ the circumference of the insulation, turned up or rounded at the corners to avoid damage to the vapor barrier.

2.2 HANGER RODS

- A. Steel Hanger Rods: Threaded both ends or continuous threaded.

2.3 FLASHING

- A. Metal Flashing: 26 gauge galvanized steel
- B. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing

2.4 SLEEVES

- A. Sleeves for Pipes: Form with schedule 40, galvanized steel pipe
- B. Fire Stopping Insulation: Glass fiber type, non-combustible
- C. Caulk: Fire Barrier type sealant

2.5 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars, black and galvanized
- B. Bolts and Nuts: ASME B18.10 or ASTM A 183, steel, hex-head, track bolts and nuts
- C. Washers: ASTM F 844, steel, plain, flat washers
- D. Grout: ASTM C 1107, Grade B, non-shrink, non-metallic
 - 1. Characteristics include post-hardening, volume-adjusting, dry, hydraulic cement-type grout that is non-staining, non-corrosive, non-gaseous and is recommended for both interior and exterior applications.
 - 2. Design Mix: 5000-psi (34.5MPa), 28-day compressive strength
 - 3. Water: Potable
 - 4. Packaging: Pre-mixed and factory-packaged

2.6 ATTACHMENTS

- A. Mechanical Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used. Permitted in concrete over four (4) inches thick.
- B. Weld: Type 22
- C. Beam clamps: Types 20, 21, 28 or 29
- D. Wood: Wood screws or lag bolts

PART III - EXECUTION

3.1 HANGERS AND SUPPORTS INSTALLATION

- A. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Install building attachments within concrete or to structural steel. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping.
- C. Install hangers and support complete with necessary inserts, bolts, rods, nuts, washers and other accessories.
- D. Install hangers and supports to allow controlled movement of piping systems, permit freedom of movement between pipe anchors, and facilitate action of expansion joints, expansion loops, expansion bends and similar units.
- E. Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

- F. Support horizontal piping as follows:

<u>PIPE SIZE</u>	<u>HANGER SPACING</u>	<u>MAXIMUM DIAMETER</u>
1/2 to 1-1/4 inch	6'-6"	3/8"
1-1/2 to 2 inch	10'-0"	3/8"
2-1/2 to 3 inch	10'-0"	1/2"
4 to 6 inch	10'-0"	5/8"
Waste Pipe	5'-0"	3/8"

- G. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work
- H. Place a hanger within 12 inches of each horizontal elbow.
- I. Use hangers with 1 1/2 inch minimum vertical adjustment
- J. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.
- K. Support horizontal cast iron pipe adjacent to each hub with 5 feet maximum spacing between hangers.
- L. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- M. Support riser piping independently of connected horizontal piping.
- N. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

3.2 EQUIPMENT BASES AND SUPPORTS

- A. Provide equipment bases of concrete.
- B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural steel stands to suspend equipment from structure above or support equipment above floor.
- B. Grouting: Place grout under supports for equipment, and make a smooth bearing surface.

3.4 METAL FABRICATION

- A. Cut, drill, and fit miscellaneous metal fabrications for pipe and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for manual shielded metal arc welding, appearance and quality of welds.

3.5 FLASHING

- A. Provide flashing and counter-flashing where piping penetrates weather-proofed walls, floors and roofs.
- B. Flash vent and soil pipes projecting six (6) inches minimum above finished roof surface with lead worked one (1) inch minimum into hub. For pipes through outside walls, turn flanges back into wall and caulk, metal counter-flash and seal.

3.6 SLEEVES

- A. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- B. Design hangers without disengagement of supported pipe
- C. Extend sleeves through floors one (1) inch above finished floor level. Caulk sleeves full depth and provide floor plate.
- D. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with fire stopping insulation and caulk seal air-tight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- E. Install chrome plated steel or stainless steel escutcheons at finished surfaces.
- F. Pipe strapping will not be allowed.

END OF SECTION 15140

SECTION 15190 - PLUMBING IDENTIFICATION**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes plumbing identification materials and devices.

1.3 QUALITY ASSURANCE

- A. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.4 SEQUENCING AND SCHEDULING

- A. Coordinate installation of identifying devices after completion of covering and painting where devices are applied to surfaces. Install identifying devices prior to installation of acoustical ceilings and similar concealment.

PART II - PRODUCTS

2.1 MATERIALS

- A. Color: Unless specified otherwise, conform with ANSI/ASME A13.1.
 - 1. Plastic Nameplates: Laminated three-layer plastic with engraved black letters on light contrasting background color.
 - 2. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1½ inch diameter.
 - 3. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
 - 4. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape of not less than 6 inch wide by 4 mil thick, manufactured for direct burial service.

PART III - EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

- A. Plastic Nameplates: Install with corrosive-resistant mechanical fasteners.

- B. Plastic Tags: Install with corrosive-resistant chain.
- C. Plastic Tape Pipe Markers: Install complete around pipe in accordance with the manufacturer's instructions
- D. Underground Plastic Pipe Markers: Install 6 to 8 inches below finished grade, directly above the buried pipe.
- E. Equipment: Identify pumps, heat transfer equipment, tanks, and water treatment devices with plastic nameplates. Small devices, such as in-line pumps, may be identified with plastic tags
- F. Controls: Identify control panels and major control components outside panels with plastic nameplates.
- G. Piping: Identify piping, concealed or exposed, with plastic tape pipe markers. Tags may be used on small diameter piping. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and "T", at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION 15190

SECTION 15250 - PLUMBING PIPING INSULATION**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes Plumbing Pipe Insulation.

1.3 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Conform to the following characteristics for insulation including facings, cements, and adhesives, when tested according to ASTM E 84, by UL or other testing or inspecting organization acceptable to the authority having jurisdiction. Label insulation with appropriate markings of testing laboratory.
 - 1. Interior Insulation: Flame spread rating of 25 or less and a smoke developed rating of 50 or less.
 - 2. Exterior Insulation: Flame spread rating of 75 or less and a smoke developed rating of 150 or less.

1.4 SEQUENCING AND SCHEDULING

- A. Schedule insulation application after testing of piping systems.
- B. Schedule insulation application after installation and testing of heat trace tape.

PART II - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Glass Fiber:
 - a. Certain Teed Corporation
 - b. Knauf Fiberglass GmbH
 - c. Manville
 - d. Owens-Corning Fiberglas Corporation
 - e. USG Interiors, Inc. - Thermafiber Division
 - 2. Flexible Elastomeric Cellular:
 - a. Armstrong World Industries, Inc.
 - b. Halstead Industrial Products
 - c. IMCOA
 - d. Rubatex Corporation

2.2 GLASS FIBER

- A. Material: Inorganic glass fibers, bonded with a thermosetting resin. Jacket: All purpose, factory applied, laminated glass fiber- reinforced, flame retardant Kraft paper and aluminum foil having self-sealing lap.

- B. Preformed Pipe Insulation: ASTM C 547, Class 1, rigid pipe insulation, jacketed.
 - 1. Thermal Conductivity: 0.26 average maximum at 75 degrees F mean temperature.
 - 2. Density: 10 average maximum.
- C. Adhesive: Produced under the UL Classification and Follow-up Service.
 - 1. Type: Non-flammable, solvent-based.
 - 2. Service Temperature Range: Minus 20 degrees to 180 degrees F.

2.3 FLEXIBLE ELASTOMERIC CELLULAR

- A. Material: Flexible expanded closed-cell structure with smooth skin on both sides.
- B. Form: Tubular materials conforming to ASTM C 534, Type I.
- C. Thermal Conductivity: 0.30 average maximum at 75 degrees F.
- D. Coating: Water based latex enamel coating recommended by insulation manufacturer.

2.4 INSULATING CEMENTS

- A. Mineral Fiber, Hydraulic-Setting Insulating and Finishing Cement: ASTM C 449
 - 1. Thermal Conductivity: 1.2 average maximum at 400 degrees F mean temperature.
 - 2. Compressive Strength: 100 psi at 5 percent deformation.

2.5 ADHESIVES

- A. Flexible Elastomeric Cellular Insulation Adhesive: Solvent-based, contact adhesive recommended by insulation manufacturer.
- B. Lagging Adhesive: MIL-A-3316C, non-flammable adhesive in the following Classes and Grades.
 - 1. Class 1, Grade A for bonding glass cloth and tape to un-faced glass fiber insulation, sealing edges of glass fiber insulation, and bonding lagging cloth to un-faced glass fiber insulation.
 - 2. Class 2, Grade A for bonding glass fiber insulation to metal surfaces.

2.6 JACKETS

- A. PVC Fitting Covers: Factory-fabricated fitting covers manufactured from 20-mil thick, high impact, ultra-violet resistant PVC.
 - 1. Adhesive: As recommended by insulation manufacturer.

- B. Aluminum Jacket: ASTM B 209, 3003 Alloy, H-14 temper
 - 1. Finish and Thickness: Smooth finish, 0.020 inch thick
 - 2. Elbows: Pre-formed 45-degree and 90-degree, short and long radius elbows, same material, finish, and thickness as jacket.

2.7 ACCESSORIES AND ATTACHMENTS

- A. Bands: 3/4 inch wide, 0.007 inch thick, Aluminum
- B. Wire: 16 gauge, soft annealed stainless steel

2.8 SEALING COMPOUNDS

- A. Vapor Barrier Compound: Water-based, fire-resistive composition
 - 1. Water Vapor Permeance: 0.08 perm maximum
 - 2. Temperature Range: Minus 20 degrees to 180 degrees F
- B. Weatherproof Sealant: Flexible elastomer based, vapor barrier sealant designed to seal metal joints.
 - 1. Water Vapor Permeance: 0.02 perm maximum
 - 2. Temperature Range: Minus 50 degrees to 250 degrees F
 - 3. Color: Aluminum

PART III - EXECUTION

3.1 PREPARATION

- A. Surface Preparation: Clean, dry, and remove foreign materials such as rust, scale, and dirt.

3.2 INSTALLATION - GENERAL

- A. Select accessories compatible with materials suitable for the service. Select accessories that do not corrode, soften, or otherwise attack the insulation or jacket in either the wet or dry state.
- B. Apply insulation material, accessories, and finishes according to the manufacturer's printed instructions.
- C. Keep insulation materials dry during application and finishing.
- D. Apply insulation continuously over fittings, valves and specialties.
- E. Apply insulation with a minimum number of joints.
- F. Apply insulation with integral jackets as follows:
 - 1. Pull jacket tight and smooth.

2. Cover circumferential joints with butt strips, at least three (3) inches wide, and of same material as insulation jacket. Secure with adhesive and outward clinching staples along both edges of butt strip and space 4 inches on center.
 3. Longitudinal Seams: Overlap seams at least 1½ inches. Apply insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at four (4) inches on center.
 4. Vapor Barrier Coatings: Apply on seams and joints, over staples, and at ends butt to flanges, unions, valves, and fittings.
 5. At penetrations in jackets for thermometers and pressure gauges, fill and seal voids with vapor barrier coating.
 6. Repair damaged insulation jackets, except metal jackets, by applying jacket material around damaged jacket. Adhere, staple, and seal. Extend patch at least 2 inches in both directions beyond damaged insulation jacket and around the entire circumference of the pipe.
- G. Interior Walls and Partitions Penetrations: Apply insulation continuously through walls and partitions, except fire rated walls and partitions.
- H. Fire Rated Walls and Partitions Penetrations: Terminate insulation at penetrations through fire rated walls and partitions. Seal insulation ends with vapor barrier coating. Seal around penetration with fire stopping or fire resistant joint sealer.
- I. Flanges, Fittings, and Valves: Apply pre-molded, pre-cut, or field fabricated segments of insulation around flanges, unions, valves, and fittings. Make joints tight. Bond with adhesive.
1. Use same material and thickness as adjacent pipe insulation.
 2. Overlap nesting insulation by 2 inches or 1 pipe diameter, whichever is greater.
 3. Apply materials with adhesive, fill voids with mineral fiber insulating cement. Secure with wire or tape.
 4. Insulate elbows and tees smaller than three (3) inches pipe size with pre-molded insulation.
 5. Insulate elbows and tees Three (3) inches and larger with pre-molded insulation or insulation material segments. Use at least three (3) segments for each elbow.
 6. Cover insulation, except for metal jacketed insulation, with PVC fitting covers and seal circumferential joints with butt strips.
- J. Hangers and Anchors: Apply insulation continuously through hangers and around anchor attachments. Install saddles, shields, and inserts as specified.
1. Inserts and Shields: Cover hanger inserts and shields with jacket material matching adjacent pipe insulation.

3.3 GLASS FIBER INSULATION INSTALLATION

- A. Bond insulation to pipe with lagging adhesive.
- B. Seal exposed ends with lagging adhesive.
- C. Seal seams and joints with vapor barrier compound.

3.4 FLEXIBLE ELASTOMERIC CELLULAR INSULATION INSTALLATION

- A. Slip insulation on the pipe before making connections wherever possible. Seal joints with adhesive. Where the slip-on technique is not possible, cut one side longitudinally and apply to the pipe. Seal seams and joints with adhesive.
- B. Valves, Fittings, and Flanges: Cut insulation segments from pipe or sheet insulation. Bond to valve, fitting, and flange and seal joints with adhesive.
 - 1. Miter cut materials to cover soldered elbows and tees.
 - 2. Fabricate sleeve fitting covers from flexible elastomeric cellular insulation for screwed valves, fittings, and specialties. Miter cut materials. Overlap adjoining pipe insulation.

3.5 JACKETS

- A. Exterior Exposed Insulation: Install continuous aluminum jackets and seal all joints and seams with waterproof sealant.
- B. Install metal jacket with two (2) inch overlap at longitudinal and butt joints. Overlap longitudinal joints to shed water. Seal butt joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel draw bands 12 inches on center and at butt joints.

3.6 FINISHES

- A. Flexible Elastomeric Cellular Insulation: After adhesive has fully cured, apply 2 coats of protective coating to exposed insulation.

3.7 PIPE INSULATION SCHEDULES

<u>PIPING</u>	<u>INSULATION TYPE</u>	<u>THICKNESS IN INCHES</u>
Domestic Hot Water Supply	GLASS FIBER	1
Domestic Hot Water Re-Circulating	GLASS FIBER	1
Domestic Cold Water(EXTERIOR)	GLASS FIBER	1
Domestic Cold Water(INTERIOR)	GLASS FIBER	1/2
Roof Drains	GLASS FIBER	1
Piping Exposed to Freezing	GLASS FIBER	1
"P" Trap at Handicapped Fixtures	ELASTOMERIC	1/2

END OF SECTION 15250

PART I - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes plumbing piping systems to a point shown on the civil drawings. Systems include the following:
 - 1. Potable water distribution, including cold and hot water supply and hot water circulation.
 - 2. Drainage and Vent Systems, including sanitary and storm.
 - 3. Cast iron piping must be used in all plenum areas. Review drawings for any plenum areas.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing piping systems with the following minimum working pressure ratings, except where indicated otherwise:
 - 1. Water Distribution Systems, Below Ground: 150 psig.
 - 2. Water Distribution Systems, Above Ground: 125 psig.
 - 3. Soil, Waste and Vent Systems: 10-foot head of water

PART II - PRODUCTS

2.1 SANITARY SEWER PIPING - BURIED

- A. Cast Iron Pipe: ASTM A74 service weight. Fittings: Cast iron. Joints: Hub and Spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets.
- B. Sch. 40 PVC Pipe: ASTM D2665. Fittings: PVC. Joints: ASTM D2564, solvent weld.

2.2 SANITARY SEWER PIPING - ABOVE GRADE

- A. Cast Iron Pipe: ASTM A74 service weight. Fittings: Cast iron. Joints: Hub and Spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets.
- B. Cast Iron Pipe: CISPI 301, hubless, service weight. Fittings: Cast iron. Joints: Neoprene gaskets and stainless steel clamp and shield assemblies.
- C. Sch. 40 PVC Pipe: ASTM D2665. Fittings: PVC. Joints: ASTM D2564, solvent weld.

2.3 WATER PIPING - BURIED

- A. Copper Tubing: ASTM B88, Type K, annealed. Fittings: ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA.

2.4 WATER PIPING - ABOVE GRADE

- A. Copper Tubing: ASTM B88, Type L, hard drawn. Fittings: ANSI/ASME B16.23, cast brass, or ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA.

2.5 STORM WATER PIPING - BURIED

- A. Cast Iron Pipe: ASTM A74 service weight. Fittings: Cast iron. Joints: Hub and Spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets.
- B. Cast Iron Pipe: CISPI 301, hubless, service weight. Fittings: Cast iron. Joints: Neoprene gaskets and stainless steel clamp and shield assemblies.
- C. Sch. 40 PVC Pipe: ASTM D2665. Fittings: PVC. Joints: ASTM D2564, solvent weld.

2.6 STORM WATER PIPING - ABOVE GRADE

- A. Cast Iron Pipe: ASTM A74 service weight. Fittings: Cast iron. Joints: Hub and Spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets.
- B. Cast Iron Pipe: CISPI 301, hubless, service weight. Fittings: Cast iron. Joints: Neoprene gaskets and stainless steel clamp and shield assemblies.
- C. Sch 40 PVC Pipe: ASTM D2665. Fittings: PVC. Joints: ASTM D2564, solvent weld.

2.7 MANUFACTURERS

- A. Acceptable Manufacturers-Valves:
 - 1. Crane
 - 2. Grinnell
 - 3. Nibco
 - 4. Apollo

2.8 GATE VALVES

- A. 150 psig rated, bronze body, lever ball type, Apollo or equal.

2.9 GLOBE VALVES

- A. 150 psig rated, bronze body, rising stem and hand wheel, inside screw, renewable composition disc, threaded ends, with back seating capacity. Apollo or equal.

2.10 BALL VALVES

- A. 150 psig rated, bronze or stainless steel body, stainless steel ball, Teflon seats and stuffing box ring, lever handle and balancing stops, threaded ends. Apollo or equal.

PART III - EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

- A. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- B. Route piping in orderly manner and maintain gradient.
- C. Install piping to conserve building space and not interfere with use of space.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipes, joints, or connected equipment.
- F. Provide clearance for installation of insulation and access to valves and fittings.
- G. Slope water piping and arrange to drain at low points.
- H. Establish elevations of buried piping outside the building to ensure not less than 1 ft of cover.
- I. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- J. Prepare pipe, fittings, supports, and accessories not pre-finished, ready for finish painting.
- K. Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum. Maintain gradients.
- L. Excavate in accordance with Sections 15010.
- M. Backfill in accordance with Sections 15010.
- N. Install bell and spigot pipe with bell end upstream.

- O. Install valves with stems upright or horizontal, not inverted.

3.3 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
- C. Install gate or ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- D. Install globe or ball valves for throttling, bypass, or manual flow control services.

3.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed and clean.
- B. Inject disinfectant solution containing 100 ppm of available chlorine and allow to stand for 2 hours before flushing.
- C. Flush disinfectant from system until residual is equal to that of incoming water or 1.0 mg/L.
- E. Take samples from outlets and analyze in accordance with AWWA C601.

3.5 SERVICE CONNECTIONS

- A. Provide new [sanitary] [storm] sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.
- B. Provide new water service complete with reduced pressure back-flow preventer and water meter with by-pass valves.

END OF SECTION 15410

SECTION 15430 - PLUMBING SPECIALTIES

PART I - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes Plumbing Specialties for water distribution systems; and soil, waste and vent systems.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Submit product data including rated capacities of selected models and weights (shipping, installation, and operation). Indicate materials, finishes, dimensions, required clearances, and methods of assembly of components; and piping and wiring connections.

PART II - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Backflow Preventers:
 - a. Ames Co., Inc.
 - b. Hersey Products, Inc., Grinnell Corp.
 - c. Watts Regulator Co.
 - d. Wilkins Regulator Div., Zurn Industries, Inc.
 - 2. Water Pressure Regulators:
 - a. Spence Engineering Co., Inc.
 - b. Watts Regulator Co.
 - c. Wilkins Regulator Div., Zurn Industries, Inc.
 - 3. Specialties:
 - a. Josam Co.
 - b. Smith by Jay R. Smith Mfg. Co. Div., Smith Industries, Inc.
 - c. Watts Regulator Co.
 - d. Woodford Manufacturing Co. Div., WCM Industries, Inc.
 - e. Zurn by Hydromechanics Div., Zurn Industries, Inc.

2.2 CLEANOUTS

- A. Exterior Surfaced Areas: Round cast nickel-bronze access frame and non-skid cover.
- B. Exterior Un-Surfaced Areas: Line type with lacquered cast iron body and round epoxy coated gasketed cover.
- C. Interior Finished Floor Areas: Lacquered cast iron, two piece body, round with scoriated cover in service areas and round with depressed cover to accept floor finish in finished floor areas.
- D. Interior Finished Wall Areas: Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

2.3 WATER HAMMER ARRESTORS

- A. ANSI A112.26.1; sized in accordance with PDI WH-201, pre-charged suitable for operation in temperature range -100 to 300 degrees F and maximum 250 psig working pressure.

2.4 TRAP SEAL PRIMER VALVE:

- A. ASSE 1018; water supply fed type, fully automatic 125psig minimum working pressure, Bronze body with atmospheric vented drain chamber, ½ inch threaded or solder joint inlet and outlet connections, Chrome plated, or rough bronze finish. Unit shall be capable of being located on any active water line.

2.5 BACKFLOW PREVENTERS

- A. Reduced Pressure Back-flow Preventers: ANSI/ASSE 1013; bronze body with bronze and plastic internal parts and stainless steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve which opens under back pressure in case of diaphragm failure; non-threaded vent outlet; assembled with two gate valves, strainer, and four test cocks.

PART III - EXECUTION

3.1 PREPARATION

- A. Coordinate construction areas to receive drains to the required invert elevations.

3.2 INSTALLATION AND APPLICATION

- A. Install specialties in accordance with manufacturer's instructions to permit intended performance.

- B. Extend clean-outs to finished floor. Lubricate threaded clean-out plugs Teflon pipe dope. Ensure clearance at clean-out for rodding of drainage system.
- C. Encase exterior clean-outs in concrete flush with grade.
- D. Install water hammer arrestors complete with accessible isolation valve.

END OF SECTION 15430

SECTION 15440 - PLUMBING FIXTURES**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes plumbing fixtures and trim, fittings, and accessories, appliances, appurtenances, equipment, and supports associated with plumbing fixtures.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of plumbing fixture specified, including fixture and trim, fittings, accessories, appliances, appurtenances, equipment, supports, construction details, dimensions of components, and finishes.

PART II - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
1. Fixtures and Trim:
 - a. American Standard, Inc.
 - b. Eljer; A Household International Co.
 - c. Kohler Co.
 2. Stainless Steel Sinks:
 - a. Elkay Manufacturing Co.
 - b. Just Manufacturing Co.
 - c. Kohler Co.
 3. Mop Basins:
 - a. Crane Plumbing/Fiat Products.
 - b. Florestone Products Co., Inc.
 - c. Swan Corp.
 4. Water Coolers:
 - a. Elkay Manufacturing Co.
 - b. Halsey Taylor
 - c. Haws Drinking Faucet Co.
 - d. Sunroc Corporation
 - e. Oasis

5. Toilet Seats:
 - a. Bemis Mfg. Co.
 - b. Beneke Division: Sanderson Plumbing Products, Inc.
 - c. Church Seat Co.
 - d. Kohler Co.
 - e. Olsonite Corp.

6. Flushometers:
 - a. Coyne & Delaney Co.
 - b. Sloan Valve Co.
 - c. Zurn Industries, Inc.; Flush Valve Operations.

7. Commercial/Industrial Cast-Brass Faucets:
 - a. American Standard, Inc.
 - b. Chicago Faucet Co.
 - c. Delta Faucet Co.
 - d. Eljer; A Household International Co.
 - e. T & S Brass and Bronze Works, Inc.
 - f. Cambridge Brass
 - g. Elkay Manufacturing Co.

8. Commercial/Institutional Shower and Bathtub Valves and Trim:
 - a. Symmons Industries, Inc.
 - b. Bradley Corp.
 - c. Speakman Co.

PART III - EXECUTION

3.1 INSPECTION

- A. Review Millwork Shop Drawings. Confirm location and size of fixtures and openings before rough-in and installation.

1. Verify adjacent construction is ready to receive rough-in work of this Section.

B. INSTALLATION

1. Install each fixture with trap, easily removable for servicing and cleaning.
2. Install components level and plumb.
3. Install and secure fixtures in place with wall carriers and bolts.
4. Seal fixtures to wall and floor surfaces with sealant.

C. ADJUSTING AND CLEANING

1. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.
2. At completion, clean plumbing fixtures and equipment.
3. Solidly attach water closets to floor with lag screws.

END OF SECTION 15440

SECTION 15450 - WATER HEATERS

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PART I - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes Electric Water Heaters and In-Line Circulators.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data including rated capacities of selected models, weights (shipping, installed, and operating), furnished specialties, and accessories, and indicating dimensions, required clearances, and methods of assembly of components, and piping and wiring connections.

PART II - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Water Heaters:
 - (a) Bradford-White Corp.
 - (b) A.O. Smith Water Products Co. Div.
 - (c) State Industries, Inc.
 - (d) Ruud

2.2 RESIDENTIAL ELECTRIC WATER HEATER

- A. Automatic, electric, vertical storage type, 150 psig maximum working pressure.
- B. Glass lined welded steel tank, thermally insulated with 2 thick glass fiber; encased in corrosion-resistant steel jacket; baked-on enamel finish.
- C. Automatic water thermostat with externally adjustable temperature range from 120 to 170 degrees F, flanged or screw-in nichrome elements, enclosed controls and electrical junction box.
- D. Brass water connections and dip tube, drain valve, high density magnesium anode, and temperature and pressure relief valve.

2.3 IN-LINE CIRCULATOR PUMPS

- A. Casing: Bronze, rated for 125 psig working pressure
- B. Impeller: Bronze
- C. Shaft: Alloy steel with integral thrust collar and two (2) oil lubricated bronze sleeve bearings.
- D. Seal: Carbon rotating against a stationary ceramic seat.
- E. Drive: Flexible coupling

2.4 THERMAL EXPANSION TANKS

- A. Construction: Welded steel, tested and stamped in accordance with Section 8D of ANSI/ASME Code; supplied with National Board Form U-1, rated for working pressure of 125 psig, maximum operating temperature 210 degrees F., with flexible EPDM diaphragm sealed into tank.
- B. Accessories: Pressure gage and air-charging fitting, tank drain; pre-charge to 55 psig.
- C. Size: 10.5" diameter, 16" overall length, 5 gallon capacity.

PART III - EXECUTION

3.1 WATER HEATER INSTALLATION

- A. Install water heaters in accordance with manufacturer's instructions.
- B. Coordinate with plumbing piping and electrical work to achieve operating system.

3.2 PUMP INSTALLATION

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

END OF SECTION 15450

DIVISION 15B: MECHANICAL

15500	Basic Mechanical Requirements
15501	Hangers and Supports
15503	Mechanical Identification
15505	Piping Insulation
15507	Ductwork Insulation
15672	Split System Heat Pump
15674	Duct Free Split System Air Conditioner
15910	Duct Accessories
15932	Air Outlets and Inlets
15990	Testing, Adjusting and Balancing

SECTION 15500 BASIC MECHANICAL REQUIREMENTS

PART I - GENERAL

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1.1 GENERAL CONDITIONS

- A. The Stipulations and Conditions stated in this Section, together with all provisions of the "Instructions to Bidders", "General Conditions", "Supplemental General Conditions", and "Special Conditions", herein before set forth, shall apply to this and the other Sections of Division 15.

1.2 GENERAL REQUIREMENTS

- A. The General Requirements hereinafter listed apply to the Mechanical Work Division. If there is any conflict between the General Requirements and the General Conditions, the General Conditions shall take precedence.

1.3 ALTERNATES

- A. Carefully examine all Alternates at the back of this Specification to determine if any work described under the Mechanical Section will be affected thereby.

1.4 INTENT

- A. The intent of these Drawings and Specifications are to describe the installation of a complete, fully adjusted, and operational system. Therefore, any items shown on Drawings and not specifically called for in the Specifications, or any items specified and not specifically indicated or detailed on the Drawings, or any items neither specified or shown, but which are reasonably incidental to and commonly required to make a complete job, will be furnished and installed by the Mechanical Contractor at his own expense.

1.5 DEFINITIONS

- A. The Mechanical Contractor shall provide all supervision, labor, material equipment, machinery, plant, and any and all other items necessary to complete the mechanical systems. All items of equipment are specified in the singular; however, the Mechanical Contractor shall provide the number of items of equipment as indicated on the Drawings, and as required for complete systems.

Where the word "provide" is used, it shall mean "furnish and install complete and ready to use".

1.6 VISIT TO THE SITE

- A. The Mechanical Contractor shall visit the site before submitting his bid, so as to be thoroughly familiar with the job conditions and/or peculiarities. No extra payment will be allowed for anything that could have been anticipated from a visit to the site.

1.7 REGULATORY REQUIREMENTS

- A. All work under this Section shall be accomplished in strict accordance with State codes. Where these Plans and Specifications conflict with such codes, the codes shall govern. The Mechanical Contractor shall notify the Architect or Engineer of such conflicts in writing prior to receipt of bids.

1.8 PERMITS AND FEES

- A. The Mechanical Contractor shall make all necessary arrangements, obtain all necessary approval, obtain all permits and pay fees required for the installation of any of the work covered under the Mechanical Work Division of the Specifications. Any fees required by any utility companies or municipal authorities for the final connections for these services shall be paid by the Mechanical Contractor under whose work such services appear. Before the job is certified as substantially complete, a Certificate of Approval from all authorities involved must be obtained and turned over to the Architect/Engineer.

1.9 DRAWINGS AND SPECIFICATIONS

- A. The Mechanical Drawings and Specifications are intended to cover all the work enumerated under the respective headings. The drawings are diagrammatic only. No Contractor shall take advantage of conflict or error between Drawings and Specifications, or between general Drawings and Mechanical, Plumbing and/or Electrical Drawings, but shall request a clarification of such from the Architect/Engineer, should this condition exist. If there is insufficient time to issue an Addendum for this clarification, the Mechanical Contractor shall figure on the most expensive of the items in conflict.
- B. The Mechanical Contractor shall refer to the Architectural and Structural Drawings and Specifications for the general construction of the building, for floors and ceiling heights, for locations of walls, partitions, beams, etc., and shall be guided accordingly for setting of all sleeves, inserts and equipment. No Contractor shall under any circumstances scale Drawings for the location of equipment. The Mechanical Contractor shall verify the locations of all utility services.
- C. The Mechanical Contractor shall keep at least one (1) set of corrected Shop and Design Drawings at the site. Drawings are to be current, denoting approved modifications and actual installed departure. Submit drawings to Architect/Engineer before final payment is made.

1.10 SUPERVISION

- A. The Mechanical Contractor performing the work specified shall be required to employ a qualified superintendent or foreman to continuously supervise the installation of their work, with authorization to act as agent Contractors. He shall be capable of checking layouts, coordinating and supervising the work, establishing grades and levels and locating chases, openings, hangers, inserts, sleeves, etc.

PART II - PRODUCTS

2.1 STANDARD PRODUCTS

- A. Unless otherwise indicated in writing by the Architect/Engineer, the materials to be provided under this Specification shall be standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest design. All items of the same type or rating shall be identical.

2.2 SUBMITTAL

- A. The Mechanical Contractor shall submit, for approval, detailed Shop Drawings on all major equipment and where requested. No materials or equipment may be delivered to the job site or installed until the Mechanical Contractor has in his possession the approved shop drawing for the particular material or equipment. The Mechanical Contractor shall furnish the number of copies required by the General or Special Conditions of the contract, but in no case less than six (6) copies.
- B. Submitted material shall be properly labeled indicating specific Service for which material or equipment to be used, Section and Article Number of Specifications governing, Contractor's name and name of job.
- C. Approval of equipment will not relieve the Mechanical Contractor of compliance with the specifications even if such approval is made in writing, unless the attention of the Engineer is called to the non-complying features by letter accompanying the submittal data. Approval of submittal data by the Engineer shall not be construed as a complete check of approval of detailed dimensions, weights, gauges and similar details with the proposed articles. The conformance with the necessary coordination between the various other contractors and suppliers shall be solely the responsibility of the Mechanical Contractor and with no additional expense to the Owner.

2.3 SUBSTITUTIONS

- A. Manufacturer's lists are to establish a Standard of Quality and not intended to limit the selection to these manufacturers. All materials and equipment which are essential and have not been specified or shown shall be new and of the highest grade and quality. Free from defect or other imperfections. It should be understood that where the words "furnished and installed" are used, it is intended that the Mechanical Contractor shall purchase and install all materials required.
- B. All materials and equipment proposed as substitutes for these specified shall require a ten (10) day prior approval from the Engineer prior to the bid date. No substitutions will be allowed after the ten (10) day period before the bid date.

2.4 PRODUCT HANDLING

- A. Equipment and materials shall be properly stored, adequately protected, and carefully handled to prevent damage before and during installation. Equipment and materials shall be handled, stored and protected in accordance with the manufacturer's recommendations and as approved by the Architect/Engineer. Equipment installed with a factory finish shall be fully protected during construction and shall be maintained free of dust, dirt, and foreign matter. Dents and other surface damage shall be repaired or replaced to the satisfaction of the Architect/Engineer at no additional cost to the Owner
- B. The Mechanical Contractor shall clean up and remove from the job site all waste materials, packaging, crating, and refuse resulting from his work on a daily basis.

2.5 MATERIALS AND WORKMANSHIP

- A. The Mechanical Contractor shall perform a first class job, both in material and workmanship. None other will be accepted. Deviations from either will be corrected by the Mechanical Contractor at the Mechanical Contractor's expense.

- B. The material used throughout the work, except when otherwise noted, shall be new and of the best of its kind. No substitutes shall be used unless approved by the Architect/Engineer. All work shall be executed with a maximum speed consistent with safety and good workmanship.
- C. Any equipment furnished by the Mechanical Contractor that is larger than those indicated on the Drawings and described in these Specifications or have different electrical characteristics, the increase in cost to the Electrical Contractor for larger wires, conduit, circuit breakers, switches, etc. or for changes in work already installed shall be borne by the instigating Contractor.

PART III - EXECUTION

3.1 EXCAVATION AND BACKFILL

- A. The Mechanical Contractor shall preform any and all trench and pit excavation and backfilling required for the installation of his work. Trenches shall be made with the sides vertical and shall be shored where necessary for the protection of men and equipment. All excavation work shall be done in a careful manner to avoid damage to footers and foundations. The backfilling shall be placed in layers not exceeding four (4) inches in depth, wetting each layer as it is placed, and thoroughly compacting each layer with mechanical tamper or other approved means. Any damage done during excavation and back-filling operations to roads, sidewalks, curbs, shrubs, sod, footers, foundations, etc. shall be replaced to its condition prior to construction at no expense to the Owner.

3.2 SCAFFOLDING, RIGGING AND HOISTING

- A. The Mechanical Contractor shall furnish all necessary scaffolding, staging, rigging and hoisting required for the completion of his work. All such scaffolding, etc., shall be removed from the premises when its use is no longer required on the job.

3.3 CUTTING AND PATCHING

- A. The Mechanical Contractor shall provide all cutting and patching necessary to install the work specified in this Section. The patching shall match adjacent surfaces.
- B. No Structural member shall be cut without the approval of the Engineer and all such cutting shall be done in a manner directed by him.

3.4 EQUIPMENT SPACE AND ARRANGEMENT

- A. The equipment shall fit into the space allotted and shall allow adequate clearance for entry, installation, replacement, servicing and maintenance. The Mechanical Contractor shall coordinate the work to ensure that equipment may be moved into place without altering building components or other installations. Access space shall not be less than the equipment manufacturer's requirements.
- B. These drawings indicate the extent and general arrangement of equipment, piping, and ductwork. If any departures are deemed necessary by the Mechanical Contractor, details of such departures and the reasons therefore shall be submitted to the Architect/Engineer for approval as soon as practicable and within 30 days after Award of Contract. No departure shall be made without written Approval of the Architect/Engineer.

3.5 DAMAGE TO WORK ALREADY IN PLACE

- A. The Mechanical Contractor shall assume full responsibility for any damage done by him, his agents or employees, to any work already in place. Any such damage done shall be repaired at the Contractor's expense by mechanics skilled at their respective trades, to the approval of the Architect/Engineer.

3.6 JURISDICTION OF WORK

- A. It may become necessary for the Mechanical Contractor to furnish labor or material which is not generally accepted as part of this trade. In cases of this type, he shall contract the work, or shall furnish materials and employ workmen of the trade involved in order not to cause any delay or stoppage of work caused by infringement of trade agreements as to jurisdiction, alleged or actual.

3.7 COORDINATION WITH OTHER TRADES

- A. All work shall be coordinated with other trades involved in the construction project. All work shall be carefully laid out in advance to coordinate Architectural, Structural, Mechanical, Plumbing and Electrical features of construction. The Contractor shall verify at the site all locations, grades, elevations, and utility service connections indicated. Any conflicts due to lack of proper coordination shall be brought to the attention of the Architect/Engineer for resolution. The Mechanical Contractor shall make required changes or relocations at no additional cost to the Owner.
- B. Installation, inspection, and testing of work above ceilings shall be completed and approved by the Architect/Engineer prior to installation of the specified finished ceilings. However, ceiling suspension system may be installed as required for coordination.
- C. The Mechanical Contractor shall consult with the other trades at the start of the work and periodically thereafter, as required to properly coordinate the various items of work, and to avoid interferences. Should any interferences of any nature develop as the work progresses, such interferences shall be resolved and eliminated as directed. The cost of any work directed will be borne by the subcontractor or contractors directed to do this work.

3.8 DIVISION OF WORK

- A. This paragraph is intended to show exactly the point of division of work between the Electrical Division and the Mechanical Division.
- B. All equipment covered in the Mechanical Division of the Specifications shall be furnished, mounted and aligned under the Mechanical Division. All individual motor starters, unless indicated as part of a motor control center, for this equipment shall be furnished and installed by the Mechanical Contractor.
- C. All final electrical connections to equipment covered in the Mechanical Division of the Specifications shall be completed under the Mechanical Division.
- D. The Electrical Contractor shall provide a disconnect switch or junction box for each item of equipment under Division 16.

- E. Electrical equipment and wiring that is provided by the Mechanical Contractor shall be in accordance with the Electrical specification.

3.9 EQUIPMENT INSTALLATION

- A. Final connections to equipment, including pipe, duct, and controls, shall be provided under applicable sections of this Division, unless otherwise specified or indicated.
- B. Manufacturer's Instructions: Equipment shall be installed as recommended by the manufacturer to conform to the requirements of the particular application, in accordance with these Drawings and Specifications.

3.10 OPERATION AND MAINTENANCE MANUALS

- A. One complete Manual as outlined herein shall be submitted for approval before conducting instruction sessions in operation, before systems or equipment tests are performed, and before final or beneficial occupancy.
- B. Manuals shall have rigid covers and index tabs for each major piece of equipment, auxiliaries, and systems. The following shall be inscribed on the cover: the words "OPERATION AND MAINTENANCE MANUAL", the name and location of the building, the name of the Section, such as "Heating" and the name of the Mechanical Contractor. Two (2) copies of each approved manual shall be submitted to the Owner and one (1) copy shall be submitted to the Architect/Engineer.
- C. Each piece of equipment shall be listed and identified with the same name, mark, number, or other identification as noted or scheduled in the Contract Documents.
- D. Manuals shall include the following:
 1. Complete Operating Installations, covering start-up and shutdown for all components installed.
 2. Legible copies of all Shop Drawings. Any comments incorporated in "as noted" approvals of Shop Drawings shall be recorded on the Drawings included in the Manuals.
 3. All equipment Maintenance and Service Manuals.
 4. A complete parts list for each piece of equipment.
 5. All descriptive literature for the equipment.
 6. Operating characteristics, performance data, ratings, and curves for each piece of equipment such as condensers, fans and air handling units.
 7. Internal wiring and control diagrams.
 8. Automatic temperature control diagrams, part descriptions and numbers, and sequences of operation. Drawings shall be neatly folded and inserted in a separate clear plastic binder. The plastic binders shall be bound in the back of each Manual.
 9. Final Testing and Balancing Reports.

10. All other information pertinent to the maintenance and servicing of equipment and systems provided in the Project.
11. Name, address, and telephone number for service on each manufacturer's equipment.

3.11 OPERATING INSTRUCTIONS

- A. After all equipment and services are in operation, and the Operation and Maintenance Manuals are available, an instruction and training session shall be conducted for the Owner's operating personnel.
- B. Instruction sessions shall be conducted during the Owner's normal working periods, and at times and locations satisfactory to the Owner.

3.12 EQUIPMENT START-UP

- A. No equipment shall be placed in operation until it has been inspected by a qualified representative of the manufacturer and certified to be ready for operation. The manufacturer's representative shall supervise the start-up operation and shall be responsible for all adjustments are required to meet design conditions. Such services shall be at no additional cost to the Owner.

3.13 GUARANTEE

- A. The Mechanical Contractor shall present to the Owner a written Guarantee covering his work, including all equipment, material and workmanship. This Guarantee shall be against all defects in any of the above work, and shall run for a period of one (1) year from the date of written acceptance of the Contractor's work.
- B. Any defective work, equipment, material and/or workmanship that develops within the Guarantee period, which is not caused by ordinary wear or abuse by other persons, shall be replaced by the Mechanical Contractor without cost to the Owner.

3.14 FINAL INSPECTION

- A. When the entire Contract has been completed and the work is ready for final inspection, the Architect/Engineer or his duly authorized representative will make the inspection. At the time of inspection, the Mechanical Contractor shall demonstrate to the Architect/Engineer that the various systems and pieces of equipment have been adjusted to operate in accordance with the requirements of the Contract.

3.15 FINAL PAYMENTS

- A. All Final Payments are contingent upon all necessary Certificates and/or Approvals cited above, together with the written Guarantee being presented to the Owner.

END OF SECTION 15500

SECTION 15501 - HANGERS AND SUPPORTS**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawing and General Provisions of the Contract, including the General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- B. This Section includes Hangers and Supports for Mechanical Systems Piping and Equipment.

1.3 QUALITY ASSURANCE

- A. Qualify welding processes and welding operators according to AWS D1.1 "Structural Welding Code - Steel".
 - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.

PART II - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

- A. Hangers: Galvanized carbon steel, adjustable, clevis.
- B. Vertical Support: Steel riser clamp.
- C. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- D. Shield for Insulated Piping 2 Inches and Smaller: 18 gage galvanized steel shield over insulation in 180 degree segments, minimum 12 inches long at pipe support.
- E. Shields for Insulated Piping 2½ Inches and Larger: Hard block non-conducting saddles in 90 degree segments, 12 inch minimum length, block thickness same as insulation thickness.
- F. Shields for Insulated Cold Water Piping 2½ Inches and Larger: Hard block non-conducting saddles in 90 degree segments, 12 inch minimum length, block thickness same as insulation thickness.

2.2 HANGER RODS

- A. Steel Hanger Rods: Threaded both ends or continuous threaded.

2.3 FLASHING

- A. Metal Flashing: 26 gage galvanized steel.
- B. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.

2.4 SLEEVES

- A. Sleeves for Pipes: Form with schedule 40, galvanized steel pipe
- B. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls, and Fireproofing: Prefabricated fire rated sleeves including seals, UL listed.
- C. Sleeves for Round Ductwork: Form with galvanized steel.
- D. Sleeves for Rectangular Ductwork: Form with galvanized steel or wood.
- E. Fire Stopping Insulation: Glass fiber type, non-combustible.
- F. Caulk: Fire Barrier type sealant.

2.5 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars, black and galvanized.
- B. Bolts and Nuts: ASME B18.10 or ASTM A 183, steel, hex-head, track bolts and nuts.
- C. Washers: ASTM F 844, steel, plain, flat washers.
- D. Grout: ASTM C 1107, Grade B, non-shrink, non-metallic.
 - 1. Characteristics include post hardening, volume-adjusting, dry, hydraulic cement-type grout that is non-staining, non-corrosive, non-gaseous and is recommended for both interior and exterior applications.
 - 2. Design Mix: 5000-psi (34.5MPa), 28-day compressive strength.
 - 3. Water: Potable
 - 4. Packaging: Pre-mixed and factory-packaged.

2.6 ATTACHMENTS

- A. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used. Permitted in concrete over 4 inches thick.
- B. Weld: Type 22
- C. Beam Clamps: Types 20, 21, 28 or 29
- D. Wood: Wood screws or lag bolts

PART III - EXECUTION

3.1 HANGERS AND SUPPORTS INSTALLATION

- A. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

- B. Install building attachments within concrete or to structural steel. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping.
- C. Install hangers and support complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- D. Install hangers and supports to allow controlled movement of piping systems, permit freedom of movement between pipe anchors, and facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- E. Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
- F. Support horizontal piping as follows:

<u>PIPE SIZE</u>	<u>HANGER SPACING</u>	<u>MAXIMUM HANGER DIAMETER</u>
1/2 to 1-1/4 inch	6' - 6"	3/8"
1-1/2 to 2 inch	10' - 0"	3/8"
2-1/2 to 3 inch	10' - 0"	1/2"
4 to 6 inch	10' - 0"	5/8"
8 to 12 inch	14' - 0"	7/8"
14 inch and over	20' - 0"	1"
PVC	6' - 0"	3/8"

- G. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
- H. Place a hanger within 12 inches of each horizontal elbow.
- I. Use hangers with 1 1/2 inch minimum vertical adjustment.
- J. Support vertical piping at every floor.
- K. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- L. Support riser piping independently of connected horizontal piping.
- M. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- N. Pipe strapping, duct tape or zip ties will not be allowed.

3.2 EQUIPMENT BASES AND SUPPORTS

- A. Provide equipment bases of concrete.
- B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural steel stands to suspend equipment from structure above or support equipment above floor.
- B. Grouting: Place grout under supports for equipment, and make a smooth bearing surface.

3.4 METAL FABRICATION

- A. Cut, drill, and fit miscellaneous metal fabrications for pipe and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for manual shielded metal arc welding, appearance and quality of welds.

3.5 FLASHING

- A. Provide flexible flashing and metal counter-flashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.
- B. Provide curbs for mechanical roof installations 14 inches minimum high above roofing surface. Flexible sheet flash and counter-flash with sheet metal; seal watertight.

3.6 SLEEVES

- A. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- B. Design hangers without disengagement of supported pipe.
- C. Extend sleeves through floors one inch above finished floor level. Caulk sleeves full depth and provide floor plate.
- D. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with fire stopping insulation and caulk seal air tight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- E. Install chrome plated steel or stainless steel escutcheons at finished surfaces.

END OF SECTION 15501

PART I - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- B. This Section includes Mechanical Identification Materials and Devices.

1.3 QUALITY ASSURANCE

- A. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.4 SEQUENCING AND SCHEDULING

- A. Coordinate installation of identifying devices after completion of covering and painting where devices are applied to surfaces. Install identifying devices prior to installation of acoustical ceilings and similar concealment.

PART II - PRODUCTS

2.1 MATERIALS

- A. Color: Unless specified otherwise, conform with ANSI/ASME A13.1.
- B. Plastic Nameplates: Laminated three-layer plastic with engraved black letters on light contrasting background color.
- C. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1½ inch diameter.
- D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
- E. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape of not less than 6 inches wide by 4 mil thick, manufactured for direct burial service.

PART III - EXECUTION

3.1 PREPARATION

- A. De-grease and clean surfaces to receive adhesive for identification materials.
- B. Prepare surfaces in accordance with manufacturers recommendations.

3.2 INSTALLATION

- A. Plastic Nameplates: Install with corrosive resistant mechanical fasteners.

- B. Plastic Tags Install with corrosive resistant chain.
- C. Plastic Tape Pipe Markers: Install completely around pipe in accordance with manufacturer's instructions.
- D. Underground Plastic Pipe Markers: Install 6 to 8 inches below finished grade, directly above buried pipe.
- E. Equipment: Identify air handling units, pumps, heat transfer equipment, tanks, and water treatment devices with plastic nameplates. Small devices, such as in-line pumps, may be identified with plastic tag.
- F. Controls: Identify control panels and major control components outside panels with plastic nameplates.
- G. Valves: Identify valves in main and branch piping with tags.
- H. Piping: Identify piping, concealed or exposed, with plastic tape pipe markers. Tags may be used on small diameter piping. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and "T", at each side of penetration of structure or enclosure and at each obstruction.

END OF SECTION 15503

SECTION 15505 - PIPING INSULATION**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes Mechanical Pipe Insulation.

1.3 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Conform to the following characteristics for insulation including facings, cements, and adhesives, when tested according to ASTM E 84, by UL or other testing or inspecting organization acceptable to the authority having jurisdiction. Label insulation with appropriate markings of testing laboratory.
 1. Interior Insulation: Flame spread rating of 25 or less and a smoke developed rating of 50 or less.
 2. Exterior Insulation: Flame spread rating of 75 or less and a smoke developed rating of 150 or less.

1.4 SEQUENCING AND SCHEDULING

- A. Schedule insulation application after testing of piping systems.
- B. Schedule insulation application after installation and testing of heat trace tape.

PART II - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers
 1. Glass Fiber:
 - a. Certain Teed Corporation
 - b. Knauf Fiberglass GmbH
 - c. Manville
 - d. Owens-Corning Fiberglass Corporation
 - e. USG Interiors, Inc. - Thermafiber Division
 2. Flexible Elastomeric Cellular:
 - a. Armstrong World Industries, Inc.
 - b. Halstead Industrial Products
 - c. IMCOA
 - d. Rubatex Corporation

2.2 GLASS FIBER

- A. Material: Inorganic glass fibers, bonded with a thermosetting resin.
- B. Jacket: All purpose, factory applied, laminated glass fiber reinforced, flame retardant Kraft paper and aluminum foil having self-sealing lap.

- C. Preformed Pipe Insulation: ASTM C 547, Class 1, rigid pipe insulation, jacketed.
 - 1. Thermal Conductivity: 0.26 average maximum at 75 degrees F mean temperature.
 - 2. Density: 10 average maximum.
- D. Adhesive: Produced under the UL Classification and Follow-up service.
 - 1. Type: Non-flammable, solvent-based.
 - 2. Service Temperature Range: Minus 20 to 180 degrees F.

2.3 FLEXIBLE ELASTOMERIC CELLULAR

- A. Material: Flexible expanded closed-cell structure with smooth skin on both sides.
- B. Form: Tubular materials conforming to ASTM C 534, Type I.
- C. Thermal Conductivity: 0.30 average maximum at 75 degrees F.
- D. Coating: Water based latex enamel coating recommended by insulation manufacturer.

2.4 INSULATING CEMENTS

- A. Mineral Fiber, Hydraulic Setting Insulating and Finishing Cement: ASTM C 449
 - 1. Thermal Conductivity: 1.2 average maximum at 400 degrees F mean temperature.
 - 2. Compressive Strength: 100 psi at 5 percent deformation.

2.5 ADHESIVES

- A. Flexible Elastomeric Cellular Insulation Adhesive: Solvent-based, contact adhesive recommended by insulation manufacturer.
- B. Lagging Adhesive: MIL-A-3316C, non-flammable adhesive in the following Classes and Grades:
 - 1. Class 1, Grade A for bonding glass cloth and tape to un-faced glass fiber insulation, sealing edges of glass fiber insulation, and bonding lagging cloth to un-faced glass fiber insulation.
 - 2. Class 2, Grade A for bonding glass fiber insulation to metal surfaces.

2.6 JACKETS

- A. Interior: PVC Fitting Covers: Factory-fabricated fitting covers manufactured from 20-mil--thick, high impact, ultra-violet resistant PVC.
 - 1. Adhesive: As recommended by insulation manufacturer.

- B. Exterior: Aluminum Jacket: ASTM B 209, 3003 Alloy, H-14 temper
 - 1. Finish and Thickness: Smooth finish, 0.020 inch thick
 - 2. Elbows: Preformed 45-degree and 90-degree, short and long-radius elbows, same material, finish, and thickness as jacket.

2.7 ACCESSORIES AND ATTACHMENTS

- A. Bands: 3/4-inch wide, 0.007 inch thick, Aluminum
- B. Wire: 16-gauge, soft-annealed stainless steel

2.8 SEALING COMPOUNDS

- A. Vapor Barrier Compound: Water-based, fire-resistive composition
 - 1. Water Vapor Permeance: 0.08 perm maximum
 - 2. Temperature Range: Minus 20 to 180 degrees F
- B. Weatherproof Sealant: Flexible elastomer based, vapor barrier sealant designed to seal metal joints.
 - 1. Water Vapor Permeance: 0.02 perm maximum
 - 2. Temperature Range: Minus 50 to 250 degrees F
 - 3. Color: Aluminum

PART III - EXECUTION

3.1 PREPARATION

- A. Surface Preparation: Clean, dry, and remove foreign materials such as rust, scale, and dirt.

3.2 INSTALLATION - GENERAL

- A. Select accessories compatible with materials suitable for the service. Select accessories that do not corrode, soften, or otherwise attack the insulation or jacket in either the wet or dry state.
- B. Apply insulation material, accessories, and finishes according to the manufacturer's printed instructions.
- C. Keep insulation materials dry during application and finishing.
- D. Apply insulation continuously over fittings, valves, and specialties.
- E. Apply insulation with a minimum number of joints.

- F. Apply insulation with integral jackets as follows:
1. Pull jacket tight and smooth.
 2. Cover circumferential joints with butt strips, at least 3-inches wide, and of same material as insulation jacket. Secure with adhesive and outward clinching staples along both edges of butt strip and space 4 inches on center.
 3. Longitudinal Seams: Overlap seams at least 1½ inches. Apply insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches on center.
 4. Vapor Barrier Coatings: Apply on seams and joints, over staples, and at ends butt to flanges, unions, valves, and fittings.
 5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor barrier coating.
 6. Repair damaged insulation jackets, except metal jackets, by applying jacket material around damaged jacket. Adhere, staple, and seal. Extend patch at least 2 inches in both directions beyond damaged insulation jacket and around the entire circumference of the pipe.
- G. Interior Walls and Partitions Penetrations: Apply insulation continuously through walls and partitions, except fire-rated walls and partitions.
- H. Fire-Rated Walls and Partitions Penetrations: Terminate insulation at penetrations through fire rated walls and partitions. Seal insulation ends with vapor barrier coating. Seal around penetration with fire stopping or fire resistant joint sealer.
- I. Flanges, Fittings, and Valves: Apply pre-molded, pre-cut, or field fabricated segments of insulation around flanges, unions, valves, and fittings. Make joints tight. Bond with adhesive.
1. Use same material and thickness as adjacent pipe insulation.
 2. Overlap nesting insulation by 2 inches or 1-pipe diameter, which ever is greater.
 3. Apply materials with adhesive, fill voids with mineral fiber insulating cement. Secure with wire or tape.
 4. Insulate elbows and tees smaller than 3-inches pipe size with pre-molded insulation.
 5. Insulate elbows and tees Three (3) inches and larger with pre-molded insulation or insulation material segments. Use at least 3 segments for each elbow.
 6. Cover insulation, except for metal jacketed insulation, with PVC fitting covers and seal circumferential joints with butt strips.
- J. Hangers and Anchors: Apply insulation continuously through hangers and around anchor attachments. Install saddles, shields, and inserts as specified.
1. Inserts and Shields: Cover hanger inserts and shields with jacket material matching adjacent pipe insulation.

3.3 GLASS FIBER INSULATION INSTALLATION

- A. Bond insulation to pipe with lagging adhesive.
- B. Seal exposed ends with lagging adhesive.
- C. Seal seams and joints with vapor barrier compound.

3.4 FLEXIBLE ELASTOMERIC CELLULAR INSULATION INSTALLATION

- A. Slip insulation on the pipe before making connections wherever possible. Seal joints with adhesive. Where the slip-on technique is not possible, cut one side longitudinally and apply to the pipe. Seal seams and joints with adhesive.
- B. Valves, Fittings, and Flanges: Cut insulation segments from pipe or sheet insulation. Bond to valve, fitting, and flange and seal joints with adhesive.
 - 1. Miter cut materials to cover soldered elbows and tees.
 - 2. Fabricate sleeve fitting covers from flexible elastomeric cellular insulation for screwed valves, fittings, and specialties. Miter cut materials. Overlap adjoining pipe insulation.

3.5 JACKETS

- A. Exterior Exposed Insulation: Install continuous aluminum jackets and seal all joints and seams with waterproof sealant.
- B. Install metal jacket with 2 inch overlap at longitudinal and butt joints. Overlap longitudinal joints to shed water. Seal butt joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless steel draw bands 12 inches on center and at butt joints.

3.6 FINISHES

- A. Flexible Elastomeric Cellular Insulation: After adhesive has fully cured, apply 2 coats of protective coating to exposed insulation. Paint all exterior insulation with UV resistant paint as recommended by Insulation manufacturer.

3.7 PIPE INSULATION SCHEDULES

INTERIOR COLD CONDENSATE DRAINS

<u>PIPE SIZES (NPS)</u>	<u>MATERIALS</u>	<u>THICKNESS IN INCHES</u>
1/2 TO 4	GLASS FIBER FLEXIBLE ELASTOMERIC	1 3/4

REFRIGERANT SUCTION

<u>PIPE SIZES (NPS)</u>	<u>MATERIALS</u>	<u>THICKNESS IN INCHES</u>
1/2 TO 1-1/4	FLEXIBLE ELASTOMERIC	3/4
1-1/2 TO 4	FLEXIBLE ELASTOMERIC	1

END OF SECTION 15505

SECTION 15507 - DUCTWORK INSULATION**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes Duct and Plenum Insulation.

1.3 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Conform to the following characteristics for insulation including linings, cements, and adhesives, when tested according to ASTM E 84, by UL or other testing or inspecting organization acceptable to the authority having jurisdiction. Label insulation with appropriate markings of testing laboratory.
 - 1. Interior Insulation: Flame spread rating of 25 or less and a smoke developed rating of 50 or less.
 - 2. Exterior Insulation: Flame spread rating of 75 or less and a smoke developed rating of 150 or less.

PART II - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Duct Board:
 - a. Armstrong
 - b. CSG Ultraliner
 - c. Johns Manville
 - 2. Glass Fiber:
 - a. Certain Teed Corporation
 - b. Knauf Fiberglass GmbH
 - c. Manville
 - d. Owens-Corning Fiberglass Corporation
 - e. USG Interiors, Inc. - Thermafiber Division

2.2 INSTALLATION

A. DUCT BOARD

- 1. All exterior supply and return ductwork shall be completely insulated. See Schedule for type.
- 2. Provide aluminum sheet over duct board.
- 3. Exhaust air duct does not require insulation, unless otherwise noted on the plans.

B. GLASS FIBER

1. Material: Inorganic glass fibers, bonded with a thermosetting resin.

C. Jacket: All purpose, factory-applied, laminated glass fiber reinforced, flame retardant Kraft paper and aluminum foil having self-sealing lap.

D. Board: 2" thick polyisocyanurate with factory applied foil backing.

1. Minimum R-value of 5.0 per inch.

E. Blanket: ASTM C 553, Type II, Class F-1, jacketed flexible blankets

1. Thermal Conductivity: 0.32 average maximum, at 75 degrees F mean temperature.

F. Adhesive: Produced under the UL Classification and follow-up service.

1. Type: Non-Flammable, solvent-based.

2. Service Temperature Range: Minus 20 to 180 degrees F.

2.3 ACCESSORIES AND ATTACHMENTS

A. Corner Angles: 28-gauge, 1inch by 1-inch aluminum, adhered to 2-inch by 2-inch Kraft paper.

B. Anchor Pins: Capable of supporting 20 pounds each. Provide anchor pins and speed washers of sizes and diameters as recommended by the manufacturer for insulation type and thickness.

2.4 SEALING COMPOUNDS

A. Vapor Barrier Compound: Water-based, fire-resistive composition

1. Water Vapor Permeance: 0.08 perm maximum

2. Temperature Range: Minus 20 to 180 degrees F

PART III - EXECUTION

3.1 PREPARATION

A. Surface Preparation: Clean, dry, and remove foreign materials such as rust, scale and dirt.

3.2 INSTALLATION

A. Select accessories compatible with materials suitable for the service. Select accessories that do not corrode, soften, or otherwise attack the insulation or jacket in either the wet or dry state.

B. Apply insulation material, accessories, and finishes according to the manufacturer's printed instructions.

C. Install insulation with smooth, straight, and even surfaces.

- D. Seal joints and seams to maintain vapor barrier.
- E. Seal penetrations for hangers, supports, anchors and other projections.
- F. Keep insulation materials dry during application and finishing.
- G. Install block and board insulation as follows:
 - 1. Speed Washers Attachment: Secure insulation tight and smooth with speed washers and welded pins. Space anchor pins 12 inches apart each way and three (3) inches from insulation joints. Protect insulation at exterior corners with metal corner angles. Apply vapor barrier coating compound to insulation in contact, open joints, breaks, punctures and voids in insulation.
 - 2. Board insulation shall be covered with .032 mil embossed aluminum sheet attached with sheet metal screws with rubber washers. All joints shall be sealed with aluminum silicon caulking. All exterior insulation shall be pitched so that water cannot stand on top of the duct.
- H. Blanket Insulation: Install tight and smooth. Secure to ducts having long sides or diameters as follows:
 - 1. Smaller Than 24 Inches: Bonding adhesive applied in 6-inch wide transverse strips on 12-inch centers.
 - 2. Twenty-four (24) Inches and Larger: Anchor pins spaced 12 inches apart each way. Apply bonding adhesive to prevent sagging of the insulation.
 - 3. Overlap joints three (3) inches.
 - 4. Seal joints, breaks, and punctures with vapor barrier compound.

3.3 DUCT SYSTEMS INSULATION SCHEDULE

INTERIOR CONCEALED HVAC SUPPLY, RETURN AND OUTSIDE AIR DUCTS AND PLENUMS

<u>MATERIAL</u>	<u>FORM</u>	<u>THICKNESS IN INCHES</u>
GLASS FIBER	BLANKET	2

EXTERIOR EXPOSED HVAC SUPPLY, RETURN AND OUTSIDE AIR DUCTS AND PLENUMS

<u>MATERIAL</u>	<u>FORM</u>	<u>HICKNESS IN INCHES</u>
DUCT BOARD	BOARD - RECT.	2

END OF SECTION 15507

SECTION 15672 - SPLIT SYSTEM HEAT PUMP**PART I - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and a Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Section includes Split System Heat Pumps.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data, including rated capacities of selected model clearly indicated, weights (shipping, installed, and operating), dimensions, required clearances, and methods of assembly of components, furnished specialties and accessories and installation and start-up instructions.
- B. Wiring Diagrams: Submit ladder-type wiring diagrams for power and control wiring required for final installation of heat pump units and controls. Clearly differentiate between portions of wiring which are factory-installed and portions to be field-installed.
- C. Operation and Maintenance Data: Submit maintenance data and parts list for each heat pump unit, control, and accessory; including "trouble shooting" maintenance guide; plus servicing, and preventative maintenance procedures and schedule. Include this data and product data in maintenance manual in accordance with requirements of Division 1.

1.4 WARRANTY

- A. Provide Five (5) Year Warranty.
- B. Warranty: Include coverage for Refrigerant Compressors.

PART II - PRODUCTS**2.1 SPLIT SYSTEM HEAT PUMPS**

- A. Acceptable Manufacturers:
 1. Carrier Air Conditioning: Division of Carrier Corp.
 2. Trane (The) Co.: Division of American Standard Inc.
 3. York: Division of York International
 4. Lennox

2.2 GENERAL

- A. Split System: The split-system unit shall be an outdoor heat pump unit and indoor factory-fabricated single-zone draw-through air-handling unit. Both indoor and outdoor unit shall be by the same manufacturer. The net capacities shall be as indicated and shall not exceeded by more than 5%. The minimum efficiency for systems less than 65,000 BTUH shall be 15 SEER. The minimum efficiency for systems of 65,000 BTUH or greater shall be in accordance with the 2012 N. C. State Building Code, Energy Conservation Code.

2.3 AIR HANDLER

- A. Direct Expansion Coil: Coil shall be provided with pressure-type brass distributors and solder connections. The coil shall be dehydrated after testing and charged with dry air. Maximum working conditions shall be 300 psig at 200 degrees F for cooling. Tests shall be conducted, subjecting the coil to a minimum air pressure of 350 psig with the coil submerged in water. The cooling coil shall be subject to ASHRAE 15-1978 Safety code for Mechanical Refrigeration. Coils shall be of the cartridge type, removable from other side of casing and supported the entire length in tracks. Staggered tube pattern shall be provided for all coils of more than one row deep. Tubing shall have a minimum outside diameter of 1/2 inch. Tubing shall be individually finned with smooth aluminum or copper fins, wound under tension. Tube joints for all coils shall be made with high temperature brazing alloys.
- B. Cabinet: Unit shall be provided with baked enamel finish and internally insulated. Fan shall be forward curved, and dynamically and statically balanced at the factory. Fan shall be belt driven. Provide adjustable sheaves for each air handler. Fan and motor bearings shall be permanently lubricated type.

2.4 OUTDOOR HEAT PUMP UNIT

- A. Unit shall be factory-assembled and tested. Unit shall provide liquid lift as required to suit installation. Unit shall deliver the specified capacity to the cooling coil with an ambient air temperature of 95 degrees F. Units shall be certified per ARI 240 and 270.
- B. Coil shall have aluminum plate fins, mechanically bonded to 1/2 inch aluminum tubes. Coil shall be circuited for sub-cooling.
- C. Outdoor Fans and Motors: Unit shall be furnished with direct-driven, propeller-type fans arranged for vertical discharge. Condenser fan motors shall have Class B motor insulation and built in current and thermal overload protection, and shall be of the permanently lubricated type, resiliently mounted. Each fan shall have a safety guard.
- D. Compressor: Unit shall have compressors of serviceable hermetic design with external spring isolators and an automatically reversible oil pump. Compressor motors shall have across-the-line start.
- E. Controls shall be factory-wired and located in a separate enclosure. Safety devices shall consist of high and low pressure stats and compressor overload devices. Unit wiring shall incorporate a time delay relay to prevent short-cycling of the compressor. Relay shall prevent compressor from restarting for a 5-minute period. The unit shall include a transformer for 24-volt control circuit, pressure relief valves and circuit breakers.
- F. Casing shall make unit fully weatherproof for outdoor installation. Casing shall be of galvanized steel, zinc phosphatized and finished with baked enamel. Openings shall be provided for power and refrigerant connections. Panel shall be removable to provide access for servicing. The unit shall be mounted on manufacturer's standard legs anchored to concrete pedestals with steel bearing plates and neoprene pads.
- G. Connections: Only one liquid line, one suction line, required for units under 15 tons in capacity shall be provided. A 15-ton unit shall be dual circuited. Double suction risers for the refrigerant lines shall be provided.
- H. Piping shall be sized by the manufacturer.

2.5 TEMPERATURE CONTROL SYSTEM

- A. Provide electronic programmable thermostat for each heat pump system.
- B. Heat pumps with supplementary electric resistance heat shall have controls that except during defrost, prevent the supplementary heat operation when the heat pump can meet the heating load. In systems with cooling capacity of less than 65,000 Btuh, a heat strip outdoor temperature lockout shall be provided to prevent supplemental heat operation in response to the thermostat being changed to a warmer setting. The lockout shall be set not lower than 35 degrees F, and no higher than 40 degrees F.

2.6 FILTRATION

- A. Provide a filter rack and a 1" replaceable pleated throwaway filter. Filter rack size shall be as required by AHU manufacture.
- B. Provide additional sets of filters (minimum of 3) as required during construction. Install a clean set of filters for the Final Inspection.

PART III - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide for connection to electrical service.
- C. Install units with vibration isolation.
- D. Install units on concrete base as indicated.

3.2 MANUFACTURER'S FIELD SERVICES

- A. Prepare start systems under provisions of Section 15500.
- B. Provide initial start-up.
- C. Supply initial charge of refrigerant and oil for each refrigerant circuit. Replace losses of refrigerant and oil.

END OF SECTION 15672

SECTION 15674 DUCT FREE SPLIT SYSTEM AIR CONDITIONER**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and a Division 1 Specification Sections, apply to work of this Section.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data, including rated capacities of selected model clearly indicated, weights (shipping, installed, and operating), dimensions, required clearances, and methods of assembly of components, furnished specialties and accessories and installation and start-up instructions.
- B. Wiring Diagrams: Submit ladder-type wiring diagrams for power and control wiring required for final installation of heat pump units and controls. Clearly differentiate between portions of wiring which are factory-installed and portions to be field-installed.
- C. Operation and Maintenance Data: Submit maintenance data and parts list for each heat pump unit, control, and accessory; including "trouble shooting" maintenance guide; plus servicing, and preventative maintenance procedures and schedule. Include this data and product data in maintenance manual in accordance with requirements of Division 1.

1.3 WARRANTY

- A. Provide Five (5) Year Warranty.
- B. Warranty: Include coverage for Refrigerant Compressors.

PART II - PRODUCTS

2.1 SPLIT SYSTEM AIR CONDITIONER

- A. Acceptable Manufacturers:
1. Mitsubishi
 2. Sanyo
 3. Freidrich
 4. Amana

2.2 GENERAL

- A. Split System: The split-system unit shall be an outdoor condensing unit and indoor factory-fabricated single-zone draw-through air-handling unit. Both indoor and outdoor unit shall be by the same manufacturer. The net capacities shall be as indicated and shall not be exceeded by more than 5%. The minimum efficiency for systems less than 65,000 BTUH shall be 15 SEER and shall be in accordance with the 2012 N. C. State Building Code, Energy Conservation Code.

2.3 AIR HANDLER

- A. Direct Expansion Coil: Coil shall be provided with pressure-type brass distributors and solder connections. The coil shall be dehydrated after testing and charged with dry air. Maximum working conditions shall be 300 psig at 200 degrees F for cooling. Tests shall

be conducted, subjecting the coil to a minimum air pressure of 350 psig with the coil submerged in water. The cooling coil shall be subject to ASHRAE 15-1978 Safety code for Mechanical Refrigeration. Staggered tube pattern shall be provided for all coils of more than one row deep. Tubing shall have a minimum outside diameter of 1/2 inch. Tubing shall be individually finned with smooth aluminum or copper fins, wound under tension. Tube joints for all coils shall be made with high temperature brazing alloys.

- B. Cabinet: Unit shall be provided with baked enamel finish and internally insulated. Fan shall be forward curved, and dynamically and statically balanced at the factory. Fan and motor bearings shall be permanently lubricated type.

2.4 OUTDOOR CONDENSING UNIT

- A. Unit shall be factory-assembled and tested. Unit shall provide liquid lift as required to suit installation. Unit shall deliver the specified capacity to the cooling coil with an ambient air temperature of 95 degrees F. Units shall be certified per ARI 240 and 270.
- B. Coil shall have aluminum plate fins, mechanically bonded to 1/2 inch aluminum tubes. Coil shall be circuited for sub-cooling.
- C. Outdoor Fans and Motors: Unit shall be furnished with direct-driven, propeller-type fans arranged for vertical discharge. Condenser fan motors shall have Class B motor insulation and built in current and thermal overload protection, and shall be of the permanently lubricated type, resiliently mounted. Each fan shall have a safety guard.
- D. Compressor: Unit shall have compressors of serviceable hermetic design with external spring isolators and an automatically reversible oil pump. Compressor motors shall have across-the-line start.
- E. Controls shall be factory-wired and located in a separate enclosure. Safety devices shall consist of high and low pressure stats and compressor overload devices. Unit wiring shall incorporate a time delay relay to prevent short-cycling of the compressor. Relay shall prevent compressor from restarting for a 5-minute period. The unit shall include a transformer for 24-volt control circuit, AND pressure relief valve.
- F. Casing shall make unit fully weatherproof for outdoor installation. Casing shall be of galvanized steel, zinc phosphatized and finished with baked enamel. Openings shall be provided for power and refrigerant connections. Panel shall be removable to provide access for servicing. The unit shall be mounted on manufacturer's standard legs anchored to concrete pedestals with steel bearing plates and neoprene pads.
- G. Piping shall be sized by the manufacturer.

2.5 FILTRATION

- A. Provide a throw away filter.
- B. Provide additional sets of filters (minimum of 3) as required during construction. Install a clean set of filters for the Final Inspection.

PART III - EXECUTION

3.1 INSTALLATION

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

- B. Provide for connection to electrical service.
- C. Install units with vibration isolation.
- D. Install units on concrete base as indicated.

3.2 MANUFACTURER'S FIELD SERVICES

- A. Prepare start systems under provisions of Section 15500.
- B. Provide initial start-up.
- C. Supply initial charge of refrigerant and oil for each refrigerant circuit. Replace losses of refrigerant and oil.

END OF SECTION



BURKE DESIGN GROUP, PA
CONSULTING ENGINEERS

566-A

New 2-14-14

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Date: 02/12/14

Project: I-4928: I-85 NBL Weigh Station
Gaston County NC

RE: Addendum #2
Approved equals

Fans-

- a) Twin City Fans
- b) American Coolair Fans

Duct-less Split Systems-

- a) Panasonic
- b) Samsung



SECTION 15910 - DUCT ACCESSORIES**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Turning Vanes
 - 2. Duct Mounted Access Doors and Panels
 - 3. Flexible Connectors
 - 4. Flexible Ducts

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data including details for materials, dimensions of individual components, profiles, and finishes for the following items:
- C. Shop drawings from manufacturer detailing assemblies: Include dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection.

PART II - PRODUCTS

2.1 VOLUME CONTROL DAMPERS

- A. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards and as indicated.
- B. Fabricate splitter dampers of material same gage as duct to 24 inches size in either direction, and two gauges heavier for sizes over 24 inches.
- C. Fabricate splitter dampers of double thickness sheet metal to streamline shape. Secure blade with continuous hinge or rod. Operate with minimum ¼ inch diameter rod in self aligning, universal joint action flanged bushing with set screw.
- D. Fabricate single blade dampers for duct sizes to 9½ x 30 inches.
- E. Fabricate multi-blade damper of opposed blade pattern with maximum blade sizes 12 x 72. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

- F. Except in round ductwork 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil impregnated nylon or sintered bronze bearings.
- G. Provide locking, indicating quadrant regulators on single and multi-blade dampers. Where rod lengths exceed 30 inches provide regulator at both ends.
- H. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

2.2 AIR TURNING DEVICES

- A. Multi-blade device with blades aligned in short dimension; steel or aluminum construction; with individually adjustable blades, mounting straps.

2.3 FLEXIBLE DUCT CONNECTIONS

- A. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards, and as indicated.
- B. UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 20 oz per sq. yd. approximately 6 inches wide, crimped into metal edging strip.

2.4 DUCT ACCESS DOORS

- A. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards and as indicated.
- B. Review locations prior to fabrication.
- C. Fabricate rigid and close fitting doors of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum one-inch thick insulation with sheet metal cover.
- D. Access doors smaller than 12 inches square may be secured with sash locks.
- E. Provide two hinges and two sash locks for sizes up to 18 inches square, three hinges and two compression latches with outside and inside handles for sizes up to 24 x 48 inches. Provide an additional hinge for larger sizes.
- F. Access doors with sheet metal screw fasteners are not acceptable.

PART III - EXECUTION

3.1 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions.
- B. Provide balancing dampers at points on low pressure supply systems where branches are taken from larger ducts as required for air balancing. Use splitter dampers only where indicated.

- C. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.
- D. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated.
- E. Provide duct test holes where indicated and required for testing and balancing purposes.

END OF SECTION 15910

SECTION 15932 - AIR OUTLETS AND INLETS**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.2 DESCRIPTION OF WORK

- A. Extent of air outlets and inlets work is indicated by Drawings and Schedules and by Requirements of this Section.

- B. Types of outlets and inlets required for this Project include the following:

1. Ceiling Air Diffusers
2. Wall Registers and Grilles
3. Louvers

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data for air outlets and inlets including the following:

1. Schedule of air outlets and inlets indicating drawing designation, room location, number furnished, model number, size and accessories furnished.
2. Data sheet for each type of air outlet and inlet, and accessory furnished; indicating construction, finish and mounting details.
3. Performance data for each type of air outlet and inlet furnished, throw and drop; and noise criteria ratings. Indicate selections on data.

- B. Shop Drawings: Submit manufacturer's assembly-type shop drawing for each type of air outlet and inlet, indicating materials and methods of assembly of components.

PART II - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Diffusers & Grilles

1. Titus, Inc.
2. Metalaire, Inc.
3. Carnes, Inc.
4. E. H. Price

- B. Louvers

1. Arrow United Industries, Inc.
2. Louvers & Dampers, Inc.
3. Penn Ventilator Co., Inc.

4. Ruskin Mfg. Co.
5. Safe-Air Inc.
6. Vent Products Co., Inc.
7. NCA
8. Cesco Products

2.2 RECTANGULAR CEILING DIFFUSERS

- A. Rectangular, extruded aluminum, multi-core type diffuser to discharge air in 360 degree pattern.
- B. Provide inverted T-bar type frame. In plaster ceilings, provide plaster frame and ceiling frame.
- C. Fabricate of aluminum with baked enamel off-white finish.
- D. Provide opposed blade damper with damper adjustable from diffuser face.

2.3 CEILING GRID CORE EXHAUST AND RETURN REGISTERS/GRILLES

- A. Fixed grilles of 1/2 x 1/2 x 1 inch egg crate.
- B. Provide inverted T-bar type frame. In plaster ceilings, provide plaster frame and ceiling frame.
- C. Fabricate of aluminum with baked enamel off-white finish.
- D. Where not individually connected to exhaust fans, provide integral, gang-operated opposed blade dampers with removable key operator, operable from face.

2.4 WALL SUPPLY REGISTERS/GRILLES

- A. Streamlined and individually adjustable blades, depth of which exceeds 3/4 inch maximum spacing with spring or other device to set blades, horizontal face, double deflection.
- B. Fabricate 1 1/4 inch margin frame with countersunk screw mounting and gasket.
- C. Fabricate of aluminum extrusions with 20 gauge minimum frames and 22 gauge minimum blades, with baked enamel off-white finish.
- D. Provide integral, gang-operated opposed blade dampers with removable key operator, operable from face.

2.5 LINEAR WALL REGISTERS/GRILLES

- A. Streamlined blades with 0 degree deflection, 1/8 x 3/4 inch on 1/4 inch centers.
- B. Fabricate 1 1/4 inch margin frame with countersunk screw mounting and gasket.
- C. Fabricate of aluminum extrusions with baked enamel off-white finish.
- D. Provide integral, gang-operated opposed blade dampers with removable key operator, operable from face.

2.6 LOUVERS

- A. Provide 4-inch deep louvers with blades on 45 degree slope with center baffle and return bend, heavy channel frame, bird screen with ½ inch square mesh.
- B. Fabricate of 12-gauge extruded aluminum, welded assembly, with factory baked enamel finish. Color selection from manufacturer standard.
- C. Furnish with interior screw holes in jambs for installation.

2.7 ROOF HOODS

- A. Fabricate air inlet or exhaust hoods in accordance with SMACNA Low Pressure Duct Construction Standards.
- B. Fabricate of aluminum, minimum 16 gauge base and 18 gauge hood; suitably reinforced; with removable hood; bird screen with ½ inch square mesh and factory prime coat baked enamel finish.
- C. Mount unit on minimum 12-inch high curb base with insulation between duct and curb.
- D. Make hood outlet area minimum of twice throat area.

PART III - EXECUTION

3.1 INSTALLATION

- A. Install items in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry and lighting arrangement.
- C. Install diffusers to ductwork with air-tight connection.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, regardless of whether dampers are specified as part of the diffuser, or grille and register assembly.
- E. Paint ductwork visible behind air outlets and inlets matte black.

END OF SECTION 15932

SECTION 15990 - TESTING, ADJUSTING AND BALANCING**PART I - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section specifies the Requirements and Procedures of Total Mechanical Systems Testing, Adjusting and Balancing. Requirements include measurement and establishment of the fluid quantities of the Mechanical Systems as required to meet Design Specifications and Recording and reporting the results.
- B. Testing and Balancing must be conducted by an independent, Certified Testing and Balancing firm, registered with either the AABC or the NEBB.
- C. The Test and Balance Contractor shall be a subcontractor to the Mechanical Contractor.

1.3 SECTION INCLUDES

- A. Testing, adjustment and balancing of air systems.
- B. Measurement of final operating condition of HVAC Systems.

1.4 SUBMITTALS

- A. Submit under provisions of Section 15500.
- B. Submit name of adjusting and balancing agency for approval within 30 days after Award of Contract.
- C. Field Reports: Submit under provisions of Section 15500.
- D. Field Reports: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
- E. Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required.
- F. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Owner and for inclusion in operating and maintenance manuals.
- G. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Report shall reference the Contract Drawings for location of equipment and devices. Where reference to the contract drawings is not satisfactory, include a set of reduced drawings or sketches with equipment and devices identified to correspond with data sheets.

- H. Include detailed procedures, agenda, sample report forms and copy of AABC National Project Performance Guaranty prior to commencing system balance.
- I. Test Reports: Indicate data on AABC National Standards for Total System Balance forms or NEBB forms.

1.5 QUALITY ASSURANCE

- A. Perform total system balance in accordance with AABC National Standards for Field Measurement and Instrumentation, Total System Balance, ASHRAE 111, and NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.
- B. Maintain one copy of each document on site.

1.6 SEQUENCING AND SCHEDULING

- A. Sequence work under the provisions of Section 15500.
- B. Sequence work to commence after completion of systems and schedule completion of work before Substantial Completion of Project.
- C. Schedule work under the provisions of Section 15500.
- D. Schedule and provide assistance in final adjustment and test of Smoke Control System with Fire Authority.

PART II - PRODUCTS (Not Used)

PART III - EXECUTION

3.1 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 - 1. Systems are started and operating in a safe and normal condition.
 - 2. Control systems are installed complete and operable.
 - 3. Proper thermal overload protection is in place for electrical equipment.
 - 4. Ductwork Systems:
 - a. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 - b. Duct systems are clean of debris.
 - c. Fans are rotating correctly.
 - d. Dampers are in place and open.
 - e. Air coil fins are cleaned and combed.
 - f. Access doors are closed and duct end caps are in place.
 - g. Air inlets and outlets are installed and connected.
 - h. Duct system leakage is minimized.

5. Piping Systems:

- a. Hydronic systems are flushed, filled, tested and vented.
- b. Pumps are rotating correctly.
- c. Proper strainer baskets are clean and in place.
- d. Service and balance valves are open.

B. Submit Field Reports: Report defects and deficiencies noted during performance of services which prevent system balance.

C. Beginning of work means acceptance of existing conditions.

3.2 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Owner to facilitate spot checks during testing.

B. Provide additional balancing devices as required.

3.3 INSTALLATION TOLERANCES

A. HVAC Systems: Adjust to within plus or minus 5 percent of design for supply and return systems and plus or minus 10 percent of design for exhaust systems.

B. Air Outlets and Inlets: Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.4 ADJUSTING

A. Ensure recorded data represents actual measured or observed conditions.

B. Permanently mark settings of balancing devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.5 AIR SYSTEM PROCEDURE

A. Adjust equipment and distribution systems to provide required or design air quantities.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure and record air quantities at air inlets and outlets.

- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels. Adjust air volume by adjusting duct internal devices such as dampers and splitters. Do not utilize opposed blade dampers at air inlets and outlets.
- F. Vary total system air quantities by adjusting sheave position at each fan. Vary branch air quantities by damper regulation.
- G. Measure and record static air pressure conditions at air supply and exhaust units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- H. Adjust settings and minimum set points for motorized and back draft dampers to design conditions.
- I. Measure and record temperature conditions across dampers to check leakage.
- J. Where modulating dampers are provided, take measurements and balance at extreme conditions.
- K. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.
- L. Measure and record building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches (12.5 Pa) positive static pressure near the building entries.
- M. For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.
- N. Measure and record inlet and outlet temperatures at each air supply unit at full cooling and heating capacity.

3.7 REPORT FORMS

- A. Forms shall include the following:
 - 1. Title Page:
 - a. Name of Testing, Adjusting and Balancing Agency
 - b. Address of Testing, Adjusting and Balancing Agency
 - c. Telephone number of Testing, Adjusting and Balancing Agency
 - d. Project Name
 - e. Project Location
 - f. Project Architect
 - g. Project Engineer
 - h. Project Contractor
 - i. Project Altitude
 - j. Report Date
 - 2. Summary Comments:
 - a. Design versus final performance
 - b. Notable characteristics of system
 - c. Description of systems operation sequence

- d. Summary of outdoor and exhaust flows to indicate amount of building pressurization
 - e. Nomenclature used throughout report
 - f. Test Conditions
3. Instrument List:
- a. Instrument
 - b. Manufacturer
 - c. Model Number
 - d. Serial Number
 - e. Range
 - f. Calibration Date
4. Electric Motors:
- a. Manufacturer
 - b. Model/Frame
 - c. HP/BHP/Efficiency
 - d. Phase, Voltage, Amperage; Nameplate, Actual, No Load
 - e. RPM
 - f. Service Factor
 - g. Starter Size, Rating, Heater Elements
 - h. Sheave Make/Size/Bore
5. V-Belt Drive:
- a. Identification/Location
 - b. Required Driven RPM
 - c. Driven Sheave, Diameter and RPM
 - d. Belt, Size and Quantity
 - e. Motor Sheave Diameter and RPM
 - f. Center to center distance, maximum, minimum, and actual

6. Equipment Data:
 - a. Identification/number
 - b. Manufacturer
 - c. Model number and Serial number
 - d. Capacity
 - e. Service
 - f. Design flow rate, pressure drop, BHP
 - g. Actual flow rate, pressure drop, BHP
 - h. Temperature readings

7. Duct Traverse:
 - a. System zone/branch
 - b. Duct size
 - c. Area
 - d. Design velocity
 - e. Design air flow
 - f. Test velocity
 - g. Test air flow
 - h. Duct static pressure
 - i. Air temperature
 - j. Correction factor

8. Air Distribution Test Sheet:
 - a. Air terminal number
 - b. Room number/location
 - c. Terminal type
 - d. Terminal size
 - e. Area factor
 - f. Design velocity
 - g. Design air flow
 - h. Test (final) velocity
 - i. Test (final) air flow
 - j. Percent of design air flow

END OF SECTION 15990

DIVISION 16: ELECTRICAL

16010	Basic Electrical Requirements
16050	Basic Electrical Materials and Methods
16100	Raceways, Boxes and Cabinets
16120	Wires and Cables
16140	Wiring Devices
16190	Supporting Devices
16195	Electrical Identification
16420	Service Entrance
16452	Grounding
16470	Panel Boards
16476	Disconnects
16515	Interior Lighting

SECTION 16010 - BASIC ELECTRICAL REQUIREMENTS**PART I - GENERAL****1.1 GENERAL CONDITIONS**

- A. The Stipulations and Conditions stated in this Section, together with all provisions of the "Instructions to Bidders", "General Conditions", "Supplemental General Conditions" and "Special Conditions", hereinbefore set forth, shall apply to this and the other Sections of Division 16.

1.2 GENERAL REQUIREMENTS

- A. The General Requirements hereinafter listed apply to the Electrical Work Division. If there is any conflict between the General Requirements and the General Conditions, the General Conditions shall take precedence.

1.3 ALTERNATES

- A. Carefully examine all alternates at the back of this Specification and on the Drawings to determine if any work described under the Electrical Section will be affected thereby.

1.4 INTENT

- A. The intent of these Drawings and Specifications are to describe the installation of a complete, fully adjusted, and operational system. Therefore, any items shown on Drawings and not specifically called for in the Specifications, or any items specified and not specifically indicated or detailed on the Drawings, or any items neither specified or shown, but which are reasonably incidental to and commonly required to make a complete job, will be furnished and installed by the Electrical Contractor at his own expense.

1.5 DEFINITIONS

- A. The Electrical Contractor shall provide all supervision, labor, material equipment, machinery, plant, and any and all other items necessary to complete the Electrical systems. All items of equipment are specified in the singular; however, the Electrical Contractor shall provide the number of items of equipment as indicated on the drawings, and as required for complete systems.

Where the word "provide" is used, it shall mean "furnish and install complete and ready to use".

1.6 VISIT TO THE SITE

- A. The Electrical Contractor shall visit the site before submitting his bid so as to be thoroughly familiar with the job conditions and/or peculiarities. No extra payment will be allowed for anything which could have been anticipated from a visit to the site.

1.7 REGULATORY REQUIREMENTS

- A. All work under this section shall be accomplished in strict accordance with State codes. Where these plans and specifications conflict with such codes, the codes shall govern.

- B. The Electrical Contractor shall notify the Architect or Engineer of such conflicts in writing prior to receipt of bids.
- C. References to the National Electrical Code (NEC), Underwriters Laboratories, Inc. (UL), and National Fire Protection Association (NFPA) are a minimum installation requirement.
- D. The following regulatory shall be used as minimum standards:

AEIC	American Association of Edison Illuminating Companies
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronic Engineers
NCCM	N.C. Construction Manual w/G.S. as listed
NCSBC	N.C. State Building Code
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
U/L	Underwriters' Laboratories, Inc.
OSHA	Occupational Safety and Health Standards
ASHRAE/IES	90.1 energy code

1.8 TEST STANDARDS

- A. All material and equipment shall be listed, labeled or certified by a nationally recognized testing laboratory to meet Underwriters Laboratories, Inc., or third party agencies accredited by the North Carolina Building Code Councils latest edition or amendment.

1.9 PERMITS AND FEES

- A. The Electrical Contractor shall make all necessary arrangements, obtain all necessary approval, obtain all permits and pay fees required for the installation of any of the work covered under the Electrical Work Division of the Specifications. Any fees required by any utility companies or municipal authorities for the final connections for these services shall be paid by the Electrical Contractor under whose work such services appear. Before the job is certified as substantially complete, a Certificate of Approval from all authorities involved must be obtained and turned over to the Architect/Engineer.

1.10 DRAWINGS AND SPECIFICATIONS

- A. The Electrical Drawings and Specifications are intended to cover all the work enumerated under the respective headings. The Drawings are diagrammatic only. No Contractor shall take advantage of conflict or error between Drawings and Specifications, or between General Drawings and Mechanical, Plumbing and/or Electrical Drawings, but shall request a clarification of such from the Architect/Engineer, should this condition exist. If there is insufficient time to issue an Addendum for this clarification, the Electrical Contractor shall include in his bid the most expensive of the items in conflict.

- B. The Electrical Contractor shall refer to the Architectural and Structural Drawings and Specifications for the general construction of the building, for floors and ceiling heights, for locations of walls, partitions, beams, etc., and shall be guided accordingly for setting of all sleeves, inserts and equipment. No Contractor shall under any circumstances scale drawings for the location of equipment. The Electrical Contractor shall verify the locations of all utility services and electrical equipment.
- C. The Electrical Contractor shall keep at least one set of corrected Shop and Design Drawings at the site. Drawings are to be current, denoting approved modifications and actual installed departure. Submit Drawings to Architect/Engineer before final payment is made.

1.11 SUPERVISION

- A. The Electrical Contractor performing the work specified shall be required to employ a qualified superintendent or foreman to continuously supervise the installation of their work, with authorization to act as agent. He shall be capable of checking layouts, coordinating and supervising the work, establishing grades and levels and locating chases, openings, hangers, inserts, sleeves, etc.

PART II - PRODUCTS

2.1 STANDARD PRODUCTS

- A. Unless otherwise indicated in writing by the Architect/Engineer, the materials to be provided under this Specification shall be standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest design. All items of the same type or rating shall be identical.

2.2 SUBMITTAL

- A. The Electrical Contractor shall submit, for approval, detailed Shop Drawings on all major equipment and where requested. No materials or equipment may be delivered to the job site or installed until the Electrical Contractor has in his possession the approved Shop Drawing for the particular material or equipment. The Electrical Contractor shall furnish the number of copies required by the General or Special Conditions of the contract, but no case less than six (6) copies.
- B. Submitted material shall be properly labeled indicating specific service for which material or equipment is to be used, Section and Article Number of Specifications governing, Contractor's name and name of job.
- C. Approval of equipment will not relieve the Electrical Contractor of compliance with the Specifications even if such approval is made in writing, unless the attention of the Engineer is called to the non-complying features by letter accompanying the submittal data. Approval of submittal data by the Engineer shall not be construed as a complete check of approval of detailed dimensions, weights, gauges, and similar details with the proposed articles. The conformance with the necessary coordination between the various other Contractors and suppliers shall be solely the responsibility of the Electrical Contractor and with no additional expense to the Owner.

2.3 SUBSTITUTIONS

- A. Manufacturer's lists are to establish a standard of quality and not intended to limit the selection to these manufacturers. All materials and equipment which are essential and have not been specified or shown shall be new and of the highest grade and quality free from defect or other imperfections. It should be understood that where the words "furnished and installed" are used, it is intended that the Electrical Contractor shall purchase and install all materials required, unless otherwise noted.
- B. All materials and equipment proposed as substitutes for these specified shall require a ten (10) day prior approval from the Engineer prior to the bid date. No substitutions will be allowed after the ten (10) day period before the bid date.
- C. All products shall be furnished in compliance with NC General Statute 133-3.

2.4 PRODUCT HANDLING

- A. Equipment and materials shall be properly stored, adequately protected, and carefully handled to prevent damage before and during installation. Equipment and materials shall be handled, stored and protected in accordance with the manufacturer's recommendations and as approved by the Architect/Engineer. Equipment installed with a factory finish shall be fully protected during construction and shall be maintained free of dust, dirt and foreign matter. Dents and other surface damage shall be repaired or replaced to the satisfaction of the Architect/Engineer at no additional cost to the Owner.
- B. The Electrical Contractor shall clean up and remove from the job site all waste materials, packaging, crating, and refuse resulting from his work on a daily basis.

2.5 MATERIALS AND WORKMANSHIP

- A. The Electrical Contractor shall perform a first class job, both in material and workmanship. None other will be accepted. Deviations from either will be corrected by the Electrical Contractor at the Electrical Contractor's expense.
- B. The material used throughout the work, except when otherwise noted, shall be new and of Specification grade and the best of its kind. No substitutes shall be used unless approved by the Architect/Engineer. All work shall be executed with a maximum speed consistent with safety and good workmanship.
- C. Any equipment furnished by the Mechanical Contractor or any other Contractor that is larger than those indicated on the Drawings and described in these Specifications or have different Electrical characteristics, the increase in cost to the Electrical Contractor for larger wires, conduit, circuit breakers, switches, etc. or for changes in work already installed shall be borne by the instigating Contractor.

PART III - EXECUTION

3.1 EXCAVATION AND BACKFILL

- A. The Electrical Contractor shall perform any and all trench and pit excavation and backfilling required for the installation of his work. Trenches shall be made with the sides

vertical and shall be shored where necessary for the protection of men and equipment. All excavation work shall be done in a careful manner to avoid damage to footers and foundations. The backfilling shall be placed in layers not exceeding 4 inches in depth, wetting each layer as it is placed and thoroughly compacting each layer with Mechanical tamper or other approved means. Any damage done during excavation and backfilling operations to roads, sidewalks, curbs, shrubs, sod, footers, foundations, etc. shall be replaced to its original condition prior to construction at no expense to the owner. All work will be approved by the Engineer.

3.2 SCAFFOLDING, RIGGING AND HOISTING

- A. The Electrical Contractor shall furnish all necessary scaffolding, staging, rigging and hoisting required for the completion of his work. All such scaffolding, etc., shall be removed from the premises when its use is no longer required on the job.

3.3 CUTTING AND PATCHING

- A. The Electrical Contractor shall provide all cutting and patching necessary to install the work specified in the 16000 Sections. The patching shall match adjacent surface material and finishes.
- B. No Structural member shall be cut without the approval of the Engineer and all such cutting shall be done in a manner directed by him.
- C. Cutting or Holes:
 - 1. Locate holes in advance where they are proposed in the Structural Sections such as ribs or beams. Obtain the approval of the Engineer prior to drilling through Structural Sections.
 - 2. Cut holes through concrete and masonry in new and existing structures with a diamond core drill or concrete saw. Pneumatic hammer, impact electric, hand or manual hammer type drills are not allowed.

3.4 WATERPROOFING

- A. At floor, exterior wall, and roof conduit penetrations, completely seal clearances around the conduit and make watertight. All work subject to approval of the Engineer.

3.5 EQUIPMENT SPACE AND ARRANGEMENT

- A. The equipment shall fit into the space allotted and shall allow adequate clearance for entry, installation, replacement, servicing, and maintenance. The Electrical Contractor shall coordinate the work to ensure that equipment may be moved into place without altering building components or other installations. Access space shall not be less than the equipment manufacturer's requirements. Working clearances shall be not less than N.E.C or other regulatory requirements.

- B. These drawings indicate the extent and general arrangement of equipment. If any departures are deemed necessary by the Electrical Contractor, details of such departures and the reasons therefore shall be submitted to the Architect/Engineer for approval as soon as practicable and within 30 days after Award of the Contract. No departure shall be made without written approval of the Architect/Engineer. Any delay on the Contractor's part to provide such submittal will not constitute an extension of the Contract time.

3.6 DAMAGE TO WORK ALREADY IN PLACE

- A. The Electrical Contractor shall assume full responsibility for any damage done by him, his agents or employees, to any work already in place. Any such damage done shall be repaired at the Contractor's expense by Mechanics skilled at their respective trades, to the approval of the Architect/Engineer.

3.7 JURISDICTION OF WORK

- A. It may become necessary for the Electrical Contractor to furnish labor or materials which are not generally accepted as part of this trade. In cases of this type, he shall contract the work or shall furnish materials and employ workmen of the trade involved in order not to cause any delay or stoppage of work caused by infringement of Trade Agreements as to jurisdiction, alleged or actual.

3.8 COORDINATION WITH OTHER TRADES

- A. All work shall be coordinated with other trades involved in the construction project. All work shall be carefully laid out in advance to coordinate Architectural, Structural, Mechanical, Plumbing and Electrical features of construction. The Contractor shall verify at the site all locations, grades, elevations and utility service connections indicated. Any conflicts due to lack of proper coordination shall be brought to the attention of the Architect/Engineer for resolution. The Electrical Contractor shall make required changes or relocations at no additional cost to the Owner.
- B. Installation, inspection, and testing of work above ceilings shall be completed and approved by the Architect/Engineer prior to installation of the specified finished ceilings. However, a Ceiling Suspension System may be installed as required for coordination.
- C. The Electrical Contractor shall consult with the other trades at the start of the work and periodically thereafter, as required to properly coordinate the various items of work, and to avoid interferences. Should any interferences of any nature develop as the work progresses, such interferences shall be resolved and eliminated as directed. The cost of any work directed shall be borne by the Subcontractor or Contractors directed to do this work.

3.9 DIVISION OF WORK

- A. These paragraphs are intended to show exactly the point of division of work between the Electrical Division and the Mechanical Division or any other division.
- C. All equipment covered in the Mechanical Division or any other Division of the Specifications shall be furnished, mounted, and aligned under the respective Division. All starters, controls and wiring for this equipment, including final connection to the same, shall be furnished and installed under that Division.
- D. Divisions of the Specifications shall be completed under the respective Division.
- E. Under Division 16, the Contractor shall be responsible for providing all line side power wiring, conduit, disconnect switches, and junction boxes as shown on the electrical drawings.

3.10 EQUIPMENT INSTALLATION

- A. Manufacturer's Instructions: Equipment shall be installed as recommended by the manufacturer to conform to the requirements of the particular application, in accordance with these Drawings and Specifications.

3.11 OPERATION AND MAINTENANCE MANUALS

- A. Prepare maintenance manuals in accordance with Division 1 Section "PROJECT CLOSEOUT". In addition to the requirements specified in Division 1, include the following information for equipment items:
 1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
 2. Manufacturer's printed Operating Procedures to include start-up, break-in, and routine and normal Operating Instructions; regulation, control, stopping, shutdown, and emergency instructions and summer and winter operating instructions.
 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and re-assembly; aligning and adjusting instructions.
 4. Servicing Instructions and Lubrication Charts and Schedules.

3.12 RECORD DOCUMENTS

- A. Prepare record documents in accordance with the requirements in Division 1 Section "PROJECT CLOSEOUT". In addition to the requirements specified in Division 1, indicate installed conditions for:
 1. Major raceway systems, size and location, for both exterior and interior; locations of control devices; distribution and branch electrical circuitry; and fuse and circuit breaker size and arrangements.
 2. Equipment locations (exposed and concealed) dimensioned from prominent building lines.
 3. Approved substitutions, Contract modifications and actual equipment and materials installed.

3.13 GUARANTEE

- A. The Electrical Contractor shall present to the Owner a written guarantee covering his work, including all equipment, material and workmanship. This guarantee shall be against all defects in any of the above work, and shall run for a period of one (1) year from the date of written acceptance of the Contractor's work.
- B. Any defective work, equipment, material and/or workmanship that develops within the Guarantee period, which is not caused by ordinary wear or abuse by other persons, shall be replaced by the Electrical Contractor without cost to the Owner.

3.14 FINAL INSPECTION

- A. When the entire Contract has been completed and the work is ready for final inspection, the Architect/Engineer or his duly authorized representative will make the inspection. At the time of inspection, the Electrical Contractor shall demonstrate to the Architect/Engineer that the various systems and pieces of equipment have been adjusted to operate in accordance with the requirements of the Contract.
- B. **An authorized State Electrical Inspector from the Office of State Construction shall inspect the project during construction and upon completion of the construction phase. It shall be the responsibility of the Electrical Contractor to notify the Inspector as the work progresses. The Electrical Contractor shall schedule the the required inspections including rough-in, above ceiling and final inspections as required.**

3.15 FINAL PAYMENTS

- A. All Final Payments are contingent upon all necessary Certificates and/or Approvals cited above, together with the written Guarantee being presented to the Owner.

3.16 DOCUMENTATION

- A. All tests shall be completely documented indicated time of day, temperature, and all pertinent test information.
- B. All required documentation of readings shall be submitted to the engineer prior to, and as one of the prerequisites for, final acceptance of the project.

END OF SECTION 16010

SECTION 16050 - BASIC ELECTRICAL MATERIALS AND METHODS**PART I - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes limited Scope, General Construction Materials and Methods for Application with Electrical Installations as follows:

1. Miscellaneous metals for support of electrical materials and equipment.
2. Joint sealers for sealing around electrical materials and equipment; and for sealing penetrations in fire and smoke barriers, floors, and foundation walls.

1.3 DEFINITIONS

- A. The following definitions apply to excavation operations:

1. Additional Excavation: Where excavation has reached required subgrade elevations, if unsuitable bearing materials are encountered, continue excavation until suitable bearing materials are reached. The Contract Sum may be adjusted by an appropriate Contract Modification.
2. Sub-Base: As used in this Section refers to the compacted soil layer used in pavement systems between the subgrade and the pavement base course material.
3. Sub-Grade: As used in this Section refers to the compacted soil immediately below the slab or pavement system.
4. Unauthorized excavation consists of removal of materials beyond indicated sub-grade elevations or dimensions without specific direction from the Architect.

1.4 SUBMITTALS

- A. Product data for the following products:

1. Joint sealers

1.5 SEQUENCE AND SCHEDULING

- A. Coordinate the shut-off and disconnection of electrical service with the Owner and the utility company.

PART II - PRODUCTS**2.1 SOIL MATERIALS**

- A. Sub-Base Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, or natural or crushed sand.
- B. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100 percent passing a 1½ inch sieve, and not more than 5 percent passing a No. 4 sieve.
- C. Backfill and Fill Materials: Materials complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP; free of clay, rock, or gravel larger than 2 inches in any dimension; debris; waste; frozen materials; and vegetable and other deleterious matter.

2.2 MISCELLANEOUS METALS

- A. Steel plates, shapes, bars, and bar grating: ASTM A 36.
- B. Cold-Formed Steel Tubing: ASTM A 500.
- C. Hot-Rolled Steel Tubing: ASTM A 501.
- D. Steel Pipe: ASTM A 53, Schedule 40, welded.
- E. Fasteners: Zinc-coated, type, grade and class as required.

2.3 JOINT SEALERS

- A. General: Joint sealers, joint fillers, and other related materials compatible with each other and with joint substrates under conditions of service and application.
- B. Colors: As selected by the Architect from manufacturer's standard colors.
- C. Elastomeric Joint Sealers: Provide the following types:
 - 1. One-part, non-acid curing, silicone sealant complying with ASTM C 920, Type S, Grade NS, Class 25, for uses in non-traffic areas for masonry, glass, aluminum and other substrates recommended by the sealant manufacturer.
 - 2. One part, mildew-resistant, silicone sealant complying with ASTM C 920, Type S, Grade NS, Class 25, for uses in non-traffic areas for glass, aluminum, and nonporous joint substrates; formulated with fungicide; intended for sealing interior joints with nonporous substrates; and subject to in-service exposure to conditions of high humidity and temperature extremes.
- D. Acrylic-Emulsion Sealants: One part, non-sag, mildew resistant, paintable complying with ASTM C 834 recommended for exposed applications on interior and protected exterior locations involving joint movement of not more than plus or minus 5 percent.

- E. Fire Resistant Joint Sealers: Two part, foamed-in-place, silicone sealant formulated for use in through penetration fire stopping around cables, conduit, pipes, and duct penetrations through fire rated walls and floors. Sealants and accessories shall have fire resistance ratings indicated, as established by testing identical assemblies in accordance with ASTM E 814, by Underwriters Laboratories, Inc., or other testing and inspection agency acceptable to authorities having jurisdiction.

1. Acceptable Products:
 - a. Dow Corning "Fire Stop Foam", Dow Corning Corp.
 - b. "Hilti" Fire Stop Systems
 - c. "Fire Stop" Systems, Inc.

PART III - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting installation and application of joint sealers. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION FOR JOINT SEALERS

- A. Surface Cleaning for Joint Sealers: Clean surfaces of joints immediately before applying joint sealers to comply with recommendations of joint sealer manufacturer.
- B. Apply joint sealer primer to substrates as recommended by joint sealer manufacturer. Protect adjacent areas from spillage and migration of primers, using masking tape. Remove tape immediately after tooling without disturbing joint seal.

3.3 EXCAVATION

- A. Slope sides of excavations to comply with local codes and ordinances. Shore and brace as required for stability of excavation.
- B. Install sediment and erosion control measures in accordance with local codes and ordinances.
- C. Dewatering: Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding area.
 1. Do not allow water to accumulate in excavations. Remove water to prevent softening of bearing materials.
 2. Provide and establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey surface water to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.
- D. Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.
 1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

2. Remove and legally dispose of excess excavated materials and materials not acceptable for use as backfill or fill.
- E. Trenching: Excavate trenches for electrical installations as follows:
1. Excavate trenches to the uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches clearance on both sides of raceways and equipment.
 2. Excavate trenches to depth indicated or required.
 3. Limit the length of open trench to that in which installations can be made and the trench backfilled within the same day.
 4. Where rock is encountered, carry excavation below required elevation and backfill with a layer of crushed stone or gravel prior to installation of raceways and equipment. Provide a minimum of 6 inches of stone or gravel cushion between rock bearing surface and electrical installations.
- F. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F (1 degree 2 C).
- G. Backfilling and Filling: Place soil materials in layers to required subgrade elevations for each area classification listed below, using materials specified in Part 2 of this Section.
1. Under walks and pavements, use a combination of sub-base materials and excavated or borrowed materials.
 2. Under building slabs, use drainage fill materials.
 3. Under piping and equipment, use subbase materials where required over rock bearing surface and for correction of unauthorized excavation.
 4. For raceways less than 30 inches below surface of roadways, provide 4-inch thick concrete base slab support. After installation of raceways, provide a 4-inch thick concrete encasement (sides and top) prior to backfilling and placement of roadway sub-base.
 5. Other areas, use excavated or borrowed materials.
- H. Backfill excavations as promptly as work permits, but not until completion of the following:
1. Inspection, testing, approval, and locations of underground utilities have been recorded.
 2. Removal of concrete formwork.
 3. Removal of shoring and bracing and backfilling of voids.
 4. Removal of trash and debris.
- I. Placement and Compaction: Place backfill and fill materials in layers of not more than eight (8) inches in loose depth for material compacted by heavy equipment, and not more than four (4) inches in loose depth for material compacted by hand operated tampers.

- J. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification specified below. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- K. Place backfill and fill materials evenly adjacent to structures, piping, and equipment to required elevations. Prevent displacement of raceways and equipment by carrying material uniformly around them to approximately same elevation in each lift.
- L. Compaction: Control soil compaction during construction, providing minimum percentage of density specified for each area classification indicated below.
 - 1. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils), determined in accordance with ASTM D 1557 and not less than the following percentages of relative density, determined in accordance with ASTM D 2049, for soils which will not exhibit a well-defined moisture density relationship (cohesion-less soils).
 - 2. Areas Under Structures, Building Slabs and Steps, Pavements: Compact top 12 inches of material, or 95 percent relative density for cohesionless material.
 - a. Areas Under Walkways: Compact top 6 inches of subgrade and each layer of backfill or fill material to 90 percent maximum density for cohesive material or 95 percent relative density for cohesionless material.
 - b. Other Areas: Compact top 6 inches of subgrade and each layer of backfill or fill material to 85 percent maximum density for cohesive soils, and 90 percent relative density for cohesionless soils.
 - 3. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water. Apply water in minimum quantity necessary to achieve required moisture content and to prevent water appearing on surface during, or subsequent to, compaction operations.
 - 4. Subsidence: Where subsidence occurs at electrical installation excavations during the period 12 months after Substantial Completion, remove surface treatment (i.e., pavement, lawn, or other finish), add backfill material, compact to specified conditions, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent areas.

3.4 ERECTION OF METAL SUPPORTS AND ANCHORAGE

- A. Cut, fit, and place miscellaneous metal fabrications accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS "Structural Welding Code".

3.5 APPLICATION OF JOINT SEALERS

- A. General: Comply with joint sealer manufacturers' printed application instructions applicable to products and applications indicated, except where more stringent requirements apply.

1. Comply with recommendations of ASTM C 962 for use of elastomeric joint sealants.
 2. Comply with recommendations of ASTM C 790 for use of acrylic-emulsion joint sealants.
- B. Tooling: Immediately after sealant application and prior to time shinning or curing begins, tool sealants to form smooth, uniform beads; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
- C. Installation of Fire Stopping Sealant: Install sealant, including forming, packing, and other accessory materials, to fill openings around electrical services penetrating floors and walls, to provide fire stops with fire resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.

END OF SECTION 16050

SECTION 16100 - RACEWAYS, BOXES AND CABINETS**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes Raceways, Fittings, Boxes, Enclosures and Cabinets for Electrical Wiring.

PART II - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Rigid Steel Conduit: ANSI C80.1
- B. Intermediate Metal Conduit: ANSI C80.6
- C. Electrical Metallic Tubing and Fittings: ANSI C80.3 with compression-type fittings.
- D. Flexible Metal Conduit: Zinc coated steel
- E. Liquid tight Flexible Metal Conduit: Flexible steel conduit with PVC jacket.
- F. Fittings: NEMA FB 1, compatible with conduit/tubing materials.
- G. Non-Metallic Rigid Conduit: Schedule 40 pvc as where shown on the drawings.
- H. "MC" type cable is not acceptable.

2.2 WIRE WAYS

- A. Material: Sheet metal sized and shaped as indicated.
- B. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireway as required for complete system.
- C. Select features where not otherwise indicated, as required to complete wiring system and to comply with NEC.
- D. Wireway Covers: Match equipment specified.
- E. Finish: Paint to match adjacent finish. Work shall be neat and subject to approval by the Architect/Engineer.

2.3 SURFACE RACEWAY

- A. Types, sizes, and channels as indicated and required for each application with fittings that match and mate with raceway.

- B. Surface Metal Raceway: Galvanized steel with snap-on covers. Finish with manufacturer's standard prime coating suitable for painting.

2.4 OUTLET AND DEVICE BOXES

- A. Sheet Metal Boxes: NEMA OS 1
- B. Cast Metal Boxes: NEMA FB 1, type FD, cast alloy box with gasketed cover

2.5 FLOOR BOXES

- A. Floor Box: Cast metal, fully adjustable, rectangular. Size as required to provide the number of devices shown. Provide barriers for separation of power and data. Cover shall match the floor finish. Brass flip type only unless noted otherwise.

2.6 PULL AND JUNCTION BOXES

- A. Small Sheet Metal Boxes: NEMA OS 1.
- B. Cast Metal Boxes: NEMA FB 1, cast aluminum with gasketed cover.
- C. Pull Boxes: Code gauge steel with screw type removable cover. NEMA rated for the condition.

PART III - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of the raceway system. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 MINIMUM CONDUIT SIZE: (unless indicated otherwise) on the drawings conduit shall be sized as follows:

- A. Indoors: The minimum conduit size shall be 1/2".
 - 1. Flexible metal conduit may be used for tap connection to recessed lighting fixtures.
- B. Outdoors: Branch circuit conduit installed below grade to exterior equipment shall be one (1) inch minimum unless noted otherwise.

3.3 WIRING METHODS: Unless noted otherwise on the drawings the following materials shall be used:

- A. Outdoors: Use the following wiring methods:
 - 1. Exposed: Rigid or intermediate metal conduit.
 - 2. Concealed: Rigid or intermediate metal conduit.

3. Underground, Single Run: Rigid, encased in concrete conduit.
 4. Underground, Grouped: Rigid metallic conduit or (non-metallic rigid conduit) where noted.
 5. Connection to Vibrating Equipment (including transformers and hydraulic, pneumatic, or electric solenoid or motor-driven equipment): Liquid tight flexible metal conduit.
 6. Boxes and Enclosures: NEMA Type 3R or Type 4.
- B. Indoors: Use the following wiring methods:
1. Connection to Vibrating Equipment (including transformers and hydraulic, pneumatic, or electric solenoid or motor-driven equipment): Flexible metal conduit, except in wet or damp locations use liquid tight flexible metal conduit.
 2. Damp or Wet Locations: Rigid steel conduit.
 3. Exposed: Electrical metallic tubing above 8 feet and rigid metallic conduit below eight (8) feet.
 4. Concealed: Electrical metallic tubing, conduit (where allowed by the N.E.C.).
 5. Boxes and Enclosures: NEMA Type 1, except in damp or wet locations use NEMA Type 3R, unless otherwise noted.

3.4 INSTALLATION

- A. Telephone/Data/Cable TV outlet boxes shall be 2 gang with appropriate trim and cover. Coordinate cover plates with Owner.
- B. Provide insulated bushings for all conduit ends.
- C. Conceal rigid conduit and EMT, unless otherwise indicated, within finished walls, ceilings, above attic space and below floors.
- D. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot water pipes. Install horizontal raceway runs above water and steam piping.
- E. Install raceways level and square and at proper elevations. Provide adequate headroom.
- F. Complete raceway installation before starting conductor installation.
- G. Use temporary closures to prevent foreign matter from entering raceway.
- H. Protect stubs from damage where conduits rise through floor slabs. Arrange so curved portion of bends is not visible above the finished slab.
- I. **Where non-metallic conduit is shown to be used below the slab provide rigid conduit to turn up into the building space or at all exterior walls, poles or equipment.**
- J. Use raceway fittings compatible with raceway and suitable for use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings, except as otherwise indicated.

- K. Run concealed raceways with a minimum of bends in the shortest practical distance considering the type of building construction and obstructions, except as otherwise indicated. Where the number of bends exceed the total number required by the N.E.C., provide pull boxes as required by code.
- L. Install raceways parallel to or at right angles to surfaces or structural members, and follow the surface contours as much as practical.
1. Run parallel or banked raceways together, on common supports where practical.
 2. Make bends in parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where they can be installed parallel; otherwise, provide field bends for parallel raceways.
- M. Join raceways with fittings designed and approved for the purpose and make joints tight.
1. Use bonding jumpers where joints cannot be made tight.
 2. Use insulating bushings to protect conductors.
 3. Provide expansion joint fittings where required for the raceway used.
- N. IMC and GRC shall terminate with either a double locknut/bushing set or in a threaded hub.
- O. Where conduit type "LB" fittings are used all conduits on conduits over 2" in size shall be "MOGAL" type.
- P. "EMT" connectors shall be steel plated hexagonal compression type only. Do not use pot metal, set-screw, or indenter type connectors.**
- Q. Where concentric, eccentric, or oversized knockouts are encountered, a grounding-type insulated bushing shall be provided.
- R. Where conduits of any type pass over a building expansion joint, a standard "expansion joint" fitting, compatible with the type raceway, shall be provided.
- S. Terminations: Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely and install the locknuts with dished part against the box. Where terminations cannot be made secure with one locknut, use two locknuts, one inside and one outside the box.
- T. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align the raceway so the coupling is square to the box and tighten the chase nipple so no threads are exposed.
- U. Install pull cords in all empty raceways. Use monofilament plastic line having not less than 200-lb (90 kg) tensile strength. Leave not less than 12 inches (300 mm) of slack at each end of the pull cord.
- V. Telephone and Signal System Raceways 2 Inch Trade Size and Smaller: In addition to the above requirements, install in maximum lengths of 150 feet (45 m) and with a maximum of two 90-degree bends or equivalent. Install pull or junction boxes where necessary to comply with these requirements. Pull boxes shall be a minimum of 10" square x 6" deep with removable cover.
- W. Install raceway sealing fittings at suitable, approved, accessible locations and fill them

with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points and elsewhere as indicated:

1. Where conduits enter or leave hazardous classified locations.
 2. Where conduits pass from warm locations to cold locations, such as exterior spaces and air-conditioned spaces.
 3. Where otherwise required by the NEC.
- X. **Stub-Up Connections:** Extend conduits through concrete floor a minimum of 6" for connection to freestanding equipment. Extend conductors to equipment with flexible metal conduit. Where equipment connections are not made under this Contract verify the length of the flexible connectors.
- Y. **Flexible Connections:** Use maximum of 6 feet (1830 mm) of flexible conduit for recessed and semi-recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquid tight flexible conduit in wet or damp locations. Install separate ground conductor.
- Z. Set floor boxes level and adjust to floor surface. Provide the proper trimming for the finished floor condition. Flip top brass type cover rings shall be provided for the device shown unless noted otherwise.
- AA. Provide grounding connections for raceway, boxes and components. Tighten connectors and terminals according to tightening torques specified in UL Standard 486A.
- BB. All underground raceways shall be identified by "UNDERGROUND LINE MARKING TAPE" located directly above the raceway at 6" below finished grade. Tape shall be permanent, bright-colored, continuous, magnetic strip, printed, plastic tape compounded for direct burial not less than 6" wide and 4 mils thick. Printed legend shall be indicative of the service it is marking. Provide sufficient tape not less than 2/3 of the width of the item marked for the full length of the Raceway.
- CC. Where underground raceways are required to turn up into cabinets, equipment, etc., and on to poles, the elbow required and the sub-up out of the slab or earth shall be rigid steel.
- DD. Where shown to be used on the drawings PVC non-metallic conduit used exterior to the building for grouped circuits it shall be encased in a minimum of 3" of 3000 psi rated concrete. Concrete encased non-metallic ducts shall be supported on plastic separators coordinated with duct size and spacing. Separators shall be spaced close enough to prevent sagging and deforming of ducts. Secure separators to the earth and to ducts to prevent floating during placement of concrete. Do not use steel or tie wires in such a way to form conductive or magnetic loops around ducts or duct groups.
- EE. The Raceway System shall not be relied on for grounding continuity. See Section 16452 for Grounding and Bonding Requirements.
- FF. Where non-metallic conduit is allowed on the drawings all bends and off-sets shall be made by approved mechanical benders per the manufacturers instruction. Any conduit not in compliance will be removed.

3.5 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer

and Installer, to ensure that coatings, finishes, and cabinets are without damage or deterioration at Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to paint finishes with matching touch-up coating recommended by the manufacturer.

3.6 CLEANING

- A. Upon completion of installation of system, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt and construction debris and repair damaged finish, including chips.

END OF SECTION 16100

SECTION 16120 - WIRES AND CABLES**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes Building Wires and Cables and Associated Splices, Connectors and Terminations for Wiring Systems rated 600 Volts and Less.

PART II - PRODUCTS

2.1 BUILDING WIRES AND CABLES

- A. UL-listed building wires and cables with conductor material, insulation type, cable construction, and rating as specified in Part 3 "Applications" Article.
- B. Rubber Insulation: Conform to NEMA WC 3.
- C. Thermoplastic Insulation: Conform to NEMA WC 5.
- D. Cross-Linked Polyethylene Insulation: Conform to NEMA WC 7.
- E. Ethylene Propylene Rubber Insulation: Conform to NEMA WC 8.
- F. Solid conductor for 10 AWG and smaller: Stranded conductor for larger than 10 AWG.

2.2 CONNECTORS AND SPLICES

- A. UL-listed factory fabricated wiring connectors of size, ampacity rating, material, and type and class for application and for service indicated.

PART III - EXECUTION

3.1 EXAMINATION

- A. Examine raceways and building finishes to receive wires and cables for compliance with installation tolerances and other conditions. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

- A. Feeders and Branch Circuits: Type THHN\THWN or XHHW, copper conductor, in raceway.

- B. Fire Alarm Signal Circuits: Power-limited fire protective signaling circuit cable.
- C. Fire Alarm Notification Circuits: Type THHN/THWN, copper conductor, in raceway.
- D. Switchboard Control circuits: Type SIS copper conductors, stranded, tin coated.

3.3 INSTALLATION

- A. All conductors shall be copper.
- B. Minimum conductor size for power and lighting circuits shall be #12 AWG. Maximum conductor size shall be 500 KCMIL AWG.
- C. All power and lighting circuits #10 awg and smaller shall be solid copper conductors. Conductor sizes #8 awg and larger shall be Class "B" stranded copper conductors.
- D. Pull conductors into raceway simultaneously where more than one is being installed in same raceway.
 - 1. Use pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation.
 - 2. Use pulling means, including fish tape, cable, rope, and basket weave wire/cable grips that will not damage cables or raceway.
- E. Conductor Splices: Keep to minimum.
- F. Wiring at Outlets: Install with at least 8 inches of slack conductor at each outlet.
- G. Connect outlets and components to wiring and to ground as indicated. Tighten to UL Standard 486A.
- H. Power and Lighting circuits will be allowed to be grouped where not more than three phase conductors and one common neutral are used, unless noted otherwise.
- I. All power circuits noted for computer equipment with isolated grounding shall be individually installed in a separate conduit with separate phase, neutral conductor, grounding conductor, and isolated grounding conductor, unless noted otherwise.
- J. In no case shall any wire installed to a device exceed the U.L. rating of the device.

3.4 SPLICING

- A. Joints in solid conductors shall be using Idea "wire nuts", 3M Company "scotch lock", or "T&B" "PIGGY" connectors in junction boxes, outlet boxes and lighting fixtures.
- B. "Sta-kon" or other permanent type crimp connectors shall not be used for branch circuit connections.
- C. Joints in stranded conductors shall be spliced by approved mechanical connectors. Solderless mechanical connectors similar to "NSI" multi-cable connector blocks for splices and taps, provided with UL approved insulating covers, may be used instead of mechanical connectors plus tape.

- D. Conductors in all cases, shall be continuous from outlet to outlet unless "taps" are required and shall be made only within outlet, junction boxes, troughs and gutters.

3.5 VOLTAGE DROP

- A. Where conductor length from the panel to the first outlet on a 120 volt circuit exceeds 100 feet, the branch circuit conductors from the panel to the first outlet shall be not smaller than #10 awg.
- B. Where the conductor length from the panel to the first outlet on a 277 volt circuit exceeds 200 feet, the branch circuit conductor from the panel to the first outlet shall be not smaller than #10 awg.

3.6 FIELD QUALITY CONTROL

- A. Testing: Upon installation of wires and cables and before electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
1. Procedures: Perform each Visual and Mechanical Inspection and Electrical Test stated in NETA Standard ATS, Section 7.3.1. Certify compliance with test parameters.
- B. Correct malfunctioning products at site, where possible, and re-test to demonstrate compliance; otherwise, remove and replace with new units and re-test.

3.7 ELECTRICAL TESTING

- A. Feeder Insulation Resistance Testing:
1. All current carrying phase conductors and neutrals shall be tested as installed, and before connections are made, for insulation resistance and accidental grounds. This shall be done with a 500-volt megger. The procedures listed below shall be followed:
 2. Minimum readings shall be one million (1,000,000) or more ohms for wire and smaller, 250,000 ohms or more for #4 wire or larger, between conductor and the grounding conductor.
 3. After all devices and equipment are installed and all connections completed to each panel, the Contractor shall disconnect the neutral feeder conductor from the neutral bar and take a megger reading between the neutral bar and the grounded enclosure. If this reading is less than 250,000 ohms, the Contractor shall disconnect the branch circuit neutral wires from the neutral bar. Test each neutral conductor separately until the low readings are found. The Contractor shall correct troubles, reconnect and re-test until at least 250,000 ohms from the neutral bar to the grounded panel can be achieved with only the neutral feeder disconnected.

4. The Contractor shall send a letter to the Engineer certifying that the above has been done and tabulating the megger readings for each panel. This shall be done at least four (4) days prior to final inspection.
5. At the final inspection, the Contractor shall furnish a megger and show the Engineers and SCO representatives that the panels comply with the above requirements. He shall also furnish a hook-on type ammeter and a voltmeter and take current and voltage readings as directed by the representatives.

END OF SECTION 16120

SECTION 16140 - WIRING DEVICES**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes various types of receptacles, connectors, switches and finish plates.

1.3 SUBMITTALS

- A. Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each product specified.

PART II - PRODUCTS

2.1 WIRING DEVICES

- A. Comply with NEMA Standard WD 1-101968, "General Purpose Wiring Devices".
- B. Enclosures: NEMA 1 equivalent, except as otherwise indicated.
- C. Color: Selected by Architect.
- D. Duplex receptacles shall be of the grounding type arranged for back and side wiring, with separate single or double grounding terminals. Receptacles shall be straight blade, rated 20 amp, 125 volt and the face configuration shall conform to the NEMA Standard No. WDI.101968, and shall be approved third party listed. Self-grounding or automatic type grounding receptacles are not acceptable in lieu of receptacles with separate grounding screw lugs and a direct green insulated conductor connection to the equipment grounding system. Receptacles shall be specification grade mounted vertically.
- E. Receptacles, Straight-Blade, Special Features: Comply with the basic requirements specified above for straight-blade receptacles of the class and type indicated, and with the following additional requirements:
 - 1. Ground Fault Circuit Interrupter (GFCI) Receptacles: UL Standard 943, "Ground Fault Circuit Interrupters" with integral NEMA 5-20R duplex receptacle. Design units for installation in a 2¾ inch (70-mm) deep outlet box without an adapter.
 - 2. Isolated Ground Receptacles: Equipment grounding contacts are connected only to the green grounding screw terminal of the device and have inherent electrical isolation from the mounting strap.
 - a. Devices: Listed and labeled as isolated ground receptacles.
 - b. Isolation Method: Integral to the receptacle construction and not dependent on removable parts.
 - c. Color: Orange with "green" triangle.

- F. Receptacles, Industrial Heavy-Duty: Conform to NEMA Standard PK 4 "Plugs, Receptacles and Cable Connectors of the Pin and Sleeve type for Industrial Use".
- G. Plug Sets: Match voltage and current ratings and number of conductors to requirements of the equipment being connected.
- H. Single pole and three/four-way toggle type Snap Switches: Shall be 20 amp 120/277v. a.c. rated, quiet-type a.c. switches, NRTL listed and labeled as complying with UL Standard 20 "General Use Snap Switches" and with Federal Specification W-S-896. Color selected by Architect.
- I. Dimmer Switches: Modular full-wave solid-state units with integral, quiet On/Off switches, and audible and electromagnetic noise filters. See plans for model numbers.
1. Wattage rating shall be 2000 watts minimum, except as otherwise indicated.
 2. Control: Continuously adjustable slide or toggle. Single pole or 3-way switch to suit conditions.
- J. Motion Sensor Switches
1. Single Pole-single switching- Hubbell Model LHMTS1
 2. Single Pole-double switching-Hubbell Model LMHTD2
 3. Switches shall be combination ultrasonic and passive infrared.
 4. 100 square foot coverage, 180 degree.
 5. 120 volt: 800 watt incandescent, 1000 watt fluorescent.
 6. 277 volt, 1800 watt fluorescent.
 7. 5 year warranty.
 8. Equals by Wattstopper and Lutron.
- K. Wall Plates: Single and combination types that mate and match with corresponding wiring devices. Features include the following:
1. Material for Finished Spaces: 0.04 inch thick, type 302, satin finished stainless steel, intermediate jumbo size except as otherwise indicated.
 2. Material for Unfinished Spaces: Galvanized cast ferrous steel, standard size.
 3. Provide a quantity of 2% spare cover plates for each type of device cover used to the Owner.

2.2 FLOOR SERVICE OUTLET ASSEMBLIES

- A. Types: Modular, above-floor, or recessed in floor, dual service units suitable for the wiring method indicated.
- B. Compartmentation: Barrier separates power and signal compartments.

- C. Housing Material: Die-cast aluminum, satin finished.
- D. Power Receptacle: NEMA configuration 5-20R, ivory finish, except as otherwise indicated.
- E. Signal Outlet: Blank cover with bushed cable opening, except as otherwise indicated.

2.3 MULTI-OUTLET ASSEMBLIES

- A. Comply with Standard UL 5, "Surface Metal Raceways and Fittings".
- B. Components of Assemblies: Products of a single manufacturer designed to be used together to provide a complete matching assembly of raceways and receptacles.
- C. Raceway Material: Metal with manufacturer's standard corrosion-resistant finish.

PART III - EXECUTION

3.1 INSTALLATION

- A. Install devices and assemblies plumb and secure.
- B. Install wall plates when painting is complete.
 - 1. Arrangement of Devices: Except as otherwise indicated, mount flush, with long dimension vertical and grounding terminal of receptacles on top. Group adjacent switches under single, multi-gang wall plates.
- C. Protect devices and assemblies during painting.
- D. Adjust locations at which floor service outlets are installed to suit the indicated arrangement of partitions and furnishings.
- E. Field verify the actual location of all outlet devices above equipment or counter tops before rough-in and installation. Any outlet installed in conflict with equipment or conditions that could have been avoided, will be corrected at the Contractor's expense.
- F. Provide weatherproof cast aluminum cover plates for all devices exterior to the building or in "wet" locations, Hubbell WP26M or equal.
- G. GFCI protection shall be provided for all receptacles exterior to the building, in restrooms or where required by Code.
- H. Locate all receptacles in rated walls with 24" minimum horizontal separation. This includes devices located opposite each other in the walls.

3.2 IDENTIFICATION

- A. Comply with Division 16 Section "Electrical Identification".
 - 1. Switches: Where 3 or more switches are ganged and elsewhere where indicated, identify each switch with approved legend engraved on wall plate.
 - 2. Receptacles: Identify the panelboard and circuit number from which served. Use machine-printed, pressure-sensitive, abrasion-resistant label tape on face of

plate and durable wire markers or tags within outlet boxes.

3.3 GROUNDING

- A. Isolated Ground Receptacles: Connect to isolated grounding conductor routed to designated isolated equipment ground terminal of Electrical System.

3.3 FIELD QUALITY CONTROL

- A. Testing: Test wiring devices for proper polarity and ground continuity. Operate each operable device at least six (6) times.
- B. Test ground-fault circuit interrupter operation with both local and remote fault simulations according to manufacturer recommendations.
- C. Replace damaged or defective components.

3.4 CLEANING

- A. General: Internally clean devices, device outlet boxes and enclosures. Replace stained or improperly painted wall plates or devices.

END OF SECTION 16140

SECTION 16190 - SUPPORTING DEVICES**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes secure support from the building structure for Electrical items by means of Hangers, Supports, Anchors, Sleeves, Inserts, Seals and Associated Fastenings.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified.

PART II - PRODUCTS

2.1 COATINGS

- A. Coating: Supports, support hardware and fasteners shall be protected with zinc coating or with treatment of equivalent corrosion resistance using approved alternative treatment, finish and inherent material characteristic. Products for use outdoors shall be hot-dip galvanized.

2.2 MANUFACTURED SUPPORTING DEVICES

- A. Raceway Supports: Clevis hangers, riser clamps, conduit straps, threaded C clamps with retainers, ceiling trapeze hangers, wall brackets and spring steel clamps.
 - 1. Expansion Anchors: Carbon steel wedge or sleeve type.
 - 2. Toggle Bolts: All steel spring-head type.
 - 3. Powder-Driven Threaded Studs: Heat-treated steel, designed specifically for the intended service.
- B. Conduit Sealing Bushings: Factory-fabricated watertight conduit sealing bushing assemblies suitable for sealing around conduit or tubing passing through concrete floors and walls. Construct seals with steel sleeve, malleable iron body, neoprene sealing grommets or rings, metal pressure rings, pressure clamps and cap screws.
- C. U-Channel Systems: 16-gage steel channels, with 9/16-inch diameter holes, at a minimum of 8 inches on center, in top surface. Provide fittings and accessories that mate and match with U-channel and are of the same manufacturer.

2.3 FABRICATED SUPPORTING DEVICES

- A. General: Shop or field fabricated supports or manufactured supports assembled from U-Channel components.
- B. Steel Brackets: Fabricated of angles, channels and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.
- C. Pipe Sleeves: Provide pipe sleeves of one of the following:
 - 1. Sheet Metal: Fabricate from galvanized sheet metal; round tube closed with snap-lock joint, welded spiral seams, or welded longitudinal joint. Fabricate sleeves from the following gage metal for sleeve diameter noted:
 - a. 3-inch and smaller: 20-gage
 - b. 4-inch to 6-inch: 16-gage
 - c. Over 6-inch: 14-gage
 - 2. Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe.
 - 3. Plastic Pipe: Fabricate from Schedule 80 PVC plastic pipe.

PART III - EXECUTION

3.1 INSTALLATION

- A. Install supporting devices to fasten electrical components securely and permanently in accordance with NEC requirements.
- B. Coordinate with the building structural system and with other electrical installation.
- C. Raceway Supports: Comply with the NEC and the following requirements:
 - 1. Strength of each support shall be adequate to carry present and future load multiplied by a safety factor of at least four. Where this determination results in a safety allowance of less than 200 lbs, provide additional strength until there is a minimum of 200 lbs safety allowance in the strength of each support.
 - 2. Install individual and multiple (trapeze) raceway hangers and riser clamps as necessary to support raceways. Provide U-bolts, clamps, attachments and other hardware necessary for hanger assembly and for securing hanger rods and conduits.
 - 3. Support parallel runs of horizontal raceways together on trapeze-type hangers.
 - 4. Support individual horizontal raceways by separate pipe hangers. Spring steel fasteners may be used in lieu of hangers only for 1 inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings only. For hanger rods with spring steel fasteners, use ¼ inch diameter or larger threaded steel. Use spring steel fasteners that are specifically designed for supporting single conduits or tubing.

5. Space supports for raceway's types not covered by the above in accordance with NEC.
 6. Support exposed and concealed raceway within 1 foot of an unsupported box and access fittings. In horizontal runs, support at the box and access fittings may be omitted where box or access fittings are independently supported and raceway terminals are not made with chase nipples or threadless box connectors.
 7. In vertical runs, arrange support so the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports with no weight load on raceway terminals.
 8. In interior spaces provide a minimum of ¼ inch space for all conduits installed on the exterior building walls. Approved "clamp-back" or strut devices shall be used.
- D. Miscellaneous Supports: Support miscellaneous electrical components as required to produce the same structural safety factors as specified for raceway supports. Install metal channel racks for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes, transformers and other devices.
- E. In open overhead spaces, cast boxes threaded to raceways need not be supported separately except where used for fixture support; support sheet metal boxes directly from the building structure or by bar hangers. Where bar hangers are used, attach the bar to raceways on opposite sides of the box and support the raceway with an approved type of fastener not more than 24 inches from the box.
- F. Sleeves: Install in concrete slabs and walls and all other fire-rated floors and walls for raceways and cable installations. For sleeves through fire-rated wall or floor construction, apply UL- listed fire stopping sealant in gaps between sleeves and enclosed conduits and cables in accordance with the UL requirements.
- G. Conduit Seals: Install bushing seals for conduit penetrations of slabs on grade and exterior walls below grade. Tighten sleeve seal screws until sealing grommets have expanded to form watertight seal.
- H. Fastening: Unless otherwise indicated, fasten electrical items and their supporting hardware securely to the building structure, including but not limited to conduits, raceways, cables, cable trays, bus ways, cabinets, panelboards, transformers, boxes, disconnect switches and control components in accordance with the following:
1. Fasten by means of wood screws or screw-type nails on wood, toggle bolts on hollow masonry units, concrete inserts or expansion bolts on concrete or solid masonry and machine screws, welded threaded studs, or spring-tension clamps on steel. Threaded studs driven by a powder charge and provided with lock washers and nuts may be used instead of expansion bolts and machine or wood screws. Do not weld conduit, pipe straps or items other than threaded studs to steel structures. In partitions of light steel construction, use sheet metal screws.
 2. Holes cut to depth of more than 1½ inches in reinforced concrete beams or to depth of more than ¾ inch in concrete shall not cut the main reinforcing bars. Fill holes that are not used.

3. Ensure that the load applied to any fastener does not exceed 25 percent of the proof test load. Use vibration and shock resistant fasteners for attachments to concrete slabs.
- I. TESTS: The installation of any type support anchor system used on the project will be tested at the Engineers discretion.
 - J. Provide all jacks, jigs, fixtures, and calibrated indicating scales required for reliable testing. Obtain the Structural Engineer's approval before transmitting loads to the structure. Test to 90 percent of rated proof load for fastener. If fastening fails test, revise all similar fastener installations and re-test until satisfactory results are achieved.

END OF SECTION 16190

SECTION 16195 - ELECTRICAL IDENTIFICATION**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes Identification of Electrical Materials, Equipment and Installations.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product Data for each type of product specified.

PART II - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Ideal Industries, Inc.
 - 2. National Band and Tag Co.
 - 3. Panduit Corp.
 - 4. Seton Name Plate Co.
 - 5. Standard Signs, Inc.
 - 6. W.H. Brady, Co.

2.2 ELECTRICAL IDENTIFICATION PRODUCTS

- A. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape not less than 3 mils thick by 1 inch to 2 inches in width. Colors to match color schemes noted herein.
- B. Underground Line Marking Tape: Permanent, bright colored, continuous printed, metallic strip, plastic tape compounded for direct burial service not less than 6 inches wide by 4 mils thick. Printed legend indicative of general type of underground line below.
- C. Wire/Cable Designation Tape Markers: Vinyl or vinyl cloth, self adhesive, wrap-around, cable/conductor markers with pre-printed numbers and letter.
- D. Engraved, Plastic Laminated Labels, Signs, and Instruction Plates: Engraving stock melamine plastic laminate, 1/16th inch minimum thick for signs up to 20 square inches, or 8 inches in length; 1/8th inch thick for larger sizes. Engraved legend in white letters on black face and punched for mechanical fasteners. (Match face colors with the system equipment.) See color schemes.
- E. Fasteners for Plastic Laminated and Metal Signs: Self-tapping stainless steel screws or number 10/32 stainless steel machine screws with nuts and flat and lock washers.

- F. Cable Ties: Fungus inert, self-extinguishing, one-piece, self-locking nylon cable ties, 0.18-inch minimum width, 50-lb minimum tensile strength, and suitable for a temperature range from minus 50 degrees F to 350 degrees F. Provide ties in specified colors when used for color coding.

PART III - EXECUTION

3.1 INSTALLATION

- A. Lettering and Graphics: Coordinate names, abbreviations, colors and other designations used in Electrical Identification work with corresponding designations specified or indicated. Install numbers, lettering, and colors as approved in submittals and as required by code.
- B. Sequence of Work: Where identification is to be applied to surfaces that require finish, install identification after completion of finish work.
- C. Identify Raceways of Certain Systems with Color Banding: Band exposed or accessible raceways of the following systems for identification. Bands shall be colored adhesive marking tape, (painting of conduit will not be allowed). Make each color band 3 inches wide, completely encircling conduit. Install bands at changes in direction, at penetrations of walls and floors, and at 25-foot maximum intervals in straight runs. Apply the following colors:
1. Data/Voice System: Yellow
 2. Telephone System: Green
- D. Identify Junction, Pull, and Connection Boxes: Install on outside of box cover. Label box covers with identity of contained circuits. Use pressure-sensitive plastic labels at exposed locations and similar labels concealed boxes. Color code boxes as indicated below. Method shall be by colored adhesive not less than 4 square inches for 4" boxes and larger boxes. Permanent type "magic" markers are not accepted as a means of identification.
- 120/208 volt blue
- E. Underground Electrical Line Identification: During trench backfilling, for exterior underground power, signal and communications lines, install continuous underground plastic line marker, located directly above line at 6 inches below finished grade where multiple lines are installed in a common trench or concrete envelope. Provide marker tape to cover 2/3 of the overall width.
- F. Conductor Color Coding: Provide color coding for secondary service, feeder, and branch circuit conductors throughout the project secondary electrical system as follows:

<u>208/120 Volts</u>	<u>Phase</u>
Black	A
Red	B
Blue	C
White	Neutral
Green	Ground

- G. Use conductors with color factory-applied the entire length of the conductors except as follows:
1. The following field-applied color-coding methods may be used in lieu of factory-coded wire for sizes larger than No. 10 AWG.
 - a. Apply colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply the last two laps of tape with no tension to prevent possible unwinding. Use 1-inch wide tape in colors as specified. Do not obliterate cable identification markings by taping. Tape locations may be adjusted slightly to prevent such obliteration minimum width 2".
- H. Tag or label conductors as follows:
1. **Multiple Circuits:** Where multiple branch circuits or control wiring or communications/signal conductors are present in the same box or enclosure (except for three-circuit, four-wire home runs), label each conductor or cable. Provide legend indicating source, voltage, circuit number, and phase for branch circuit wiring. Phase and voltage of branch circuit wiring may be indicated by mean of coded color of conductor insulation. For control and communications/signal wiring, use color coding or wire/cable marking tape at terminations and at intermediate locations where conductors appear in wiring boxes, troughs, and control cabinets. Use consistent letter/number conductor designations throughout on wire/cable marking tapes.
 2. Match identification markings with designations used in panelboards shop drawings, Contract Documents, and similar previously established identification schemes for the facility's electrical installations.
- I. Install equipment/system circuit/device identification as follows:
1. Apply equipment identification labels of engraved plastic-laminate on each major unit of electrical equipment in building, including central or master unit of each electrical system. This includes communication/signal/alarm systems, unless unit is specified with its own self-explanatory identification. Except as otherwise indicated, provide single line of text, with 1/2 inch high lettering on 1½ inch high label (2 inch high where two lines are required), white lettering in blue field for normal power equipment other face colors shall match the equipment served. Text shall match terminology and numbering of the Contract Documents and shop drawings.
 2. All Phenolic labels shall be securely attached to the equipment by self-tapping stainless steel screws.
 3. Name plate colors shall be as follows:
 -Blue surface with white core for 120/208 Volt Equipment.
 -Orange surface with white core for all equipment related to Telephone Systems.
 -Brown surface with white core for all equipment related to the Data Systems.
 -Purple surface with white core for all equipment related to TV Systems.

- J. Apply circuit/control/item designation labels of engraved plastic laminate for disconnect switches, breakers, pushbuttons, pilot lights, motor control centers, and similar items for power distribution and control components above, except panelboards and alarm/signal components, where labeling is specified elsewhere. For panelboards, provide framed, typed circuit schedules with explicit description and identification of items controlled by each individual breaker. Pencil in all spare and leave spaces blank.
- K. Install labels at locations indicated and at locations for best convenience of viewing without interference with operation and maintenance of equipment.
- L. All empty conduit runs and conduit with conductors for future use shall be identified for use and shall indicate where they terminate. Identification shall be by pressure sensitive label applied to the conduit or outlet; designate "use" and "location served".

END OF SECTION 16195

SECTION 16420 - SERVICE ENTRANCE**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Extent of Service Entrance work is indicated by Drawings and Schedules.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's data on Service Entrance equipment and accessories.

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of service entrance equipment, of types, sizes, and ratings required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer's Qualifications: Firm with at least 5 years of successful installation experience with projects utilizing Service Entrance work similar to that required for this project.
- C. Codes and Standards:
 - 1. Electrical Code Compliance: Comply with applicable local code requirements of the authority having jurisdiction and NEC, including Articles 230, 250, and 338, as applicable to installation and construction of Service Entrances.
 - 2. NEMA Compliance: Comply with applicable Construction and Installation Requirements of the following NEMA standards for Service Entrance Equipment and Accessories:
 - a. Stds. Pub/No. AB 1: Molded-Case Circuit Breakers.
 - b. Stds. Pub/No. AB 3: Molded-Case Circuit Breakers and their application.
 - c. Stds. Pub/No. PB 2: Dead-Front Distribution Switchboards.
 - d. UL Compliance: Comply with construction and installation requirements of the following UL standards for Service Entrance Equipment and Accessories:
 - e. UL 50: Electrical Cabinets and Boxes.
 - 3. UL 489: Molded Case Circuit Breakers and Circuit Breaker Enclosures.
 - a. UL 869: Electrical Service Equipment.

4. Provide Service Entrance Equipment and Accessories which are UL-listed and labeled and marked, "SUITABLE FOR USE AS SERVICE EQUIPMENT".
5. IEEE Compliance: Comply with applicable requirements of IEEE Std 241 pertaining to Service Entrances.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver Service Entrance equipment components properly packaged and mounted on pallets or skids to facilitate handling of heavy items.
- B. Store Service Entrance equipment in original packaging indoors until installation.
- C. Handle Service Entrance equipment carefully. Do not install damaged equipment; remove from site and replace with new equipment.

1.6 SEQUENCING AND SCHEDULING

- A. Schedule delivery of Service Entrance equipment that permits ready building ingress for large equipment components to their designated installation spaces. Coordinate delivery of equipment with the installation of other building components.
- B. Coordinate the size and location of concrete equipment pads. Cast anchor bolt inserts into pad.
- C. Coordinate with other electrical work including raceways, electrical boxes and fittings and cabling/wiring work, as necessary to interface installation of Service Entrance work with other work.
- D. Coordinate the available fault current at each point of Service Entrance device. Modify breaker as required from the minimum shown on the Plan and Schedules.

PART II - PRODUCTS

2.1 SERVICE ENTRANCE EQUIPMENT

- A. General: Provide Service Entrance Equipment and Accessories of types, sizes, ratings and electrical characteristics indicated which comply with manufacturer's standard materials, design and construction in accordance with published product information and as required for complete installation and as herein specified.
- B. Circuit Breakers: Except as otherwise indicated, provide circuit breakers and ancillary components, of types, sizes, ratings, and electrical characteristics indicated, which comply with manufacturer's standard design, materials, components, and construction in accordance with published product information, and as required for a complete installation.
 1. Molded-Case Circuit Breakers: Provide factory-assembled, molded-case circuit breaker of frame sizes indicated; see the main distribution panel schedule on the drawings for ratings and sizes of breakers required. Circuit breakers shall be rated not less than the minimum available at the secondary of the service

transformer. Coordinate with the utility company. Provide breakers with permanent thermal and instantaneous magnetic trips in each pole. Construct with over-center, trip-free, toggle-type operating mechanisms with quick-make, quick-break action and positive handle trip indication. Construct breakers for mounting and operating in any physical position and operating in an ambient temperature of 40 degrees C. Provide breakers with mechanical screw type removable connector lugs, AL/CU rated and with NEMA Type 1 general purpose enclosures.

Note: The Contractor shall coordinate with the utility company as to the fault current available at the service point and notify the Engineer, so that the breaker rating can be adjusted accordingly.

PART III - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which Service Entrance equipment and components are to be installed and notify Engineer in writing of conditions detrimental to proper completion of the work. Do not proceed with the work until satisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 INSTALLATION OF SERVICE-ENTRANCE EQUIPMENT

- A. Install Service Entrance equipment as indicated, in accordance with equipment manufacturer's written instructions, and with recognized industry practices to ensure that Service Entrance equipment fulfills requirements. Comply with applicable installation requirements of NEC and NEMA Standards.
- B. Tighten electrical connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Stds. 486A and B and the National Electrical Code.

3.3 FIELD QUALITY CONTROL

- A. Prior to energization of Service Entrance equipment, check accessible connections for compliance to manufacturer's Torque Tightening Specifications.
- B. Prior to energization of Service Entrance equipment, check with ground resistance tester, phase-to-phase and phase-to-ground insulation resistance levels to ensure requirements are fulfilled.
- C. Prior to energization, check circuitry for electrical continuity and for short circuits.

3.4 GROUNDING

- A. Provide equipment grounding connections for Service Entrance equipment as indicated. Tighten connections to comply with tightening torques specified in UL Std. 486A to assure permanent and effective grounding.

3.5 CIRCUIT BREAKER TESTS

- A. For services 1,000 amperes and larger, perform the following tests on the service circuit breakers and the distribution circuit breakers. Testing shall be performed by a qualified factory Technician at the job site. All readings shall be tabulated.
- B. Phase tripping tolerance (within 20% of U/L requirements).
- C. Trip time (per phase) in seconds.
- D. Instantaneous trip (amps) per phase.
- E. Insulation resistance (Megohms) at 100 volts (phase to phase, and line to load).

3.6 GROUND FAULT PROTECTION SYSTEM

- A. The ground fault protection of the new circuit breakers shall be performance tested in the field and properly calibrated and set in accordance with fault current available at the distribution service.

3.7 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 the Engineer's representative that the panels comply with the above requirements. He shall also furnish a hook-on type ammeter and a voltmeter, taking current and voltage readings as directed by the Engineer.
- C. All required documentation of readings indicated shall be submitted to the Engineer prior to, and as one of the pre-requisites for, final acceptance of the project.

3.8 ADJUSTING AND CLEANING

- A. Adjust operating mechanisms for free mechanical movement.
- B. Touch up scratched or marred enclosure surfaces to match original finishes.

3.9 DEMONSTRATION

- A. Upon completion of installation of Service Entrance equipment and electrical circuitry, energized circuitry and demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then re-test to demonstrate compliance; otherwise, remove and replace with new units and re-test to demonstrate compliance.

END OF SECTION 16420

SECTION 16452 - GROUNDING**PART I - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes Solid Grounding of Electrical Systems and Equipment. It includes basic requirements for grounding for protection of life, equipment, circuits, and systems. Grounding requirements specified in this Section may be supplemented in other Sections of these Specifications.

1.3 QUALITY ASSURANCE

- A. Listing and Labeling: Provide products specified in this Section that are listed and labeled. The terms "listed" and "labeled" shall be defined as they are in the National Electrical Code, Article 100.

PART II - PRODUCTS

2.1 GROUNDING AND BONDING PRODUCTS

- A. Products: Of types indicated and of sizes and ratings to comply with NEC. Where types, sizes, ratings, and quantities indicated are in excess of NEC requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.
- B. Conductor Materials: Copper

2.2 WIRE AND CABLE CONDUCTORS

- A. General: Comply with Division 16 Section "Wires and Cables". Conform to NEC Table 8, except as otherwise indicated, for conductor properties, including stranding.
- B. Equipment Grounding Conductor: Green insulated
- C. Grounding Electrode Conductor: Stranded cable
- D. Bare Copper Conductors: Conform to the following:
 - 1. Solid Conductors: ASTM B-3
 - 2. Assembly of Stranded Conductors: ASTM B-8
 - 3. Tinned Conductors: ASTM B-33

2.3 MISCELLANEOUS CONDUCTORS

- A. Ground Bus: Bare annealed copper bars of rectangular cross section, full-size rated.
- B. Braided Bonding Jumpers: Copper tape, braided No. 30 gauge bare copper wire, terminated with copper ferrules.

- C. Bonding Strap Conductor/Connectors: Soft copper, 0.05 inch thick and 2 inches wide, except as indicated.

2.4 CONNECTOR PRODUCTS

- A. General: Listed and labeled as Grounding Connectors for the materials used.
- B. Pressure Connectors: High conductivity-plated units
- C. Bolted Clamps: Heavy-duty units listed for the application
- D. Exothermic Welded Connections: Provided in Kit Form and selected for the specific types, sizes and combinations of conductors and other items to be connected.

2.5 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel with high strength steel core and electrolytic grade copper outer sheath, molten welded to core.
 1. Size: 3/4 inch by 10 feet

PART III - EXECUTION

3.1 APPLICATION

- A. Equipment Grounding Conductor Application: Comply with NEC Article 250 for sizes and quantities of equipment grounding conductors, except where larger sizes or more conductors are indicated.
 1. The raceway system shall not be relied on for ground continuity. Install an equipment ground conductor in all power related conduits. Size conductor as required by NEC Table 250-122. Data and Signal conduits do not require a separate grounding conductor unless required by the manufacturer of the equipment to be installed.
 2. Install separate isolated equipment grounding conductors with circuit conductors for the following in addition to those locations where required by Code.
 - a. Isolated grounding type receptacles
- B. Underground Conductors: Bare, stranded copper except as otherwise indicated.
- C. Signal and Communications: For telephone, alarm, and communication systems, provide a #4 AWG minimum green insulated copper conductor in raceway from the grounding electrode system to each terminal equipment location. Leave 3' pigtail wiring at termination point where equipment boards are shown. Make direct connection where equipment is provided.
- D. Separately derived systems required by NEC to be grounded shall be grounded in accordance with NEC paragraph 250-26.

3.2 INSTALLATION

- A. General: Ground electrical systems and equipment in accordance with NEC requirements except where the Drawings or Specifications exceed NEC requirements.
- B. The electrical service shall be grounded by three (3) means:
1. To the cold water main, if metallic and in direct contact with the earth for at least 10 feet as per the NEC Article 250-81.
 2. To the steel frame of the building, provided the building frame is effectively grounded.
 3. To ground rod(s)
- C. Ground Rods: Locate a minimum of one-rod length from each other and at least the same distance from any other grounding electrode. Interconnect ground rods with bare conductors buried at least 24 inches below grade. Connect bare-cable ground conductors to ground rods by means of exothermic welds except as otherwise indicated. Make these connections without damaging the copper coating or exposing the steel. Use $\frac{3}{4}$ inch by 10 ft. ground rods except as otherwise indicated. Drive rods until tops are 6 inches below finished floor or final grade except as otherwise indicated. All ground connections shall be accessible.
- D. Metallic Water Service Pipe: Provide insulated copper ground conductors, sized as indicated, in conduit from the building main service equipment, or the ground bus, to main metallic water service entrances to the building. Connect ground conductors to the main metallic water service pipes by means of ground clamps. Where a dielectric main water fitting is installed, connect the ground conductor to the street side of the fitting. Do not install a grounding jumper around dielectric fittings. Bond the ground conductor conduit to the conductor at each end.
- E. Route grounding conductors along the shortest and straightest paths possible without obstructing access or placing conductors where they may be subjected to strain, impact, or damage, except as indicated.

3.3 CONNECTIONS

- A. General: Make connections in such a manner as to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
1. Use electroplated or hot tin-coated materials to assure high conductivity and make contact points closer in order of galvanic series.
 2. Make connections with clean bare metal at points of contact.
 3. Aluminum to steel connections shall be with stainless steel separators and mechanical clamps.
 4. Aluminum to galvanized steel connections shall be with tin-plated copper jumpers and mechanical clamps.
 5. Coat and seal connections involving dissimilar metals with inert material such as red lead paint to prevent future penetration of moisture to contact surfaces.

- B. Exothermic Welded Connections: Use for connections to structural steel and for underground connections except those at test wells. Install at connections to ground rods and plate electrodes. Comply with manufacturer's written recommendations. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Terminate insulated equipment grounding conductors for feeders and branch circuits with pressure-type grounding lugs. Where metallic raceways terminate at metallic housings without mechanical and electrical connection to the housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground bus in the housing. Bond electrically non-continuous conduits at both entrances and exits with grounding bushings and bare grounding conductors.
- D. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values for connectors and bolts. Where manufacturer's torquing requirements are not indicated, tighten connections to comply with torque tightening values specified in UL 486A and UL 486B.
- E. Compression-Type Connections: Use hydraulic compression tools to provide the correct circumferential pressure for compression connectors. Use tools and dies recommended by the manufacturer of the connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on the ground conductor.

3.4 FIELD QUALITY CONTROL

- A. Tests: Subject the completed grounding system to a megger test at each location where a maximum ground resistance level is specified, at service disconnect enclosure ground terminal, and at ground test wells. Measure ground resistance without the soil being moistened by any means other than natural precipitation or natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests by the 2 point method in accordance with Section 9.03 of IEEE 81, "Guide for Measuring Earth Resistivity, Ground Impedance and Earth Surface Potentials of a Grounding System".
- B. Service Grounding Test
 - 1. After completion of the electrical grounding and bonding systems, test the ground resistance with a ground resistance tester. Where test shown resistance-to-ground is over 25 ohms, provide additional ground rods until the minimum of 25 ohms is achieved.
- C. Deficiencies: Where ground resistances exceed specified values, and if directed, modify the grounding system to reduce resistance values. Where measures are detected that exceed those indicated the provisions of the Contract, covering changes will apply.

- D. Report: Prepare test reports of the ground resistance at each test location. Include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

3.5 CLEANING AND ADJUSTING

- A. Restore surface features at areas disturbed by excavation and re-establish original grades. Where sod has been removed, replace it as soon as possible after backfilling is completed. Restore areas disturbed by trenching, storing of dirt, cable laying, and other Work to their original condition. Include necessary topsoil, fertilizing, liming, seeding, sodding, sprigging, or mulching.

END OF SECTION 16452

PART I - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes Lighting and Power Panel Boards and Associated Auxiliary Equipment Rated 600 V or Less

1.3 DEFINITIONS

- A. Panel Boards: A panel board with thermal magnetic circuit-breaker branches, designed for residential and light commercial projects, operating at 600 V and below, available in both single and 3-phase versions, and equipped with combination flush/surface mounting trim.
- B. Over-current Protective Device (OCPD): A device operative on excessive current that causes and maintains the interruption of power in the circuit it protects.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type panel board, accessory item, and component specified.
- C. Shop Drawings from manufacturers of panel boards including dimensioned plans, sections, and elevations. Show tabulations of installed devices, major features and voltage rating.
- D. Include the following:
 - 1. Enclosure type with details for types other than NEMA Type 1.
 - 2. Bus configuration and current ratings.
 - 3. Short-circuit current rating of panelboard.
 - 4. Features, characteristics, ratings, and factory settings of individual protective devices and auxiliary components.

1.5 QUALITY ASSURANCE

- A. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
 - 1. The terms "listed" and "labeled" shall be defined as they are in the National Electrical Code, Article 100.
- B. Electrical Component Standard: Components and installation shall comply with NFPA 70, "National Electrical Code".

- C. NEMA Standard: Comply with NEMA PB1, "Panel Boards".
- D. UL Standards: Comply with UL 61, "Panel Boards", and UL 50, "Cabinets and Boxes".

PART II - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Cutler Hammer
2. Square D
3. Siemens

2.2 PANELBOARDS - GENERAL REQUIREMENTS

- A. Over-current Protective Devices (OCPDs): Provide type, rating, and features as indicated on the schedules. Tandem circuit breakers shall not be used. Multiple breakers shall have common trip.
- B. Circuit Breakers shall be bolt-on type.
- C. 100% rated copper Ground and Neutral Bus (unless noted otherwise).
- D. Enclosures: Cabinets, flush or surface mounted as indicated. NEMA Type 1 enclosure.
- E. Front: Secured to box with concealed trim clamps except as indicated. Front for surface-mounted panels shall be same dimensions as box. Fronts for flush panels shall overlap box except as otherwise specified.
- F. Directory Frame: Metal, mounted inside each panel door.
- G. Bus: Hard drawn copper of 98 percent conductivity.
- H. Main and Neutral Lugs: Bolt-on type.
- I. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors.
- K. Provision for Future Devices: Equip with mounting brackets, bus connections, and necessary appurtenances, for the OCPD ampere ratings indicated for future installation of devices.
- L. Feed-through panels are not permitted.
- M. The use of series breakers is not permitted.
- N. Flash protection boundary and the incident energy for the electrical equipment shall be determined in accordance with IEEE 1584 and NFPA 70E requirements.

2.3 IDENTIFICATION

- A. Panel Board Nameplates: Engraved laminated plastic or metal nameplate for each panel board mounted with self-tapping stainless steel screws.

PART III - EXECUTION

3.1 INSTALLATION

- A. General: Install panel boards and accessory items in accordance with NEMA PB 1.1, "General Instructions for Proper Installation, Operation and Maintenance of Panel Boards Rated 600 Volts or Less" and manufacturers' written installation instructions.
- B. Mounting Heights: Top of trim 6'-2" above finished floor, except as indicated.
- C. Mounting: Plumb and rigid without distortion of box. Mount flush panels uniformly flush with wall finish.
- D. Circuit Directory: Typed and reflective of final circuit changes required to balance panel loads. Obtain approval before installing. Pencil all spares. Spaces shall be left blank.
- E. Install filler plates in unused spaces.
- F. Provision for Future Circuits at Flush Panel Boards: Stub four 1-inch empty conduits from panel into accessible ceiling space or space designated to be ceiling space in future.
- G. Wiring in Panel Gutters: Train conductors neatly in groups, bundle and wrap with wire ties after completion of load balancing.

3.2 GROUNDING

- A. Connections: Make equipment grounding connections for panelboards as indicated.
- B. Provide ground continuity to main electrical ground bus indicated.

3.3 CONNECTIONS

- A. All connections shall be provided per UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

- A. Quality Control Program: Conform to the following:

1. Procedures: Field tests and Inspections will be made by the Engineer at time of completion of the work and in accordance these Specifications.
2. Schedule tests with at least one (1) week in advance notification.

B. Visual and Mechanical Inspection: Include the following inspections and related work:

1. Inspect for defects and physical damage, labeling, and nameplate compliance with requirements of up-to-date Drawings and Panel Board Schedules.
2. Exercise and perform of operational tests of all Mechanical components and other operable devices in accordance with manufacturer's Instruction Manual.
3. Check panel board mounting, area clearances and alignment and fit of components.
4. Check tightness of bolted electrical connections with calibrated torque wrench.

3.5 CLEANING

- A. Upon completion of installation, inspect interior and exterior of panel boards. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish.

END OF SECTION 16470

SECTION 16476 – DISCONNECTS**PART I - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes Equipment and Service disconnects.

1.3 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for Switches and Accessories specified in this Section.

1.4 QUALITY ASSURANCE

- A. Comply with NFPA 70 "National Electrical Code" for components and installation.
- B. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
 - 1. The Terms "Listed" and "Labeled": As defined in the "National Electrical Code", Article 100.

PART II - PRODUCTS**2.1 MANUFACTURERS**

- A. Acceptable Manufacturers:
 - 1. Cutler-Hammer Products; Eaton Corp.
 - 2. Siemens
 - 3. Square D Company

2.2 ENCLOSED SWITCHES

- A. Enclosed Non-Fusible Switch: NEMA KS 1, Type HD, handle lockable with 2 padlocks.
- B. Enclosed Fusible Switch, 800 Amperes and Smaller: NEMA KS 1, Type HD, clips to accommodate specified fuses, enclosure consistent with environment where located, handle lockable with 2 padlocks, and interlocked with cover in CLOSED position.
- C. Enclosure: NEMA KS 1, Type 1, unless specified or required otherwise to meet environmental conditions of installed location.
- D. Outdoor Locations: Type 3R
- E. Other Wet or Damp Indoor Locations: Type 4

- F. All switches shall be "Heavy Duty" rated for the voltage required.
- G. Coordinate all fuse rated switches with the equipment to be furnished. Furnish fuses.
- H. Safety switches shall be third-party listed.
- I. Switches shall have defeatable door interlocks that prevent the door from opening when the operating handle is in the open position.
- J. Switches shall have handles whose positions are easily recognizable in the "on" or "off" position. For safety reasons, padlocks shall be provided for switches located in the public areas.
- K. Switches shall have nonteasible, positive, quick make-quick-quick-break mechanisms.
- L. Switches shall be properly labeled. See section 16195, Electrical Identification.

PART III - EXECUTION

3.1 INSTALLATION

- A. Install enclosed switches level and plumb.
- B. Where fuses are required, the fuses shall be matched with the equipment supplier's requirements.
- C. Provide one additional set of fuses for each disconnect switch.

3.2 FIELD QUALITY CONTROL

- A. Testing: After installing enclosed switches and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
- B. Correct malfunctioning units at site, where possible, and retest to demonstrate compliance. Otherwise, remove and replace with new units and re-test.

3.3 CLEANING

- A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, construction debris and repair damaged finish including chips, scratches and abrasions.

END OF SECTION 16476

SECTION 16515 - INTERIOR LIGHTING**PART I - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes interior lighting fixtures, lamps, ballasts, emergency lighting units, and accessories.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data describing fixtures, lamps, ballasts, and emergency lighting units. Arrange product data for fixtures in order of fixture designation. Include data on features and accessories and the following information:
1. Outline drawings of fixtures indicating dimensions and principal features.
 2. Electrical ratings and photometric data with specified lamps and certified results of independent laboratory tests.
 3. Data on batteries and chargers of emergency lighting units.
 4. Shop Drawings from manufacturers detailing non-standard fixtures and indicating dimensions, weights, methods of field assembly, components, features and accessories.
 5. Non-returnable samples, when requested by Engineer, for verification purposes of specific individual fixtures.

1.4 QUALITY ASSURANCE

- A. Comply with NFPA 70 "National Electrical Code" for components and installation.
- B. Listing and Labeling: Provide fixtures that are listed and labeled for their indicated use on the Project.
- C. Coordination of Fixtures With Ceiling: Coordinate fixtures mounting hardware and trim with the ceiling system. Provide plaster or sheet-rock trims when required on the project whether indicated or not at no additional cost to the Owner. Coordinate with Architectural Plans before ordering fixtures.

1.5 WARRANTY

- A. Minimum warranty period on emergency lights shall be three (3) years from date acceptance. Warranty shall include all parts (less lamps).

- B. All other lighting products shall be warranted for a period of not less than 1 year from date of acceptance. This warranty does not include miscellaneous parts which are external to the product (i.e. lamps) which are considered maintenance item.

PART II - PRODUCTS

2.1 FIXTURES - GENERAL

- A. Comply with the requirements specified in the Articles below and the Lighting Fixture Schedule on the Drawings.

2.2 FIXTURE COMPONENTS - GENERAL

- A. Metal Parts: Free from burrs and sharp corners and edges.
- B. Sheet Metal Components: Steel, except as indicated. Components are formed and supported to prevent warping and sagging.
- C. Doors, Frames, and Other Internal Access: Smooth operating and free from light leakage under operating conditions. Arrange to permit re-lamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during re-lamping and when secured in the operating position. Light seal strips inside the fixture will not be allowed.
- D. Reflecting Surfaces: Minimum reflectances as follows, except as otherwise indicated:
- | | | |
|----|----------------------------------|------------|
| 1. | White Surfaces: | 85 percent |
| 2. | Specular Surfaces: | 83 percent |
| 3. | Diffusing Specular Surfaces: | 75 percent |
| 4. | Laminated Silver Metalized Film: | 90 percent |
- E. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic
- | | |
|----|--|
| 1. | Plastic: Highly resistance to yellowing and other changes due to aging, exposure to heat and UV radiation. |
| 2. | Lens Thickness: 0.125 inches minimum |

2.3 SUSPENDED FIXTURE SUPPORT COMPONENTS

- A. Single-Stem Hangers: ½ inch steel tubing with swivel ball fitting and ceiling canopy. Finish same as fixture.
- B. Twin-Stem Hangers: Two, ½ inch steel tubes with single canopy arranged to mount a single fixture. Finish same as fixture.
- C. Rod Hangers: 3/16 inch diameter cadmium plated, threaded steel rod.

2.4 FLUORESCENT FIXTURES

- A. Fixtures: Conform to UL 1570, "Fluorescent Lighting Fixtures".
- B. Electronic Ballast:
 - 1. Ballast to be "UL listed, Class P".
 - 2. Ballast to be "Sound Rated A".
 - 3. Ballast enclosure size shall be same as or smaller than, magnetic ballast.
 - 4. Light regulation shall be +/- 10% input voltage variation.
 - 5. Ballast shall have high power factor (minimum of 90%).
 - 6. Lamp current crest factor shall be equal to, or less than, 1.7.
 - 7. Input current third harmonics shall not exceed ANSI recommendations (32% total harmonic distortion, 27.5% of the third triplets).
 - 8. Flicker shall be 15% or less with any lamp suitable for the ballast.
 - 9. Ballast design shall withstand line transients per IEEE 587, Category A.
 - 10. Ballast case temperature shall not exceed 25 degrees C rise over 40 degrees C ambient.
 - 11. Ballast shall meet FCC Rules and Regulations, Part 18.
 - 12. Parallel wiring between the ballast and fixture is recommended.
 - 13. Minimum of five (5) years warranty is required with each electronic ballast.
 - 14. The manufacturer shall have not less than 5 years of experience in manufacturing electronic ballast.
- C. Low Temperature Ballast Minimum Starting Temperature: Minus 20 degrees C
- D. Where compact fluorescent light fixtures are specified, "High Power Factor" electronic ballast shall be standard.

2.5 FLUORESCENT LAMPS

- A. All fluorescent lamps to be {41} K-rated unless noted otherwise.

2.6 EXIT SIGNS

- A. Conform to UL 924, "Emergency Lighting and Power Equipment".
 - 1. Arrows: Include as indicated.
- B. Emergency Exit Signs shall be of the "LED" style.
- C. Units shall be completely self-contained, provided with maintenance-free battery, automatic charger, and other features. Luminaire must be third-party listed as emergency lighting equipment, and meet or exceed the following standards: NEC, NC Building Code, Volume X Energy code, NFPA-101, and NEMA Standards.
- D. BATTERY-It shall be sealed, maintenance-free type, with minimum of 90 minutes operating endurance. Must have a normal life expectancy of 10 years. Batteries shall be a high temperature type with an operating range of 0 degree C to 60 degrees C and contain a resealable pressure vent, a sintered + positive and - negative terminal.
- E. CHARGER- It shall be fully automatic solid state type, full wave rectifying, with current limiting. Charger shall restore the battery to its full charge within 24 hours after a discharge of 90 minutes under full rated load. The unit shall be activated when the voltage drops below 80%. A low voltage disconnect switch shall be included if LEAD battery is used to disconnect the battery from the load and prevent damage from a deep discharge during extended power outage.
- F. ADDITIONAL FEATURES- Pilot light to indicate the unit is connected to AC power. The battery shall have rate discharge pilot light, unless self-diagnostic type. Test switch to simulate the operation of the unit upon loss of AC power by energizing the lamps from the battery. This simulation must also exercise the transfer relay.
- G. WARRANTY-The entire unit shall be warranted for 3 years. The battery must have an additional 2 more years pro-rated warranty. Warranty shall start from the date of project final acceptance. Warranty shall be included in the contract document.
- H. LED-The use of LED is required due to their reliable performance, low power consumption, and limited maintenance requirements. Maximum LED failure rate shall be 25% within a seven (7) year period; otherwise, if exceeded, manufacturer shall replace the complete unit at no charge to the owner.

2.7 EMERGENCY LIGHTING UNITS

- A. Conform to UL 924, "Emergency Lighting and Power Equipment" requirements for "Unit Equipment". Provide self-contained units with the following features and additional characteristics as indicated.
- B. Units shall be completely self-contained, provided with maintenance-free battery, automatic charger, and other features. Luminaire must be third-party listed as emergency lighting equipment, and meet or exceed the following standards: NEC, NC Building Code, Volume X Energy code, NFPA-101, and NEMA Standards.

- C. **BATTERY**-It shall be sealed, maintenance-free type, with minimum of 90 minutes operating endurance. Must have a normal life expectancy of 10 years. Batteries shall be a high temperature type with an operating range of 0 degree C to 60 degrees C and contain a resealable pressure vent, a sintered + positive and - negative terminal.
- D. **CHARGER**- It shall be fully automatic solid state type, full wave rectifying, with current limiting. Charger shall restore the battery to its full charge within 24 hours after a discharge of 90 minutes under full rated load. The unit shall be activated when the voltage drops below 80%. A low voltage disconnect switch shall be included if LEAD battery is used to disconnect the battery from the load and prevent damage from a deep discharge during extended power outage.
- E. **ADDITIONAL FEATURES**- Pilot light to indicate the unit is connected to AC power. The battery shall have rate discharge pilot light, unless self-diagnostic type. Test switch to simulate the operation of the unit upon loss of AC power by energizing the lamps from the battery. This simulation must also exercise the transfer relay.
- F. **WARRANTY**-The entire unit shall be warranted for 3 years. The battery must have an additional 2 more years pro-rated warranty. Warranty shall start from the date of project final acceptance. Warranty shall be included in the contract document.

2.8 FINISH

- A. **Steel Parts:** Manufacturer's standard finish applied over corrosion-resistant primer, free of streaks, runs, holidays, stains, blisters, and defects. Remove fixtures showing evidence of corrosion during project warranty period and replace with new fixtures.
- B. **Paint parts** after fabrication.

PART III – EXECUTION

3.1 INSTALLATION

- A. **Setting and Securing:** Set units plumb, square, and level with ceiling and walls, and secure according to manufacturer's printed instructions and approved Shop Drawings.
- B. **Support For Recessed and Semi-Recessed Fixtures:** Units shall be supported independent from suspended ceiling. Install fixture with support wires at 2 diagonal corners to the structure or building steel.
 - 1. **Fixtures of Sizes Less Than Ceiling Grid:** Center in the acoustical panel. Support fixtures independently with at least two ¾ inch metal channels spanning and secured to the ceiling tees.
 - 2. **Install support clips or screws for recessed fixtures,** securely fastened to ceiling grid members, at or near each fixture corners.
 - 3. **Support wires shall be not less than the support wires for the ceiling system.**
- C. **Support for Suspended Fixtures:** Brace pendants and rods that are 4 feet long or longer to limit swinging. Support stem mounted single unit suspended fluorescent fixtures with twin stem hangers. For continuous rows, use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of chassis, including one at each end.
- D. **Lamping:** See Schedule on Drawings, or provide standard lamp for the rating of the fixture.

- E. Where mounting height for fixtures are not scheduled, coordinate with the Engineer before any installation.

3.2 FIELD QUALITY CONTROL

- A. Inspect each installed fixture for damage. Replace damaged fixtures and components.
- B. Emergency Battery Units Test: Verify normal operation of each fixture after fixtures have been installed and circuits have been energized with normal power source. Interrupt electrical energy for a period of not less than 90 minutes to demonstrate proper operation of Emergency Lighting installation. Include the following in tests of emergency lighting equipment.
 - 1. Duration of supply
 - 2. Low battery voltage shut-down
 - 3. Normal transfer to battery source and retransfer to normal
 - 4. Low supply voltage transfer
- C. Replace or repair malfunctioning fixtures and components, then retest. Repeat procedure until all units operate properly.
- D. Contractor shall perform a test on each unit after it is permanently installed and charged for a minimum of 24 hours. Battery shall be tested for 90 minutes. The battery test shall be done 10 days prior to final inspection by the State Construction Office. Any unit which fails the test must be repaired or replaced and tested again. Copy of the test report shall be sent to the State Construction Office.

3.3 ADJUSTING AND CLEANING

- A. Clean fixtures upon completion of installation. Use methods and materials recommended by manufacturer.
- B. Adjust aimable fixtures to provide required light intensities.

END OF SECTION 16515

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DIVISION 17 - COMPENSATION FOR GENERAL CONSTRUCTION

SECTION 17100 - COMPENSATION FOR GENERAL CONSTRUCTION

1.01 COMPENSATION

- A. The work of furnishing materials and constructing the Gaston County I-85 Weigh Station Buildings Northbound lane, consisting of the Scale Booth and the Scale Building, in accordance with the plans and specifications; completed and accepted, will be paid for at the contract unit prices for "General Construction of Gaston County I-85 Weigh Station". Such price and payment will be full compensation for all work of constructing Gaston County I-85 Weigh Station Scale Booth and Scale Building; including but not limited to furnishing all transportation, materials, labor, tools, equipment, fees and incidentals necessary to complete the work. Payment will be made under:

"Scale Building and Scale Booth: Complete General Construction and All Systems As Indicated"Lump Sum

SECTION 17200 - COMPENSATION FOR GENERAL CONSTRUCTION

1.01 COMPENSATION

- A. The work of furnishing materials and constructing the Inspection Building of the Gaston County I-85 Weigh Station Northbound lane in accordance with the plans and specifications; completed and accepted, will be paid for at the contract unit prices for "General Construction of Gaston County I-85 Weigh Station". Such price and payment will be full compensation for all work of constructing Gaston County I-85 Weigh Station Inspection Building; including but not limited to furnishing all transportation, materials, labor, tools, equipment, fees and incidentals necessary to complete the work. Payment will be made under:

"Inspections Building: Complete General Construction and All Systems As Indicated"Lump Sum

Project I-4928

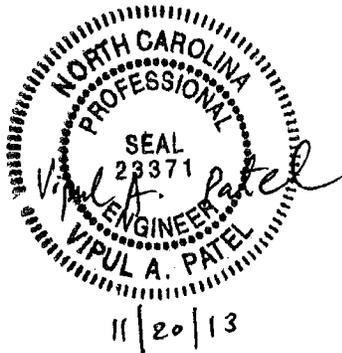
Gaston/Cleveland Co.

**Project Special Provisions
Culvert**

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For Polyurethane Grout Injection, see Geotechnical special provisions.



PROJECT SPECIAL PROVISIONS
CULVERT

PROJECT I-4928

GASTON/CLEVELAND CO.

FALSEWORK AND FORMWORK

(4-5-12)

1.0 DESCRIPTION

Use this Special Provision as a guide to develop temporary works submittals required by the Standard Specifications or other provisions; no additional submittals are required herein. Such temporary works include, but are not limited to, falsework and formwork.

Falsework is any temporary construction used to support the permanent structure until it becomes self-supporting. Formwork is the temporary structure or mold used to retain plastic or fluid concrete in its designated shape until it hardens. Access scaffolding is a temporary structure that functions as a work platform that supports construction personnel, materials, and tools, but is not intended to support the structure. Scaffolding systems that are used to temporarily support permanent structures (as opposed to functioning as work platforms) are considered to be falsework under the definitions given. Shoring is a component of falsework such as horizontal, vertical, or inclined support members. Where the term "temporary works" is used, it includes all of the temporary facilities used in bridge construction that do not become part of the permanent structure.

Design and construct safe and adequate temporary works that will support all loads imposed and provide the necessary rigidity to achieve the lines and grades shown on the plans in the final structure.

2.0 MATERIALS

Select materials suitable for temporary works; however, select materials that also ensure the safety and quality required by the design assumptions. The Engineer has authority to reject material on the basis of its condition, inappropriate use, safety, or nonconformance with the plans. Clearly identify allowable loads or stresses for all materials or manufactured devices on the plans. Revise the plan and notify the Engineer if any change to materials or material strengths is required.

3.0 DESIGN REQUIREMENTS**A. Working Drawings**

Provide working drawings for items as specified in the contract, or as required by the Engineer, with design calculations and supporting data in sufficient detail to permit a structural and safety review of the proposed design of the temporary work.

On the drawings, show all information necessary to allow the design of any component to be checked independently as determined by the Engineer.

When concrete placement is involved, include data such as the drawings of proposed sequence, rate of placement, direction of placement, and location of all construction joints. Submit the number of copies as called for by the contract.

When required, have the drawings and calculations prepared under the guidance of, and sealed by, a North Carolina Registered Professional Engineer who is knowledgeable in temporary works design.

If requested by the Engineer, submit with the working drawings manufacturer's catalog data listing the weight of all construction equipment that will be supported on the temporary work. Show anticipated total settlements and/or deflections of falsework and forms on the working drawings. Include falsework footing settlements, joint take-up, and deflection of beams or girders.

As an option for the Contractor, overhang falsework hangers may be uniformly spaced, at a maximum of 36 inches, provided the following conditions are met:

Member Type (PCG)	Member Depth, (inches)	Max. Overhang Width, (inches)	Max. Slab Edge Thickness, (inches)	Max. Screenshot Wheel Weight, (lbs.)	Bracket Min. Vertical Leg Extension, (inches)
II	36	39	14	2000	26
III	45	42	14	2000	35
IV	54	45	14	2000	44
MBT	63	51	12	2000	50
MBT	72	55	12	1700	48

Overhang width is measured from the centerline of the girder to the edge of the deck slab.

For Type II, III & IV prestressed concrete girders (PCG), 45-degree cast-in-place half hangers and rods must have a minimum safe working load of 6,000 lbs.

For MBT prestressed concrete girders, 45-degree angle holes for falsework hanger rods shall be cast through the girder top flange and located, measuring along the top of the member, 1'-2 1/2" from the edge of the top flange. Hanger hardware and rods must have a minimum safe working load of 6,000 lbs.

The overhang bracket provided for the diagonal leg shall have a minimum safe working load of 3,750 lbs. The vertical leg of the bracket shall extend to the point that the heel bears on the girder bottom flange, no closer than 4 inches from the bottom of the member. However, for 72-inch members, the heel of the bracket shall bear on the web, near the bottom flange transition.

Provide adequate overhang falsework and determine the appropriate adjustments for deck geometry, equipment, casting procedures and casting conditions.

If the optional overhang falsework spacing is used, indicate this on the falsework submittal and advise the girder producer of the proposed details. Failure to notify the Engineer of hanger type and hanger spacing on prestressed concrete girder casting drawings may delay the approval of those drawings.

Falsework hangers that support concentrated loads and are installed at the edge of thin top flange concrete girders (such as bulb tee girders) shall be spaced so as not to exceed 75% of the manufacturer's stated safe working load. Use of dual leg hangers (such as Meadow Burke HF-42 and HF-43) are not allowed on concrete girders with thin top flanges. Design the falsework and forms supporting deck slabs and overhangs on girder bridges so that there will be no differential settlement between the girders and the deck forms during placement of deck concrete.

When staged construction of the bridge deck is required, detail falsework and forms for screed and fluid concrete loads to be independent of any previous deck pour components when the mid-span girder deflection due to deck weight is greater than $\frac{3}{4}$ ".

Note on the working drawings any anchorages, connectors, inserts, steel sleeves or other such devices used as part of the falsework or formwork that remains in the permanent structure. If the plan notes indicate that the structure contains the necessary corrosion protection required for a Corrosive Site, epoxy coat, galvanize or metalize these devices. Electroplating will not be allowed. Any coating required by the Engineer will be considered incidental to the various pay items requiring temporary works.

Design falsework and formwork requiring submittals in accordance with the 1995 AASHTO *Guide Design Specifications for Bridge Temporary Works* except as noted herein.

1. Wind Loads

Table 2.2 of Article 2.2.5.1 is modified to include wind velocities up to 110 mph. In addition, Table 2.2A is included to provide the maximum wind speeds by county in North Carolina.

Table 2.2 - Wind Pressure Values

Height Zone feet above ground	Pressure, lb/ft ² for Indicated Wind Velocity, mph				
	70	80	90	100	110
0 to 30	15	20	25	30	35
30 to 50	20	25	30	35	40
50 to 100	25	30	35	40	45
over 100	30	35	40	45	50

2. Time of Removal

The following requirements replace those of Article 3.4.8.2.

Do not remove forms until the concrete has attained strengths required in Article 420-16 of the Standard Specifications and these Special Provisions.

Do not remove forms until the concrete has sufficient strength to prevent damage to the surface.

Table 2.2A - Steady State Maximum Wind Speeds by Counties in North Carolina

COUNTY	25 YR (mph)	COUNTY	25 YR (mph)	COUNTY	25 YR (mph)
Alamance	70	Franklin	70	Pamlico	100
Alexander	70	Gaston	70	Pasquotank	100
Alleghany	70	Gates	90	Pender	100
Anson	70	Graham	80	Perquimans	100
Ashe	70	Granville	70	Person	70
Avery	70	Greene	80	Pitt	90
Beaufort	100	Guilford	70	Polk	80
Bertie	90	Halifax	80	Randolph	70
Bladen	90	Harnett	70	Richmond	70
Brunswick	100	Haywood	80	Robeson	80
Buncombe	80	Henderson	80	Rockingham	70
Burke	70	Hertford	90	Rowan	70
Cabarrus	70	Hoke	70	Rutherford	70
Caldwell	70	Hyde	110	Sampson	90
Camden	100	Iredell	70	Scotland	70
Carteret	110	Jackson	80	Stanley	70
Caswell	70	Johnston	80	Stokes	70
Catawba	70	Jones	100	Surry	70
Cherokee	80	Lee	70	Swain	80
Chatham	70	Lenoir	90	Transylvania	80
Chowan	90	Lincoln	70	Tyrell	100
Clay	80	Macon	80	Union	70
Cleveland	70	Madison	80	Vance	70
Columbus	90	Martin	90	Wake	70
Craven	100	McDowell	70	Warren	70
Cumberland	80	Mecklenburg	70	Washington	100
Currituck	100	Mitchell	70	Watauga	70
Dare	110	Montgomery	70	Wayne	80
Davidson	70	Moore	70	Wilkes	70
Davie	70	Nash	80	Wilson	80
Duplin	90	New Hanover	100	Yadkin	70
Durham	70	Northampton	80	Yancey	70
Edgecombe	80	Onslow	100		
Forsyth	70	Orange	70		

B. Review and Approval

The Engineer is responsible for the review and approval of temporary works' drawings.

Submit the working drawings sufficiently in advance of proposed use to allow for their review, revision (if needed), and approval without delay to the work.

The time period for review of the working drawings does not begin until complete drawings and design calculations, when required, are received by the Engineer.

Do not start construction of any temporary work for which working drawings are required until the drawings have been approved. Such approval does not relieve the Contractor of the responsibility for the accuracy and adequacy of the working drawings.

4.0 CONSTRUCTION REQUIREMENTS

All requirements of Section 420 of the Standard Specifications apply.

Construct temporary works in conformance with the approved working drawings. Ensure that the quality of materials and workmanship employed is consistent with that assumed in the design of the temporary works. Do not weld falsework members to any portion of the permanent structure unless approved. Show any welding to the permanent structure on the approved construction drawings.

Provide tell-tales attached to the forms and extending to the ground, or other means, for accurate measurement of falsework settlement. Make sure that the anticipated compressive settlement and/or deflection of falsework does not exceed 1 inch. For cast-in-place concrete structures, make sure that the calculated deflection of falsework flexural members does not exceed 1/240 of their span regardless of whether or not the deflection is compensated by camber strips.

A. Maintenance and Inspection

Inspect and maintain the temporary work in an acceptable condition throughout the period of its use. Certify that the manufactured devices have been maintained in a condition to allow them to safely carry their rated loads. Clearly mark each piece so that its capacity can be readily determined at the job site.

Perform an in-depth inspection of an applicable portion(s) of the temporary works, in the presence of the Engineer, not more than 24 hours prior to the beginning of each concrete placement. Inspect other temporary works at least once a month to ensure that they are functioning properly. Have a North Carolina Registered Professional Engineer inspect the cofferdams, shoring, sheathing, support of excavation structures, and support systems for load tests prior to loading.

B. Foundations

Determine the safe bearing capacity of the foundation material on which the supports for temporary works rest. If required by the Engineer, conduct load tests to verify proposed bearing capacity values that are marginal or in other high-risk situations.

The use of the foundation support values shown on the contract plans of the permanent structure is permitted if the foundations are on the same level and on the same soil as those of the permanent structure.

Allow for adequate site drainage or soil protection to prevent soil saturation and washout of the soil supporting the temporary works supports.

If piles are used, the estimation of capacities and later confirmation during construction using standard procedures based on the driving characteristics of the pile is permitted. If preferred, use load tests to confirm the estimated capacities; or, if required by the Engineer conduct load tests to verify bearing capacity values that are marginal or in other high risk situations.

The Engineer reviews and approves the proposed pile and soil bearing capacities.

5.0 REMOVAL

Unless otherwise permitted, remove and keep all temporary works upon completion of the work. Do not disturb or otherwise damage the finished work.

Remove temporary works in conformance with the contract documents. Remove them in such a manner as to permit the structure to uniformly and gradually take the stresses due to its own weight.

6.0 METHOD OF MEASUREMENT

Unless otherwise specified, temporary works will not be directly measured.

7.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items requiring temporary works will be full compensation for the above falsework and formwork.

SUBMITTAL OF WORKING DRAWINGS

(8-9-13)

1.0 GENERAL

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this provision. For this provision, "submittals" refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required submittals for the project. Submittals are only necessary for those items as required by the

contract. Make submittals that are not specifically noted in this provision directly to the Resident Engineer. Either the Structure Design Unit or the Geotechnical Engineering Unit or both units will jointly review submittals.

If a submittal contains variations from plan details or specifications or significantly affects project cost, field construction or operations, discuss the submittal with and submit all copies to the Resident Engineer. State the reason for the proposed variation in the submittal. To minimize review time, make sure all submittals are complete when initially submitted. Provide a contact name and information with each submittal. Direct any questions regarding submittal requirements to the Resident Engineer, Structure Design Unit contacts or the Geotechnical Engineering Unit contacts noted below.

In order to facilitate in-plant inspection by NCDOT and approval of working drawings, provide the name, address and telephone number of the facility where fabrication will actually be done if different than shown on the title block of the submitted working drawings. This includes, but is not limited to, precast concrete items, prestressed concrete items and fabricated steel or aluminum items.

2.0 ADDRESSES AND CONTACTS

For submittals to the Structure Design Unit, use the following addresses:

Via US mail:

Mr. G. R. Perfetti, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1581 Mail Service Center
Raleigh, NC 27699-1581

Attention: Mr. P. D. Lambert, P. E.

Via other delivery service:

Mr. G. R. Perfetti, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1000 Birch Ridge Drive
Raleigh, NC 27610

Attention: Mr. P. D. Lambert, P. E.

Submittals may also be made via email.

Send submittals to:

plambert@ncdot.gov (Paul Lambert)

Send an additional e-copy of the submittal to the following address:

jgaither@ncdot.gov (James Gaither)

jlbolden@ncdot.gov (James Bolden)

For submittals to the Geotechnical Engineering Unit, use the following addresses:

For projects in Divisions 1-7, use the following Eastern Regional Office address:

Via US mail:

Mr. K. J. Kim, Ph. D., P. E.
 Eastern Regional Geotechnical
 Manager
 North Carolina Department
 of Transportation
 Geotechnical Engineering Unit
 Eastern Regional Office
 1570 Mail Service Center
 Raleigh, NC 27699-1570

Via other delivery service:

Mr. K. J. Kim, Ph. D., P. E.
 Eastern Regional Geotechnical
 Manager
 North Carolina Department
 of Transportation
 Geotechnical Engineering Unit
 Eastern Regional Office
 3301 Jones Sausage Road, Suite 100
 Garner, NC 27529

For projects in Divisions 8-14, use the following Western Regional Office address:

Via US mail:

Mr. Eric Williams, P. E.
 Western Regional Geotechnical
 Manager
 North Carolina Department
 of Transportation
 Geotechnical Engineering Unit
 Western Regional Office
 5253 Z Max Boulevard
 Harrisburg, NC 28075

Via other delivery service:

Mr. Eric Williams, P. E.
 Western Region Geotechnical
 Manager
 North Carolina Department
 of Transportation
 Geotechnical Engineering Unit
 Western Regional Office
 5253 Z Max Boulevard
 Harrisburg, NC 28075

The status of the review of structure-related submittals sent to the Structure Design Unit can be viewed from the Unit's web site, via the "Contractor Submittal" link.

Direct any questions concerning submittal review status, review comments or drawing markups to the following contacts:

Primary Structures Contact: Paul Lambert (919) 707 – 6407
 (919) 250 – 4082 facsimile
plambert@ncdot.gov

Secondary Structures Contacts: James Gaither (919) 707 – 6409
 James Bolden (919) 707 – 6408

Eastern Regional Geotechnical Contact (Divisions 1-7):

K. J. Kim (919) 662 – 4710
 (919) 662 – 3095 facsimile
kkim@ncdot.gov

Western Regional Geotechnical Contact (Divisions 8-14):

Eric Williams (704) 455 – 8902
 (704) 455 – 8912 facsimile
ewilliams@ncdot.gov

3.0 SUBMITTAL COPIES

Furnish one complete copy of each submittal, including all attachments, to the Resident Engineer. At the same time, submit the number of hard copies shown below of the same complete submittal directly to the Structure Design Unit and/or the Geotechnical Engineering Unit.

The first table below covers “Structure Submittals”. The Resident Engineer will receive review comments and drawing markups for these submittals from the Structure Design Unit. The second table in this section covers “Geotechnical Submittals”. The Resident Engineer will receive review comments and drawing markups for these submittals from the Geotechnical Engineering Unit.

Unless otherwise required, submit one set of supporting calculations to either the Structure Design Unit or the Geotechnical Engineering Unit unless both units require submittal copies in which case submit a set of supporting calculations to each unit. Provide additional copies of any submittal as directed.

STRUCTURE SUBMITTALS

Submittal	Copies Required by Structure Design Unit	Copies Required by Geotechnical Engineering Unit	Contract Reference Requiring Submittal ¹
Arch Culvert Falsework	5	0	Plan Note, SN Sheet & “Falsework and Formwork”
Box Culvert Falsework ⁷	5	0	Plan Note, SN Sheet & “Falsework and Formwork”
Cofferdams	6	2	Article 410-4
Foam Joint Seals ⁶	9	0	“Foam Joint Seals”
Expansion Joint Seals (hold down plate type with base angle)	9	0	“Expansion Joint Seals”
Expansion Joint Seals (modular)	2, then 9	0	“Modular Expansion Joint Seals”

Expansion Joint Seals (strip seals)	9	0	“Strip Seals”
Falsework & Forms ² (substructure)	8	0	Article 420-3 & “Falsework and Formwork”
Falsework & Forms (superstructure)	8	0	Article 420-3 & “Falsework and Formwork”
Girder Erection over Railroad	5	0	Railroad Provisions
Maintenance and Protection of Traffic Beneath Proposed Structure	8	0	“Maintenance and Protection of Traffic Beneath Proposed Structure at Station ____”
Metal Bridge Railing	8	0	Plan Note
Metal Stay-in-Place Forms	8	0	Article 420-3
Metalwork for Elastomeric Bearings ^{4,5}	7	0	Article 1072-8
Miscellaneous Metalwork ^{4,5}	7	0	Article 1072-8
Optional Disc Bearings ⁴	8	0	“Optional Disc Bearings”
Overhead and Digital Message Signs (DMS) (metalwork and foundations)	13	0	Applicable Provisions
Placement of Equipment on Structures (cranes, etc.)	7	0	Article 420-20
Pot Bearings ⁴	8	0	“Pot Bearings”
Precast Concrete Box Culverts	2, then 1 reproducible	0	“Optional Precast Reinforced Concrete Box Culvert at Station ____”
Prestressed Concrete Cored Slab (detensioning sequences) ³	6	0	Article 1078-11
Prestressed Concrete Deck Panels	6 and 1 reproducible	0	Article 420-3
Prestressed Concrete Girder (strand elongation and detensioning sequences)	6	0	Articles 1078-8 and 1078- 11
Removal of Existing Structure over Railroad	5	0	Railroad Provisions

Revised Bridge Deck Plans (adaptation to prestressed deck panels)	2, then 1 reproducible	0	Article 420-3
Revised Bridge Deck Plans (adaptation to modular expansion joint seals)	2, then 1 reproducible	0	“Modular Expansion Joint Seals”
Sound Barrier Wall (precast items)	10	0	Article 1077-2 & “Sound Barrier Wall”
Sound Barrier Wall Steel Fabrication Plans ⁵	7	0	Article 1072-8 & “Sound Barrier Wall”
Structural Steel ⁴	2, then 7	0	Article 1072-8
Temporary Detour Structures	10	2	Article 400-3 & “Construction, Maintenance and Removal of Temporary Structure at Station _____”
TFE Expansion Bearings ⁴	8	0	Article 1072-8

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Articles refer to the *Standard Specifications*.
2. Submittals for these items are necessary only when required by a note on plans.
3. Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials & Tests Unit.
4. The fabricator may submit these items directly to the Structure Design Unit.
5. The two sets of preliminary submittals required by Article 1072-8 of the *Standard Specifications* are not required for these items.
6. Submittals for Fabrication Drawings are not required. Submittals for Catalogue Cuts of Proposed Material are required. See Section 5.A of the referenced provision.
7. Submittals are necessary only when the top slab thickness is 18” or greater.

GEOTECHNICAL SUBMITTALS

Submittal	Copies Required by Geotechnical Engineering Unit	Copies Required by Structure Design Unit	Contract Reference Requiring Submittal ¹
Drilled Pier Construction Plans ²	1	0	Subarticle 411-3(A)
Crosshole Sonic Logging (CSL) Reports ²	1	0	Subarticle 411-5(A)(2)
Pile Driving Equipment Data Forms ^{2,3}	1	0	Subarticle 450-3(D)(2)
Pile Driving Analyzer (PDA) Reports ²	1	0	Subarticle 450-3(F)(3)
Retaining Walls ⁴	8 drawings, 2 calculations	2 drawings	Applicable Provisions
Temporary Shoring ⁴	5 drawings, 2 calculations	2 drawings	“Temporary Shoring” & “Temporary Soil Nail Walls”

FOOTNOTES

- References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Subarticles refer to the *Standard Specifications*.
- Submit one hard copy of submittal to the Resident or Bridge Maintenance Engineer. Submit a second copy of submittal electronically (PDF via email) or by facsimile, US mail or other delivery service to the appropriate Geotechnical Engineering Unit regional office. Electronic submission is preferred.
- The Pile Driving Equipment Data Form is available from:
www.ncdot.org/doh/preconstruct/highway/geotech/formdet/
See second page of form for submittal instructions.
- Electronic copy of submittal is required. See referenced provision.

CRANE SAFETY**(8-15-05)**

Comply with the manufacturer specifications and limitations applicable to the operation of any and all cranes and derricks. Prime contractors, sub-contractors, and fully operated rental companies shall comply with the current Occupational Safety and Health Administration regulations (OSHA).

Submit all items listed below to the Engineer prior to beginning crane operations involving critical lifts. A critical lift is defined as any lift that exceeds 75 percent of the manufacturer's crane chart capacity for the radius at which the load will be lifted or requires the use of more than one crane. Changes in personnel or equipment must be reported to the Engineer and all applicable items listed below must be updated and submitted prior to continuing with crane operations.

CRANE SAFETY SUBMITTAL LIST

- A. **Competent Person:** Provide the name and qualifications of the "Competent Person" responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.
- B. **Riggers:** Provide the qualifications and experience of the persons responsible for rigging operations. Qualifications and experience should include, but not be limited to, weight calculations, center of gravity determinations, selection and inspection of sling and rigging equipment, and safe rigging practices.
- C. **Crane Inspections:** Inspection records for all cranes shall be current and readily accessible for review upon request.
- D. **Certifications:** By July 1, 2006, crane operators performing critical lifts shall be certified by NC CCO (National Commission for the Certification of Crane Operators), or satisfactorily complete the Carolinas AGC's Professional Crane Operator's Proficiency Program. Other approved nationally accredited programs will be considered upon request. All crane operators shall also have a current CDL medical card. Submit a list of anticipated critical lifts and corresponding crane operator(s). Include current certification for the type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

GROUT FOR STRUCTURES**9-30-11****1.0 DESCRIPTION**

This special provision addresses grout for use in pile blockouts, grout pockets, shear keys, dowel holes and recesses for structures. This provision does not apply to grout placed in post-tensioning ducts for bridge beams, girders, or decks. Mix and place grout in

accordance with the manufacturer's recommendations, the applicable sections of the Standard Specifications and this provision.

2.0 MATERIAL REQUIREMENTS

Use a Department approved pre-packaged, non-shrink, non-metallic grout. Contact the Materials and Tests Unit for a list of approved pre-packaged grouts and consult the manufacturer to determine if the pre-packaged grout selected is suitable for the required application.

When using an approved pre-packaged grout, a grout mix design submittal is not required.

The grout shall be free of soluble chlorides and contain less than one percent soluble sulfate. Supply water in compliance with Article 1024-4 of the Standard Specifications.

Aggregate may be added to the mix only where recommended or permitted by the manufacturer and Engineer. The quantity and gradation of the aggregate shall be in accordance with the manufacturer's recommendations.

Admixtures, if approved by the Department, shall be used in accordance with the manufacturer's recommendations. The manufacture date shall be clearly stamped on each container. Admixtures with an expired shelf life shall not be used.

The Engineer reserves the right to reject material based on unsatisfactory performance.

Initial setting time shall not be less than 10 minutes when tested in accordance with ASTM C266.

Test the expansion and shrinkage of the grout in accordance with ASTM C1090. The grout shall expand no more than 0.2% and shall exhibit no shrinkage. Furnish a Type 4 material certification showing results of tests conducted to determine the properties listed in the Standard Specifications and to assure the material is non-shrink.

Unless required elsewhere in the contract the compressive strength at 3 days shall be at least 5000 psi. Compressive strength in the laboratory shall be determined in accordance with ASTM C109 except the test mix shall contain only water and the dry manufactured material. Compressive strength in the field will be determined by molding and testing 4" x 8" cylinders in accordance with AASHTO T22. Construction loading and traffic loading shall not be allowed until the 3 day compressive strength is achieved.

When tested in accordance with ASTM C666, Procedure A, the durability factor of the grout shall not be less than 80.

3.0 SAMPLING AND PLACEMENT

Place and maintain components in final position until grout placement is complete and accepted. Concrete surfaces to receive grout shall be free of defective concrete, laitance,

oil, grease and other foreign matter. Saturate concrete surfaces with clean water and remove excess water prior to placing grout.

Do not place grout if the grout temperature is less than 50°F or more than 90°F or if the air temperature measured at the location of the grouting operation in the shade away from artificial heat is below 45°F.

Provide grout at a rate that permits proper handling, placing and finishing in accordance with the manufacturer's recommendations unless directed otherwise by the Engineer. Use grout free of any lumps and undispersed cement. Agitate grout continuously before placement.

Control grout delivery so the interval between placing batches in the same component does not exceed 20 minutes.

The Engineer will determine the locations to sample grout and the number and type of samples collected for field and laboratory testing. The compressive strength of the grout will be considered the average compressive strength test results of 3 cube or 2 cylinder specimens at 28 days.

4.0 BASIS OF PAYMENT

No separate payment will be made for "Grout for Structures". The cost of the material, equipment, labor, placement, and any incidentals necessary to complete the work shall be considered incidental to the structure item requiring grout.

PROJECT SPECIAL PROVISION

(10-18-95) (Rev. 2-18-14)

Z-1

PERMITS

The Contractor's attention is directed to the following permits, which have been issued to the Department of Transportation by the authority granting the permit.

<u>PERMIT</u>	<u>AUTHORITY GRANTING THE PERMIT</u>
Dredge and Fill and/or Work in Navigable Waters (404)	U. S. Army Corps of Engineers
Water Quality (401)	Division of Environmental Management, DENR State of North Carolina

The Contractor shall comply with all applicable permit conditions during construction of this project. Those conditions marked by * are the responsibility of the Department and the Contractor has no responsibility in accomplishing those conditions.

Agents of the permitting authority will periodically inspect the project for adherence to the permits.

The Contractor's attention is also directed to Articles 107-10 and 107-13 of the *2012 Standard Specifications* and the following:

Should the Contractor propose to utilize construction methods (such as temporary structures or fill in waters and/or wetlands for haul roads, work platforms, cofferdams, etc.) not specifically identified in the permit (individual, general, or nationwide) authorizing the project it shall be the Contractor's responsibility to coordinate with the Engineer to determine what, if any, additional permit action is required. The Contractor shall also be responsible for initiating the request for the authorization of such construction method by the permitting agency. The request shall be submitted through the Engineer. The Contractor shall not utilize the construction method until it is approved by the permitting agency. The request normally takes approximately 60 days to process; however, no extensions of time or additional compensation will be granted for delays resulting from the Contractor's request for approval of construction methods not specifically identified in the permit.

Where construction moratoriums are contained in a permit condition which restricts the Contractor's activities to certain times of the year, those moratoriums will apply only to the portions of the work taking place in the waters or wetlands provided that activities outside those areas is done in such a manner as to not affect the waters or wetlands.

**U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT**

Action ID. 2010-00031

County: Gaston

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Property Owner / Authorized Agent: North Carolina Department of Transportation
Attn: Mr. Phil Harris

Address: 1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Telephone No.: 919-707-6103

Size and location of property (water body, road name/number, town, etc.): The project is located on I-85 Northbound from SR 1302 to SR 1307 near Bessemer City in Gaston County, North Carolina.

Description of projects area and activity: In order to build a new weigh station, the permittee is authorized to impact waters of the U.S. as follows:

Summary of Authorized Impacts and Required Mitigation

Impact ID #	NWP / GP #	Open Water (ac)		Wetland (ac)		Stream (lf)	
		Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
Site 1 (unnamed tributary to Abernathy Creek)	<u>13, 23, and 33</u>					27 (dewater)	30 (fill/culvert)
Site 1A (unnamed tributary to Abernathy Creek)	<u>13, 23, and 33</u>						18 (fill/stabilization)
Site 2 (unnamed tributary to Abernathy Creek)	<u>13, 23, and 33</u>					65 (dewater)	92 (fill/culvert)
Site 2A (unnamed tributary to Abernathy Creek)	<u>13, 23, and 33</u>						40 (fill/stabilization)
Site 3 (unnamed tributary to Crowders Creek)	<u>13, 23, and 33</u>					18 (dewater)	16 (fill/culvert)
Site 3A (unnamed tributary to Crowders Creek)	<u>13, 23, and 33</u>						27 (fill/energy dissipater)
Impact Totals							
Total Loss of Waters of the U.S. (ac)		Total Loss of Waters of the U.S. (lf)				138	
Required Wetland Mitigation (ac)		Required Stream Mitigation (lf)				303	

Applicable Law: Section 404 (Clean Water Act, 33 USC 1344)
 Section 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: Regional General Permit Number:
Nationwide Permit Number: 13, 23, and 33

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the attached conditions, your submitted plans, and the following special conditions:

Special Conditions

1. All work must be performed in strict compliance with the description of work and plans in the application dated July 5, 2013. Any modification to the description of work and/or the permit plans must be approved by the USACE prior to implementation.
2. In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit authorization.
3. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this authorization letter in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this authorization letter, all conditions, and any authorized modifications. A copy of this authorization letter, all conditions, and any authorized modifications, shall be available at the project site during construction and maintenance of this project.
4. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area.
5. The permittee will report any violation of these conditions or violations of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act in writing to the Wilmington District, U. S Army Corps of Engineers, within 24 hours of the permittee's discovery of the violation.

Any violation of the noted conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order and/or appropriate legal action.

This verification will remain valid until the expiration date identified below unless the nationwide authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide permit authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Quality (telephone 919-807-6300) to determine Section 401 requirements.

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits.

If there are any questions regarding this verification, any of the conditions of the Permit, or the Corps of Engineers regulatory program, please contact Lori Beckwith at 828-271-7980.

Corps Regulatory Official: Lori Beckwith

Date: **August 20, 2013**

Expiration Date of Verification: **March 18, 2017**

Determination of Jurisdiction:

- A. Based on preliminary information, there appear to be waters of the US including wetlands within the above described project area. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331).
- B. There are Navigable Waters of the United States within the above described project area subject to the permit requirements of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.
- C. There are waters of the US and/or wetlands within the above described project area subject to the permit requirements of Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.
- D. The jurisdictional areas within the above described project area have been identified under a previous action. Please reference jurisdictional determination issued on June 26, 2012, under Action ID number SAW-2010-00031. This determination expires five years from issue date.

Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

Corps Regulatory Official: **Lori Beckwith**

SURVEY PLATS, FIELD SKETCH, WETLAND DELINEATION FORMS, PROJECT PLANS, ETC.,
MUST BE ATTACHED TO THE FILE COPY OF THIS FORM, IF REQUIRED OR AVAILABLE.

Copy Furnished: By e-mail - NCDOT Mr. Bill Barrett

R-5

Permit Number: 2010-00031
Permit Type: NW13, 23, and 33
Name of County: Gaston
Name of Permittee: North Carolina Department of Transportation, Attn: Mr. Phil Harris
Date of Issuance: August 20, 2013
Project Manager: Lori Beckwith

X Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

U.S. Army Corps of Engineers
Attention: CESA W-RG-A
151 Patton Avenue, Room 208
Asheville, North Carolina 28801-5006

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit conditions.

Signature of Permittee

Date

*** Compensatory Mitigation Responsibility Transfer Form**

Permittee: North Carolina Department of Transportation
Project Name: TIP No. I-4928

Action ID: SAW-2010-00031
County: Gaston

Instructions to Permittee: The Permittee must provide a copy of this form to the Mitigation Sponsor, either an approved Mitigation Bank or the North Carolina Ecosystem Enhancement Program (NCEEP), who will then sign the form to verify the transfer of the mitigation responsibility. Once the Sponsor has signed this form, it is the Permittee's responsibility to ensure that to the U.S. Army Corps of Engineers (USACE) Project Manager identified on page two is in receipt of a signed copy of this form before conducting authorized impacts, unless otherwise specified below. If more than one mitigation Sponsor will be used to provide the mitigation associated with the permit, or if the impacts and/or the mitigation will occur in more than one 8-digit Hydrologic Unit Code (HUC), multiple forms will be attached to the permit, and the separate forms for each Sponsor and/or HUC must be provided to the appropriate mitigation Sponsors.

Instructions to Sponsor: The Sponsor must verify that the mitigation requirements shown below are available at the identified site. By signing below, the Sponsor is accepting full responsibility for the identified mitigation, regardless of whether or not they have received payment from the Permittee. Once the form is signed, the Sponsor must update the appropriate ledger and provide a copy of the signed form to the Permittee and to the USACE Bank/In-Lieu Fee Program Manager. The Sponsor must also comply with all reporting requirements established in their authorizing instrument.

Permitted Impacts and Compensatory Mitigation Requirements:

Permitted Impacts Requiring Mitigation* **8-digit HUC and Basin:** 03050101, Catawba River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-riverine	Non-Riparian	Coastal
165						

*If more than one mitigation sponsor will be used for the permit, only include impacts to be mitigated by this sponsor.

Compensatory Mitigation Requirements: **8-digit HUC and Basin:** 03050101, Catawba River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-riverine	Non-Riparian	Coastal
303						

Mitigation Site Debited: NCEEP

(List the name of the bank to be debited. For umbrella banks, also list the specific site. For NCEEP, list NCEEP. If the NCEEP acceptance letter identifies a specific site, also list the specific site to be debited).

Section to be completed by the Mitigation Sponsor

Statement of Mitigation Liability Acceptance: I, the undersigned, verify that I am authorized to approve mitigation transactions for the Mitigation Sponsor shown below, and I certify that the Sponsor agrees to accept full responsibility for providing the mitigation identified in this document (see the table above), associated with the USACE Permittee and Action ID number shown. I also verify that released credits (and/or advance credits for NCEEP), as approved by the USACE, are currently available at the mitigation site identified above. Further, I understand that if the Sponsor fails to provide the required compensatory mitigation, the USACE Wilmington District Engineer may pursue measures against the Sponsor to ensure compliance associated with the mitigation requirements.

Mitigation Sponsor Name: _____

Name of Sponsor's Authorized Representative: _____

Signature of Sponsor's Authorized Representative

Date of Signature

Conditions for Transfer of Compensatory Mitigation Credit:

- Once this document has been signed by the Mitigation Sponsor and the USACE is in receipt of the signed form, the Permittee is no longer responsible for providing the mitigation identified in this form, though the Permittee remains responsible for any other mitigation requirements stated in the permit conditions.
- Construction within jurisdictional areas authorized by the permit identified on page one of this form can begin only after the USACE is in receipt of a copy of this document signed by the Sponsor, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein. For authorized impacts conducted by the North Carolina Department of Transportation (NCDOT), construction within jurisdictional areas may proceed upon permit issuance; however, a copy of this form signed by the Sponsor must be provided to the USACE within 30 days of permit issuance. NCDOT remains fully responsible for the mitigation until the USACE has received this form, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein.
- Signed copies of this document must be retained by the Permittee, Mitigation Sponsor, and in the USACE administrative records for both the permit and the Bank/ILF Instrument. It is the Permittee's responsibility to ensure that the USACE Project Manager (address below) is provided with a signed copy of this form.
- If changes are proposed to the type, amount, or location of mitigation after this form has been signed and returned to the USACE, the Sponsor must obtain case-by-case approval from the USACE Project Manager and/or North Carolina Interagency Review Team (NCIRT). If approved, higher mitigation ratios may be applied, as per current District guidance and a new version of this form must be completed and included in the USACE administrative records for both the permit and the Bank/ILF Instrument.

Comments/Additional Conditions:

138' @ 2:1 = 276

27' @ 1:1 = 27

Total = 303

This form is not valid unless signed by the mitigation Sponsor and USACE Project Manager. For questions regarding this form or any of the conditions of the permit authorization, contact the Project Manager at the address below.

USACE Project Manager: Lori Beckwith
USACE Field Office: Asheville Regulatory Field Office
US Army Corps of Engineers
151 Patton Avenue, Room 208
Asheville, North Carolina 28801-5006

Email: loretta.a.beckwith@usace.army.mil

Lori Beckwith
USACE Project Manager Signature

August 20, 2013
Date of Signature

Current Wilmington District mitigation guidance, including information on mitigation ratios, functional assessments, and mitigation bank location and availability, and credit classifications (including stream temperature and wetland groupings) is available at <http://ribits.usace.army.mil>.

**NATIONWIDE PERMIT 13
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
FINAL NOTICE OF ISSUANCE AND MODIFICATION OF NATIONWIDE PERMITS
FEDERAL REGISTER
AUTHORIZED MARCH 19, 2012**

Bank Stabilization. Bank stabilization activities necessary for erosion prevention, provided the activity meets all of the following criteria:

- (a) No material is placed in excess of the minimum needed for erosion protection;
- (b) The activity is no more than 500 feet in length along the bank, unless the district engineer waives this criterion by making a written determination concluding that the discharge will result in minimal adverse effects;
- (c) The activity will not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark or the high tide line, unless the district engineer waives this criterion by making a written determination concluding that the discharge will result in minimal adverse effects;
- (d) The activity does not involve discharges of dredged or fill material into special aquatic sites, unless the district engineer waives this criterion by making a written determination concluding that the discharge will result in minimal adverse effects;
- (e) No material is of a type, or is placed in any location, or in any manner, that will impair surface water flow into or out of any waters of the United States;
- (f) No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored trees and treetops may be used in low energy areas); and,
- (g) The activity is not a stream channelization activity.

This NWP also authorizes temporary structures, fills, and work necessary to construct the bank stabilization activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

Invasive plant species shall not be used for bioengineering or vegetative bank stabilization.

- * **Notification:** The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if the bank stabilization activity: (1) involves discharges into special aquatic sites; or (2) is in excess of 500 feet in length; or (3) will involve the discharge of greater than an average of one cubic yard per running foot along the bank below the plane of the ordinary high water mark or the high tide line. (See general condition 31.) (Sections 10 and 404)

**NATIONWIDE PERMIT 23
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
FINAL NOTICE OF ISSUANCE AND MODIFICATION OF NATIONWIDE PERMITS
FEDERAL REGISTER
AUTHORIZED MARCH 19, 2012**

Approved Categorical Exclusions. Activities undertaken, assisted, authorized, regulated, funded, or financed, in whole or in part, by another Federal agency or department where:

(a) That agency or department has determined, pursuant to the Council on Environmental Quality's implementing regulations for the National Environmental Policy Act (40 CFR part 1500 et seq.), that the activity is categorically excluded from environmental documentation, because it is included within a category of actions which neither individually nor cumulatively have a significant effect on the human environment; and

(b) The Office of the Chief of Engineers (Attn: CECW-CO) has concurred with that agency's or department's determination that the activity is categorically excluded and approved the activity for authorization under NWP 23.

The Office of the Chief of Engineers may require additional conditions, including pre-construction notification, for authorization of an agency's categorical exclusions under this NWP.

* **Notification:** Certain categorical exclusions approved for authorization under this NWP require the permittee to submit a pre-construction notification to the district engineer prior to commencing the activity (see general condition 31). The activities that require pre-construction notification are listed in the appropriate Regulatory Guidance Letters. (Sections 10 and 404)

Note: The agency or department may submit an application for an activity believed to be categorically excluded to the Office of the Chief of Engineers (Attn: CECW-CO). Prior to approval for authorization under this NWP of any agency's activity, the Office of the Chief of Engineers will solicit public comment. As of the date of issuance of this NWP, agencies with approved categorical exclusions are the: Bureau of Reclamation, Federal Highway Administration, and U.S. Coast Guard. Activities approved for authorization under this NWP as of the date of this notice are found in Corps Regulatory Guidance Letter 05-07, which is available at:

<http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/GuidanceLetters.aspx> . Any future approved categorical exclusions will be announced in Regulatory Guidance Letters and posted on this same web site.

NATIONWIDE PERMIT 33
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
FINAL NOTICE OF ISSUANCE AND MODIFICATION OF NATIONWIDE PERMITS
FEDERAL REGISTER
AUTHORIZED MARCH 19, 2012

Temporary Construction, Access, and Dewatering. Temporary structures, work, and discharges, including cofferdams, necessary for construction activities or access fills or dewatering of construction sites, provided that the associated primary activity is authorized by the Corps of Engineers or the U.S. Coast Guard. This NWP also authorizes temporary structures, work, and discharges, including cofferdams, necessary for construction activities not otherwise subject to the Corps or U.S. Coast Guard permit requirements. Appropriate measures must be taken to maintain near normal downstream flows and to minimize flooding. Fill must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. The use of dredged material may be allowed if the district engineer determines that it will not cause more than minimal adverse effects on aquatic resources. Following completion of construction, temporary fill must be entirely removed to an area that has no waters of the United States, dredged material must be returned to its original location, and the affected areas must be restored to pre-construction elevations. The affected areas must also be revegetated, as appropriate. This permit does not authorize the use of cofferdams to dewater wetlands or other aquatic areas to change their use. Structures left in place after construction is completed require a separate section 10 permit if located in navigable waters of the United States. (See 33 CFR part 322.)

* **Notification:** The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity (see general condition 31). The pre-construction notification must include a restoration plan showing how all temporary fills and structures will be removed and the area restored to pre-project conditions. (Sections 10 and 404)

NATIONWIDE PERMIT CONDITIONS

The following General Conditions must be followed in order for any authorization by a NWP to be valid:

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the NWP activity, or whether additional ESA consultation is necessary.

* (c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

(e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, The Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide web pages at <http://www.fws.gov/> or <http://www.fws.gov/ipac> and <http://www.noaa.gov/fisheries.html> respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for obtaining any “take” permits required under the U.S. Fish and Wildlife Service’s regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the U.S. Fish and Wildlife Service to determine if such “take” permits are required for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address section 106 compliance for the NWP activity, or whether additional section 106 consultation is necessary.

* (c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties on which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA

section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWP 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 31, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal, and provides a project-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in minimal adverse effects on the aquatic environment.

(2) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

(3) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) – (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).

(4) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.

(5) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream rehabilitation, enhancement, or preservation, to ensure that the activity results in minimal adverse effects on the aquatic environment.

(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2-acre of waters of

the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWP.

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the restoration or establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to establish a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or establishing a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(g) Permittees may propose the use of mitigation banks, in-lieu fee programs, or separate permittee-responsible mitigation. For activities resulting in the loss of marine or estuarine resources, permittee-responsible compensatory mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

“When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.”

(Transferee)

(Date)

* 30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized work was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the work and mitigation.

* 31. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 20 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the United States expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(4) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(5) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States, for NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of intermittent and ephemeral stream bed, and for all NWP 48 activities that require pre-construction notification, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(4) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

D. District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. For a linear project, this determination will include an evaluation of the individual crossings to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to intermittent or ephemeral streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51 or 52, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in minimal adverse effects. When making minimal effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. The district engineer will also consider site specific factors, such as the environmental setting in the

vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

2. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

3. If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (a) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (c) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period, with activity-specific

conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

FURTHER INFORMATION

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project.

DEFINITIONS

Best management practices (BMPs): Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: Effects that are caused by the activity and occur at the same time and place.

Discharge: The term “discharge” means any discharge of dredged or fill material.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

High Tide Line: The line of intersection of the land with the water’s surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence

of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Independent utility: A test to determine what constitutes a single and complete non-linear project in the Corps regulatory program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Loss of waters of the United States: Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. The loss of stream bed includes the linear feet of stream bed that is filled or excavated. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities eligible for exemptions under Section 404(f) of the Clean Water Act are not considered when calculating the loss of waters of the United States.

Non-tidal wetland: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. The definition of a wetland can be found at 33 CFR 328.3(b). Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open water: For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of standing or

flowing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of “open waters” include rivers, streams, lakes, and ponds.

Ordinary High Water Mark: An ordinary high water mark is a line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas (see 33 CFR 328.3(e)).

Perennial stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Pre-construction notification: A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a coarse substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Riparian areas: Riparian areas are lands adjacent to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through

which surface and subsurface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, non-wetland waters, or uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 23.)

Shellfish seeding: The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

Single and complete linear project: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term “single and complete project” is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Single and complete non-linear project: For non-linear projects, the term “single and complete project” is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of “independent utility”). Single and complete non-linear projects may not be “piecemealed” to avoid the limits in an NWP authorization.

Stormwater management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater management facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream channelization: The manipulation of a stream’s course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent

mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Tidal wetland: A tidal wetland is a wetland (i.e., water of the United States) that is inundated by tidal waters. The definitions of a wetland and tidal waters can be found at 33 CFR 328.3(b) and 33 CFR 328.3(f), respectively. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line, which is defined at 33 CFR 328.3(d).

Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWP, a waterbody is a jurisdictional water of the United States. If a jurisdictional wetland is adjacent – meaning bordering, contiguous, or neighboring – to a waterbody determined to be a water of the United States under 33 CFR 328.3(a)(1)-(6), that waterbody and its adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)). Examples of “waterbodies” include streams, rivers, lakes, ponds, and wetlands.

Final Regional Conditions 2012

NOTICE ABOUT WEB LINKS IN THIS DOCUMENT:

The web links (both internal to our District and any external links to collaborating agencies) in this document are valid at the time of publication. However, the Wilmington District Regulatory Program web page addresses, as with other agency web sites, may change over the timeframe of the five-year Nationwide Permit renewal cycle, in response to policy mandates or technology advances. While we will make every effort to check on the integrity of our web links and provide re-direct pages whenever possible, we ask that you report any broken links to us so we can keep the page information current and usable. We apologize in advanced for any broken links that you may encounter, and we ask that you navigate from the regulatory home page (wetlands and stream permits) of the Wilmington District Corps of Engineers, to the "Permits" section of our web site to find links for pages that cannot be found by clicking directly on the listed web link in this document.

**Final 2012 Regional Conditions for Nationwide Permits (NWP) in the
Wilmington District**

1.0 Excluded Waters

The Corps has identified waters that will be excluded from the use of all NWP's during certain timeframes. These waters are:

1.1 Anadromous Fish Spawning Areas

Waters of the United States identified by either the North Carolina Division of Marine Fisheries (NCDMF) or the North Carolina Wildlife Resources Commission (NCWRC) as anadromous fish spawning areas are excluded during the period between February 15 and June 30, without prior written approval from NCDMF or NCWRC and the Corps.

1.2 Trout Waters Moratorium

Waters of the United States in the twenty-five designated trout counties of North Carolina are excluded during the period between October 15 and April 15 without prior written approval from the NCWRC. (See Section 2.7 for a list of the twenty-five trout counties).

1.3 Sturgeon Spawning Areas as Designated by the National Marine Fisheries Service (NMFS)

Waters of the United States designated as sturgeon spawning areas are excluded during the period between February 1 and June 30, without prior written approval from the NMFS.

*** 2.0 Waters Requiring Additional Notification**

The Corps has identified waters that will be subject to additional notification requirements for activities authorized by all NWP's. These waters are:

*** 2.1 Western NC Counties that Drain to Designated Critical Habitat**

For proposed activities within Waters of the U.S. that require a Pre-Construction Notification pursuant to General Condition 31 (PCN) and are located in the sixteen counties listed below, applicants must provide a copy of the PCN to the US Fish and Wildlife Service, 160 Zillicoa Street, Asheville, North Carolina 28801. This PCN must be sent concurrently to the US Fish and Wildlife Service and the Corps Asheville Regulatory Field Office. Please see General Condition 18 for specific notification requirements related to Federally Endangered Species and the following website for information on the location of designated critical habitat.

Counties with tributaries that drain to designated critical habitat that require notification to the Asheville US Fish and Wildlife Service: Avery, Cherokee, Forsyth, Graham, Haywood, Henderson, Jackson, Macon Mecklenburg, Mitchell, Stokes, Surry, Swain, Transylvania, Union and Yancey.

Website and office addresses for Endangered Species Act Information:

The Wilmington District has developed the following website for applicants which provides guidelines on how to review linked websites and maps in order to fulfill NWP general condition 18 requirements: <http://www.saw.usace.army.mil/wetlands/ESA>

Applicants who do not have internet access may contact the appropriate US Fish and Wildlife Service offices listed below or the US Army Corps of Engineers at (910) 251- 4633:

US Fish and Wildlife Service
Asheville Field Office
160 Zillicoa Street
Asheville, NC 28801
Telephone: (828) 258-3939

Asheville US Fish and Wildlife Service Office counties: All counties west of and including Anson, Stanly, Davidson, Forsyth and Stokes Counties

US Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
Telephone: (919) 856-4520

Raleigh US Fish and Wildlife Service Office counties: all counties east of and including Richmond, Montgomery, Randolph, Guilford, and Rockingham Counties.

* **2.2 Special Designation Waters**

Prior to the use of any NWP in any of the following identified waters and contiguous wetlands in North Carolina, applicants must comply with Nationwide Permit General Condition 31 (PCN). The North Carolina waters and contiguous wetlands that require additional notification requirements are:

“Outstanding Resource Waters” (ORW) or “High Quality Waters” (HQW) as designated by the North Carolina Environmental Management Commission; “Inland Primary Nursery Areas” (IPNA) as designated by the NCWRC; “Contiguous Wetlands” as defined by the North Carolina Environmental Management Commission; or “Primary Nursery Areas” (PNA) as designated by the North Carolina Marine Fisheries Commission.

2.3 Coastal Area Management Act (CAMA) Areas of Environmental Concern

Non-federal applicants for any NWP in a designated “Area of Environmental Concern” (AEC) in the twenty (20) counties of Eastern North Carolina covered by the North Carolina Coastal Area Management Act (CAMA) must also obtain the required CAMA permit. Development activities for non-federal projects may not commence until a copy of the approved CAMA permit is furnished to the appropriate Wilmington District Regulatory Field Office (Wilmington Field Office – 69 Darlington Avenue, Wilmington, NC 28403 or Washington Field Office – 2407 West 5th Street, Washington, NC 27889).

* **2.4 Barrier Islands**

Prior to the use of any NWP on a barrier island of North Carolina, applicants must comply with Nationwide Permit General Condition 31 (PCN).

* **2.5 Mountain or Piedmont Bogs**

Prior to the use of any NWP in a Bog classified by the North Carolina Wetland Assessment Methodology (NCWAM), applicants shall comply with Nationwide Permit General Condition 31 (PCN). The latest version of NCWAM is located on the NC DWQ web site at: <http://portal.ncdenr.org/web/wq/swp/ws/pdu/ncwam> .

* **2.6 Animal Waste Facilities**

Prior to use of any NWP for construction of animal waste facilities in waters of the US, including wetlands, applicants shall comply with Nationwide Permit General Condition 31 (PCN).

* **2.7 Trout Waters**

Prior to any discharge of dredge or fill material into streams or waterbodies within the twenty-five (25) designated trout counties of North Carolina, the applicant shall comply with Nationwide Permit General Condition 31 (PCN). The applicant shall also provide a copy of the notification to the appropriate NCWRC office to facilitate the determination of any potential

impacts to designated Trout Waters. Notification to the Corps of Engineers will include a statement with the name of the NCWRC biologist contacted, the date of the notification, the location of work, a delineation of wetlands, a discussion of alternatives to working in the mountain trout waters, why alternatives were not selected, and a plan to provide compensatory mitigation for all unavoidable adverse impacts to mountain trout waters.

NCWRC and NC Trout Counties

Western Piedmont Region Coordinator	Alleghany	Caldwell	Watauga
20830 Great Smoky Mtn. Expressway	Ashe	Mitchell	Wilkes
Waynesville, NC 28786	Avery	Stokes	
Telephone: (828) 452-2546	Burke	Surry	

Mountain Region Coordinator	Buncombe	Henderson	Polk
20830 Great Smoky Mtn. Expressway	Cherokee	Jackson	Rutherford
Waynesville, NC 28786	Clay	Macon	Swain
Telephone: (828) 452-2546	Graham	Madison	Transylvania
Fax: (828) 452-7772	Haywood	McDowell	Yancey

3.0 List of Corps Regional Conditions for All Nationwide Permits

The following conditions apply to all Nationwide Permits in the Wilmington District:

3.1 Limitation of Loss of Perennial Stream Bed

NWPs may not be used for activities that may result in the loss or degradation of greater than 300 total linear feet of perennial, intermittent or ephemeral stream, unless the District Commander has waived the 300 linear foot limit for ephemeral and intermittent streams on a case-by-case basis and he determines that the proposed activity will result in minimal individual and cumulative adverse impacts to the aquatic environment. Loss of stream includes the linear feet of stream bed that is filled, excavated, or flooded by the proposed activity. Waivers for the loss of ephemeral and intermittent streams must be in writing and documented by appropriate/accepted stream quality assessments*. This waiver only applies to the 300 linear feet threshold for NWPs.

*NOTE: Applicants should utilize the most current methodology prescribed by Wilmington District to assess stream function and quality. Information can be found at:

<http://www.saw.usace.army.mil/wetlands/permits/nwp/nwp2012> (see “Quick Links”)

3.2 Mitigation for Loss of Stream Bed

For any NWP that results in a loss of more than 150 linear feet of perennial and/or ephemeral/intermittent stream, the applicant shall provide a mitigation proposal to compensate for more than minimal individual and cumulative adverse impacts to the aquatic environment. For stream losses less than 150 linear feet, that require a PCN, the District Commander may determine, on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effect on the aquatic environment.

3.3 Pre-construction Notification for Loss of Streambed Exceeding 150 Feet.

Prior to use of any NWP for any activity which impacts more than 150 total linear feet of perennial stream or ephemeral/ intermittent stream, the applicant must comply with Nationwide Permit General Condition 31 (PCN). This applies to NWPs that do not have specific notification requirements. If a NWP has specific notification requirements, the requirements of the NWP should be followed.

3.4 Restriction on Use of Live Concrete

For all NWPs which allow the use of concrete as a building material, live or fresh concrete, including bags of uncured concrete, may not come into contact with the water in or entering into waters of the US. Water inside coffer dams or casings that has been in contact with wet concrete shall only be returned to waters of the US when it is no longer poses a threat to aquatic organisms.

3.5 Requirements for Using Riprap for Bank Stabilization

For all NWPs that allow for the use of riprap material for bank stabilization, the following measures shall be applied:

3.5.1. Filter cloth must be placed underneath the riprap as an additional requirement of its use in North Carolina waters.

3.5.2. The placement of riprap shall be limited to the areas depicted on submitted work plan drawings.

3.5.3. The riprap material shall be clean and free from loose dirt or any pollutant except in trace quantities that would not have an adverse environmental effect.

3.5.4. It shall be of a size sufficient to prevent its movement from the authorized alignment by natural forces under normal conditions.

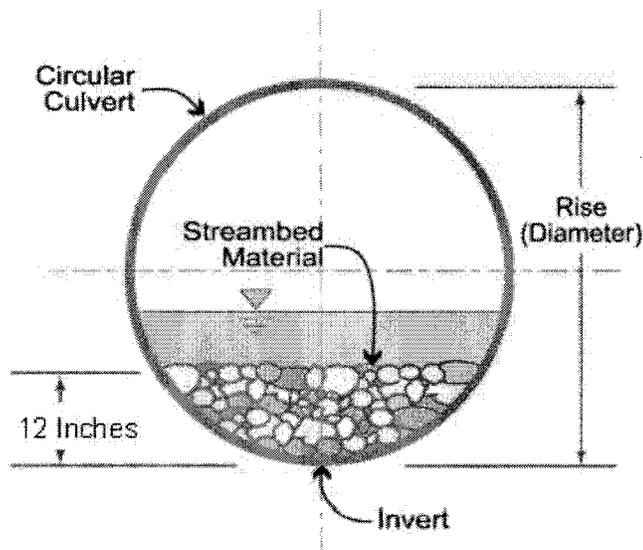
3.5.5. The riprap material shall consist of clean rock or masonry material such as, but not limited to, granite, marl, or broken concrete.

3.5.6. A waiver from the specifications in this Regional Condition may be requested in writing. The waiver will only be issued if it can be demonstrated that the impacts of complying with this Regional condition would result in greater adverse impacts to the aquatic environment.

3.6 Safe Passage Requirements for Culvert Placement

For all NWP's that involve the construction/installation of culverts, measures will be included in the construction/installation that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a pipe or culvert should not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed culvert should be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gage data, if available. In the absence of such data, bankfull flow can be used as a comparable level.

In the twenty (20) counties of North Carolina designated as coastal counties by the Coastal Area Management Act (CAMA): All pipes/culverts must be sufficiently sized to allow for the burial of the bottom of the pipe/culvert at least one foot below normal bed elevation when they are placed within the Public Trust Area of Environmental Concern (AEC) and/or the Estuarine Waters AEC as designated by CAMA, and/or all streams appearing as blue lines on United States Geological Survey (USGS) 7.5-minute quadrangle maps.



In all other counties: Culverts greater than 48 inches in diameter will be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter or less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, and every effort shall be made to maintain the existing channel slope. The bottom of the culvert must be placed at a

depth below the natural stream bottom to provide for passage during drought or low flow conditions.

Culverts are to be designed and constructed in a manner that minimizes destabilization and head cutting. Destabilizing the channel and head cutting upstream should be considered and appropriate actions incorporated in the design and placement of the culvert.

A waiver from the depth specifications in this condition may be requested in writing. The waiver will be issued if it can be demonstrated that the proposal would result in the least impacts to the aquatic environment.

All counties: Culverts placed within riparian and/or riverine wetlands must be installed in a manner that does not restrict the flow and circulation patterns of waters of the United States. Culverts placed across wetland fills purely for the purposes of equalizing surface water do not have to be buried.

3.7 Notification to NCDENR Shellfish Sanitation Section

Applicants shall notify the NCDENR Shellfish Sanitation Section prior to dredging in or removing sediment from an area closed to shell fishing where the effluent may be released to an area open for shell fishing or swimming in order to avoid contamination from the disposal area and cause a temporary shellfish closure to be made. Such notification shall also be provided to the appropriate Corps of Engineers Regulatory Field Office. Any disposal of sand to the ocean beach should occur between November 1 and April 30 when recreational usage is low. Only clean sand should be used and no dredged sand from closed shell fishing areas may be used. If beach disposal were to occur at times other than stated above or if sand from a closed shell fishing area is to be used, a swimming advisory shall be posted, and a press release shall be issued by the permittee.

3.8 Preservation of Submerged Aquatic Vegetation

Adverse impacts to Submerged Aquatic Vegetation (SAV) are not authorized by any NWP within any of the twenty coastal counties defined by North Carolina's Coastal Area Management Act of 1974 (CAMA).

3.9 Sedimentation and Erosion Control Structures and Measures

3.9.1. All PCNs will identify and describe sedimentation and erosion control structures and measures proposed for placement in waters of the US. The structures and measures should be depicted on maps, surveys or drawings showing location and impacts to jurisdictional wetlands and streams.

4.0 NWP # 13 – Bank Stabilization

4.0.1. Unanchored trees, treetops, or debris may not be used as stream bank stabilization material.

4.0.2. Properly anchored and cabled structural stabilization techniques, such as timber crib structures, revetments, and root wads, are acceptable materials to stabilize stream banks.

4.0.3. If riprap stabilization is needed, it should be placed only on the stream banks, or, if it is necessary to be placed in the stream bed, the finished top elevation of the riprap should not exceed that of the original stream bed.

4.1 NWP #23 – Approved Categorical Exclusions

No development activities authorized by this NWP may begin until the permittee obtains a consistency concurrence or a CAMA permit from the North Carolina Division of Coastal Management, if either is required.

4.2 NWP #33 – Temporary Construction, Access and Dewatering

The required restoration plan must include a timetable for restoration activities.

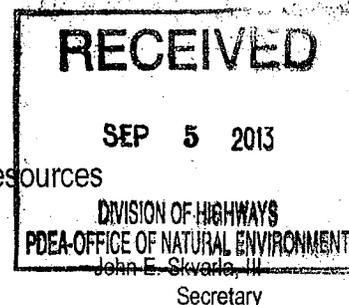
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North Carolina Department of Environment and Natural Resources

Division of Water Resources
Water Quality Programs
Thomas A. Reeder
Director

Pat McCrory
Governor



September 3, 2013
Gaston County
NCDWR Project No. 13-0722
TIP I-4928

Dr. Gregory Thorpe, Ph.D.
Manager, PDEA
1598 Mail Service Center
Raleigh, NC 27699

**APPROVAL of 401 WATER QUALITY CERTIFICATION, with ADDITIONAL CONDITIONS
Weigh Station, I-85**

Dear Dr. Thorpe:

You have our approval, in accordance with the conditions listed below, for the following impacts at the subject site located on I-85 in Gaston County:

Stream Impacts in the Catawba River Basin

Site	Permanent Impact Perennial Stream (linear ft)	Temporary Impact Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
1	30	27	57	30
1 stabilization	18		18	
2	92	65	157	92
2 stabilization	40		40	
3	16	18	34	16
3 dissipater	27		27	27
Total	223	110	333	165

Total Stream Impact for Project: 333 linear feet.

The project shall be constructed in accordance with your application dated /received July 5, 2013, and subsequent information submitted on August 30, 2013, and received by the Division of Water Resources on July 10, 2013 and August 30, 2013, respectively. After reviewing your application, we have decided that these impacts are covered by General Water Quality Certification Numbers 3885, 3891, and 3893. These certifications correspond to the Nationwide Permits 13, 23, and 33 issued by the Corps of Engineers. In addition, you should acquire any other federal, state or local permits before you proceed with your project including (but not limited to) Sediment and Erosion Control, Non-Discharge and Water Supply Watershed regulations. This approval will expire with the accompanying 404 permit.

Transportation and Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604
Phone: 919-807-6300 \ FAX: 919-807-6492
Internet: www.ncwaterquality.org



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This approval is valid solely for the purpose and design described in your application (unless modified below). Should your project change, you must notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. For this approval to remain valid, you must adhere to the conditions listed in the attached certification(s) and any additional conditions listed below.

1. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and downstream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by the NCDWR. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact the NCDWR for guidance on how to proceed and to determine whether or not a permit modification will be required.
2. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills.
3. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S., or protected riparian buffers.
4. The dimension, pattern, and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions.
5. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage.
- * 6. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval.
7. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of the NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water.
8. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials.
9. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification.
10. Discharging hydroseed mixtures and washing out hydro-seeders and other equipment in or adjacent to surface waters is prohibited.
11. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If the NCDWR determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the NCDWR may reevaluate and modify this certification.
12. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification.
13. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager.

14. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.
15. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery.
- * 16. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer or authorized agent shall complete and return the enclosed "Certification of Completion Form" to notify the NCDWR when all work included in the 401 Certification has been completed.
17. Native riparian vegetation (ex. list herbaceous, trees, and shrubs native to your geographic region) must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction.
18. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities.
19. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification.

If you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.
The mailing address for the Office of Administrative Hearings is:

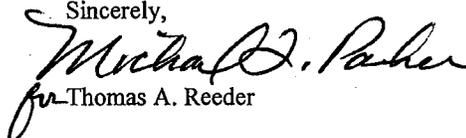
Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919)-431-3000, Facsimile: (919)-431-3100

A copy of the petition must also be served on DENR as follows:

Mr. Lacy Presnell, General Counsel
Department of Environment and Natural Resources
1601 Mail Service Center

This letter completes the review of the Division of Water Resources under Section 401 of the Clean Water Act. If you have any questions, please contact Alan Johnson at 704-663-1699 or alan.johnson@ncdenr.gov.

Sincerely,


for Thomas A. Reeder

cc: Trish Beam, Division 12, Environmental Officer
Elizabeth Lusk, PDEA Unit, (electronic copy)
Steve Kichefski, US Army Corps of Engineers, Asheville (electronic copy only)
Sonia Carrillo, Wetlands Transportation Unit

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Water Quality Certification No. 3885

GENERAL CERTIFICATION FOR STREAM RESTORATION, ENHANCEMENT AND STABILIZATION PROJECTS AND WETLAND AND RIPARIAN RESTORATION AND CREATION ACTIVITIES INCLUDING THOSE ELIGIBLE FOR U.S. ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT NUMBERS 13 (BANK STABILIZATION) AND 27 (WETLAND AND RIPARIAN RESTORATION AND CREATION), AND REGIONAL PERMIT 197800080 (BULKHEADS AND RIPRAP) AND RIPARIAN AREA PROTECTION RULES (BUFFER RULES)

Water Quality Certification Number 3885 is issued in conformity with the requirements of Section 401, Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality Regulations in 15A NCAC 02H .0500 and 15A NCAC 02B .0200 for the discharge of fill material to waters as described in 33 CFR 330 Appendix A (B) (13 and 27) and Regional Permit 197800080 and for the Riparian Area Protection Rules (Buffer Rules) in 15A NCAC 02B .0200.

The State of North Carolina certifies that the specified category of activity will not violate applicable portions of Sections 301, 302, 303, 306 and 307 of the Public Laws 92-500 and 95-217 if conducted in accordance with the conditions hereinafter set forth.

Activities meeting any one (1) of the following thresholds or circumstances require *written approval* for a 401 Water Quality Certification from the Division of Water Quality (the "Division"):

- * a) All proposed fill or modification of wetlands and/or waters, including streams and streambanks, regardless of the purpose of the restoration, enhancement, stabilization, or creation activity, except for single and independent projects involving in-stream structures for the sole purpose of streambank stabilization, which are designed based on current natural channel techniques, and do not exceed a total of three structures within 100 feet or less of streambank; or
 - b) Any stream relocation; or
 - c) Bank Stabilization projects qualifying for Nationwide Permit 13 for erosion protection which utilize non-natural armoring such as riprap, gabion baskets, deflection walls etc of greater than 150 feet in streambank length; or
 - d) Bank Stabilization projects qualifying for Nationwide Permit 13 for erosion protection which utilize natural streambank sloping, vegetation, and other natural channel protection techniques of greater than 500 feet of streambank length; or
 - e) Any impact associated with a Notice of Violation or an enforcement action for violation(s) of DWQ Wetland Rules (15A NCAC 02H .0500), Isolated Wetland Rules (15A NCAC 02H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 02B .0200); or
 - * f) Any impacts to streams and/or buffers in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan or Goose Creek Watersheds (or any other basin or watershed with Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless* the activities are listed as "EXEMPT" from these rules or a Buffer Authorization Certificate is issued through N.C. Division of Coastal Management (DCM) delegation for "ALLOWABLE" activities.
- * In accordance with North Carolina General Statute 143-215.3D(e), written approval for a 401 Water Quality General Certification must include the appropriate fee. If a project also requires a CAMA Permit, then one payment to both agencies shall be submitted and will be the higher of the two fees.

Water Quality Certification No. 3885

Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval from the Division as long as they comply with the Conditions of Certification listed below. If any of these Conditions cannot be met, then written approval from the Division is required.

Conditions of Certification:

1. Activities shall meet the definitions, design, and monitoring protocols specified within the US Army Corps of Engineers Wilmington District *Regulatory Guidance Letter* (RGL02-02) and the *Stream Mitigation Guidelines* (April 2003) or any subsequent updates to these documents.
2. No Impacts Beyond those Authorized in the Written Approval or Beyond the Threshold of Use of this Certification

No waste, spoil, solids, or fill of any kind shall occur in wetlands, waters, or riparian areas beyond the footprint of the impacts depicted in the Pre-Construction Notification, as authorized in the written approval from the Division or beyond the thresholds established for use of this Certification without written authorization, including incidental impacts. All construction activities, including the design, installation, operation, and maintenance of sediment and erosion control Best Management Practices shall be performed so that no violations of state water quality standards, statutes, or rules occur. Approved plans and specifications for this project are incorporated by reference and are enforceable parts of this permit.

3. Standard Erosion and Sediment Control Practices

Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices and if applicable, comply with the specific conditions and requirements of the NPDES Construction Stormwater Permit issued to the site:

- a. Design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
- b. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
- c. Reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.
- d. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.
- e. If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality (HQW), or Outstanding Resource (ORW) waters, then the sedimentation and erosion control designs must comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*.

Water Quality Certification No. 3885

4. No Sediment and Erosion Control Measures in Wetlands or Waters

Sediment and erosion control measures shall not be placed in wetlands or waters. Exceptions to this condition require application submittal to and written approval by the Division. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, then design and placement of temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands, stream beds, or banks, adjacent to or upstream and downstream of the above structures. All sediment and erosion control devices shall be removed and the natural grade restored within two (2) months of the date that the Division of Land Resources (DLR) or locally delegated program has released the specific area within the project.

5. Construction Stormwater Permit NCG010000

An NPDES Construction Stormwater Permit is required for construction projects that disturb one (1) or more acres of land. This Permit allows stormwater to be discharged during land disturbing construction activities as stipulated in the conditions of the permit. If your project is covered by this permit, full compliance with permit conditions including the erosion & sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required. A copy of the general permit (NCG010000), inspection log sheets, and other information may be found at <http://portal.ncdenr.org/web/wq/ws/su/npdeww#tab-w>.

The North Carolina Department of Transportation (NCDOT) shall be required to be in full compliance with the conditions related to construction activities within the most recent version of their individual NPDES (NCS000250) stormwater permit.

6. Construction Moratoriums and Coordination

If activities must occur during periods of high biological activity (i.e. sea turtle nesting, fish spawning, or bird nesting), then biological monitoring may be required at the request of other state or federal agencies and coordinated with these activities.

All moratoriums on construction activities established by the NC Wildlife Resources Commission (WRC), US Fish and Wildlife Service (USFWS), NC Division of Marine Fisheries (DMF), or National Marine Fisheries Service (NMFS) to lessen impacts on trout, anadromous fish, larval/post-larval fishes and crustaceans, or other aquatic species of concern shall be implemented. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium.

Work within the twenty-five (25) designated trout counties or identified state or federal endangered or threatened species habitat shall be coordinated with the appropriate WRC, USFWS, NMFS, and/or DMF personnel.

7. Work in the Dry

All work in or adjacent to stream waters shall be conducted so that the flowing stream does not come in contact with the disturbed area. Approved best management practices from the most current version of the NC Sediment and Erosion Control Manual, or the NC DOT Construction and Maintenance Activities Manual, such as sandbags, rock berms, cofferdams, and other diversion structures shall be used to minimize excavation in flowing water. Exceptions to this condition require application submittal to and written approval by the Division.

Water Quality Certification No. 3885

8. Riparian Area Protection (Buffer) Rules

Activities located in the protected riparian areas (whether jurisdictional wetlands or not), within the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan, or Goose Creek Watersheds (or any other basin or watershed with buffer rules) shall be limited to "uses" identified within and constructed in accordance with 15A NCAC 02B .0233, .0259, .0243, .0250, .0267 and .0605, and shall be located, designed, constructed, and maintained to have minimal disturbance to protect water quality to the maximum extent practicable through the use of best management practices. All buffer rule requirements, including diffuse flow requirements, must be met.

9. If concrete is used during the construction, then all necessary measures shall be taken to prevent direct contact between uncured or curing concrete and waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to waters of the state due to the potential for elevated pH and possible aquatic life/ fish kills.
10. All temporary fill and culverts shall be removed and the impacted area returned to natural conditions within 60 days of the determination that the temporary impact is no longer necessary. The impacted areas shall be restored to original grade, including each stream's original cross sectional dimensions, plan form pattern, and longitudinal bed and bed profile, and the various sites shall be stabilized with natural woody vegetation (except for the approved maintenance areas) and restored to prevent erosion.
11. All temporary pipes/ culverts/ riprap pads etc, shall be installed in all streams as outlined in the most recent edition of the *North Carolina Sediment and Erosion Control Planning and Design Manual* or the *North Carolina Surface Mining Manual* so as not to restrict stream flow or cause dis-equilibrium during use of this General Certification.
12. Any riprap required for proper culvert placement, stream stabilization, or restoration of temporarily disturbed areas shall be restricted to the area directly impacted by the approved construction activity. All rip-rap shall be buried and/or "keyed in" such that the original stream elevation and streambank contours are restored and maintained. Placement of rip-rap or other approved materials shall not result in de-stabilization of the stream bed or banks upstream or downstream of the area.
13. Any rip-rap used for stream stabilization shall be of a size and density so as not to be able to be carried off by wave, current action, or stream flows and consist of clean rock or masonry material free of debris or toxic pollutants. Rip-rap shall not be installed in the streambed except in specific areas required for velocity control and to ensure structural integrity of bank stabilization measures.
14. A one-time application of fertilizer to re-establish vegetation is allowed in disturbed areas including riparian buffers, but is restricted to no closer than 10 feet from top of bank of streams. Any fertilizer application must comply with all other Federal, State and Local regulations.
15. Applications for riprap groins proposed in accordance with 15A NCAC 07H .1401 (NC Division of Coastal Management General Permit for construction of Wooden and Riprap Groins in Estuarine and Public Trust Waters) must meet all the specific conditions for design and construction specified in 15A NCAC 07H .1405.

Water Quality Certification No. 3885

16. Compensatory Mitigation

In accordance with 15A NCAC 02H .0506 (h), compensatory mitigation may be required for losses of equal to or greater than 150 linear feet of streams (intermittent and perennial) and/or equal to or greater than one (1) acre of wetlands. For linear public transportation projects, impacts equal to or exceeding 150 linear feet per stream shall require mitigation.

Buffer mitigation may be required for any project with Buffer Rules in effect at the time of application for activities classified as "Allowable with Mitigation" or "Prohibited" within the Table of Uses.

A determination of buffer, wetland, and stream mitigation requirements shall be made for any General Water Quality Certification for this Nationwide and/or Regional General Permit. Design and monitoring protocols shall follow the US Army Corps of Engineers Wilmington District *Stream Mitigation Guidelines* (April 2003) or its subsequent updates. Compensatory mitigation plans shall be submitted to the Division for written approval as required in those protocols. The mitigation plan must be implemented and/or constructed before any impacts occur on site. Alternatively, the Division will accept payment into an in-lieu fee program or a mitigation bank. In these cases, proof of payment shall be provided to the Division before any impacts occur on site.

- * 17. If an environmental document is required under the National or State Environmental Policy Act (NEPA or SEPA), then this General Certification is not valid until a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) is issued by the State Clearinghouse.
- 18. In the twenty (20) coastal counties, the appropriate DWQ Regional Office must be contacted to determine if Coastal Stormwater Regulations will be required.
- 19. This General Certification does not relieve the applicant of the responsibility to obtain all other required Federal, State, or Local approvals.
- 20. The applicant/permittee and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act), and any other appropriate requirements of State and Federal Law. If the Division determines that such standards or laws are not being met, including failure to sustain a designated or achieved use, or that State or Federal law is being violated, or that further conditions are necessary to assure compliance, then the Division may reevaluate and modify this General Water Quality Certification.
- * 21. When written authorization is required for use of this certification, upon completion of all permitted impacts included within the approval and any subsequent modifications, the applicant shall be required to return the certificate of completion attached to the approval. One copy of the certificate shall be sent to the DWQ Central Office in Raleigh at 1650 Mail Service Center, Raleigh, NC, 27699-1650.
- 22. Additional site-specific conditions, including monitoring and/or modeling requirements, may be added to the written approval letter for projects proposed under this Water Quality Certification in order to ensure compliance with all applicable water quality and effluent standards.
- 23. This certification grants permission to the director, an authorized representative of the Director, or DENR staff, upon the presentation of proper credentials, to enter the property during normal business hours.

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Water Quality Certification No. 3885

This General Certification shall expire on the same day as the expiration date of the corresponding Nationwide and/or Regional General Permit. The conditions in effect on the date of issuance of Certification for a specific project shall remain in effect for the life of the project, regardless of the expiration date of this Certification.

Non-compliance with or violation of the conditions herein set forth by a specific project may result in revocation of this General Certification for the project and may also result in criminal and/or civil penalties.

The Director of the North Carolina Division of Water Quality may require submission of a formal application for Individual Certification for any project in this category of activity if it is determined that the project is likely to have a significant adverse effect upon water quality, including state or federally listed endangered or threatened aquatic species, or degrade the waters so that existing uses of the wetland or downstream waters are precluded.

Public hearings may be held for specific applications or group of applications prior to a Certification decision if deemed in the public's best interest by the Director of the North Carolina Division of Water Quality.

Effective date: March 19, 2012

DIVISION OF WATER QUALITY

By



Charles Wakild, P.E.

Director

History Note: Water Quality Certification (WQC) Number 3885 issued March 19, 2012 replaces WQC Number 3689 issued November 1, 2007; WQC Number 3626 issued March, 2007; WQC Number 3495 issued December 31, 2004; and WQC Number 3399 issued March 2003. This General Certification is rescinded when the Corps of Engineers reauthorizes any of the corresponding Nationwide and/or Regional General Permits and/or when deemed appropriate by the Director of the Division of Water Quality.

Water Quality Certification No. 3891

GENERAL CERTIFICATION FOR PROJECTS ELIGIBLE FOR U.S. ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT NUMBER 23 (APPROVED CATEGORICAL EXCLUSIONS) AND RIPARIAN AREA PROTECTION RULES (BUFFER RULES)

Water Quality Certification Number 3891 is issued in conformity with the requirements of Section 401, Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality Regulations in 15A NCAC 02H .0500 and 15A NCAC 02B .0200 for the discharge of fill material to waters and wetland areas as described in 33 CFR 330 Appendix A (B) (23) and for the Riparian Area Protection Rules (Buffer Rules) in 15A NCAC 02B .0200.

The category of activities shall include only Federally-approved Categorical Exclusion projects.

The State of North Carolina certifies that the specified category of activity will not violate applicable portions of Sections 301, 302, 303, 306 and 307 of the Public Laws 92-500 and 95-217 if conducted in accordance with the conditions hereinafter set forth.

Activities meeting any one (1) of the following thresholds or circumstances require written approval for a 401 Water Quality Certification from the Division of Water Quality (the "Division"):

- a) Stream impacts (temporary or permanent) equal or greater than 40 linear feet; or
- b) Any stream relocation; or
- c) Impacts equal to or greater than one-tenth (1/10) acre of wetlands or open waters; or
- d) Any impacts to wetlands adjacent to waters designated as: ORW, SA, WS-I, WS-II, or Trout, or wetlands contiguous to waters designated as a North Carolina or National Wild and Scenic River.
- e) Any impacts to coastal wetlands [15A NCAC 7H .0205], or Unique Wetlands (UWL) [15A NCAC 2H .0506].
- f) Any impact associated with a Notice of Violation or an enforcement action for violation(s) of DWQ Wetland Rules (15A NCAC 02H .0500), Isolated Wetland Rules (15A NCAC 02H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 02B .0200); or
- * g) Any impacts to streams and/or buffers in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan or Goose Creek Watersheds (or any other basin or watershed with Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless* the activities are listed as "EXEMPT" from these rules or a Buffer Authorization Certificate is issued through N.C. Division of Coastal Management (DCM) delegation for "ALLOWABLE" activities.

- * In accordance with North Carolina General Statute 143-215.3D(e), written approval for a 401 Water Quality General Certification must include the appropriate fee. If a project also requires a CAMA Permit, then one payment to both agencies shall be submitted and will be the higher of the two fees.

Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval from the Division as long as they comply with the Conditions of Certification listed below. If any of these Conditions cannot be met, then written approval from the Division is required.

Conditions of Certification:

1. No Impacts Beyond those Authorized in the Written Approval or Beyond the Threshold of Use of this Certification

No waste, spoil, solids, or fill of any kind shall occur in wetlands, waters, or riparian areas beyond the footprint of the impacts depicted in the Pre-Construction Notification, as

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authorized in the written approval from the Division or beyond the thresholds established for use of this Certification without written authorization, including incidental impacts. All construction activities, including the design, installation, operation, and maintenance of sediment and erosion control Best Management Practices shall be performed so that no violations of state water quality standards, statutes, or rules occur. Approved plans and specifications for this project are incorporated by reference and are enforceable parts of this permit.

2. Standard Erosion and Sediment Control Practices

Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices and if applicable, comply with the specific conditions and requirements of the NPDES Construction Stormwater Permit issued to the site:

- a. Design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
- b. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
- c. Reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.
- d. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.
- e. If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality (HQW), or Outstanding Resource (ORW) waters, then the sedimentation and erosion control designs must comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*.

3. No Sediment and Erosion Control Measures in Wetlands or Waters

Sediment and erosion control measures shall not be placed in wetlands or waters. Exceptions to this condition require application submittal to and written approval by the Division. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, then design and placement of temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands, stream beds, or banks, adjacent to or upstream and downstream of the above structures. All sediment and erosion control devices shall be removed and the natural grade restored within two (2) months of the date that the Division of Land Resources (DLR) or locally delegated program has released the specific area within the project.

4. Construction Stormwater Permit NCG010000

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An NPDES Construction Stormwater Permit is required for construction projects that disturb one (1) or more acres of land. This Permit allows stormwater to be discharged during land disturbing construction activities as stipulated in the conditions of the permit. If your project is covered by this permit, full compliance with permit conditions including the erosion & sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required. A copy of the general permit (NCG010000), inspection log sheets, and other information may be found at <http://portal.ncdenr.org/web/wq/ws/su/npdcssw#tab-w>.

The North Carolina Department of Transportation (NCDOT) shall be required to be in full compliance with the conditions related to construction activities within the most recent version of their individual NPDES (NCS000250) stormwater permit.

5. Construction Moratoriums and Coordination

If activities must occur during periods of high biological activity (i.e. sea turtle nesting, fish spawning, or bird nesting), then biological monitoring may be required at the request of other state or federal agencies and coordinated with these activities.

All moratoriums on construction activities established by the NC Wildlife Resources Commission (WRC), US Fish and Wildlife Service (USFWS), NC Division of Marine Fisheries (DMF), or National Marine Fisheries Service (NMFS) to lessen impacts on trout, anadromous fish, larval/post-larval fishes and crustaceans, or other aquatic species of concern shall be implemented. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium.

Work within the twenty-five (25) designated trout counties or identified state or federal endangered or threatened species habitat shall be coordinated with the appropriate WRC, USFWS, NMFS, and/or DMF personnel.

6. Work in the Dry

All work in or adjacent to stream waters shall be conducted so that the flowing stream does not come in contact with the disturbed area. Approved best management practices from the most current version of the NC Sediment and Erosion Control Manual, or the NC DOT Construction and Maintenance Activities Manual, such as sandbags, rock berms, cofferdams, and other diversion structures shall be used to minimize excavation in flowing water. Exceptions to this condition require application submittal to and written approval by the Division.

7. Riparian Area Protection (Buffer) Rules

Activities located in the protected riparian areas (whether jurisdictional wetlands or not), within the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan, or Goose Creek Watersheds (or any other basin or watershed with buffer rules) shall be limited to "uses" identified within and constructed in accordance with 15A NCAC 02B .0233, .0259, .0243, .0250, .0267 and .0605, and shall be located, designed, constructed, and maintained to have minimal disturbance to protect water quality to the maximum extent practicable through the use of best management practices. All buffer rule requirements, including diffuse flow requirements, must be met.

8. If concrete is used during the construction, then all necessary measures shall be taken to prevent direct contact between uncured or curing concrete and waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to waters of the state due to the potential for elevated pH and possible aquatic life/ fish kills.

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9. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to the most current version of *Stormwater Best Management Practices*. Exceptions to this condition require written approval by the Division.
10. Relocated stream designs should include the same dimensions, patterns, and profiles as the existing channel (or a stable reference reach if the existing channel is unstable), to the maximum extent practical. The new channel should be constructed in the dry and water shall not be turned into the new channel until the banks are stabilized. Vegetation used for bank stabilization shall be limited to native woody species, and should include establishment of a 30-foot wide wooded and an adjacent 20-foot wide vegetated buffer on both sides of the relocated channel to the maximum extent practical. A transitional phase incorporating appropriate erosion control matting materials and seedling establishment is allowable, however matting that incorporates plastic mesh and/or plastic twine shall not be used in wetlands, riparian buffers or floodplains as recommended by the North Carolina Sediment and Erosion Control Manual. Rip-rap, A-Jacks, concrete, gabions or other hard structures may be allowed if it is necessary to maintain the physical integrity of the stream; however, the applicant must provide written justification and any calculations used to determine the extent of rip-rap coverage. Please note that if the stream relocation is conducted as a stream restoration as defined in the US Army Corps of Engineers Wilmington District, April 2003 *Stream Mitigation Guidelines* (or its subsequent updates), the restored length may be used as compensatory mitigation for the impacts resulting from the relocation.
11. Placement of Culverts and Other Structures in Waters and Wetlands

Culverts required for this project shall be designed and installed in such a manner that the original stream profiles are not altered and allow for aquatic life movement during low flows. Existing stream dimensions (including the cross section dimensions, pattern, and longitudinal profile) must be maintained above and below locations of each culvert.

Placement of culverts and other structures in waters and streams must be below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than or equal to 48 inches, to allow low flow passage of water and aquatic life.

When topographic constraints indicate culvert slopes of greater than 5%, culvert burial is not required, provided that all alternative options for flattening the slope have been investigated and aquatic life movement/ connectivity has been provided when possible (rock ladders, crossvanes, etc). Notification to the Division including supporting documentation to include a location map of the culvert, culvert profile drawings, and slope calculations shall be provided to the Division 60 days prior to the installation of the culvert.

When bedrock is present in culvert locations, culvert burial is not required provided that there is sufficient documentation of the presence of bedrock. Notification to the Division including supporting documentation such as, but not limited to, a location map of the culvert, geotechnical reports, photographs, etc shall be provided to the Division a minimum of 60 days prior to the installation of the culvert. If bedrock is discovered during construction, then the Division shall be notified by phone or email within 24 hours of discovery.

If other site-specific topographic constraints preclude the ability to bury the culverts as described above and/or it can be demonstrated that burying the culvert would result in destabilization of the channel, then exceptions to this condition require application submittal to, and written approval by, the Division of Water Quality, regardless of the total impacts to streams or wetlands from the project.

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Installation of culverts in wetlands must ensure continuity of water movement and be designed to adequately accommodate high water or flood conditions. Additionally, when roadways, causeways, or other fill projects are constructed across FEMA-designated floodways or wetlands, openings such as culverts or bridges must be provided to maintain the natural hydrology of the system as well as prevent constriction of the floodway that may result in destabilization of streams or wetlands.

The establishment of native, woody vegetation and other soft stream bank stabilization techniques must be used where practicable instead of riprap or other bank hardening methods.

* 12. Compensatory Mitigation

In accordance with 15A NCAC 02H .0506 (h), compensatory mitigation may be required for losses of equal to or greater than 150 linear feet of streams (intermittent and perennial) and/or equal to or greater than one (1) acre of wetlands. For linear public transportation projects, impacts equal to or exceeding 150 linear feet per stream shall require mitigation.

Buffer mitigation may be required for any project with Buffer Rules in effect at the time of application for activities classified as "Allowable with Mitigation" or "Prohibited" within the Table of Uses.

A determination of buffer, wetland, and stream mitigation requirements shall be made for any General Water Quality Certification for this Nationwide and/or Regional General Permit. Design and monitoring protocols shall follow the US Army Corps of Engineers Wilmington District *Stream Mitigation Guidelines* (April 2003) or its subsequent updates. Compensatory mitigation plans shall be submitted to the Division for written approval as required in those protocols. The mitigation plan must be implemented and/or constructed before any impacts occur on site. Alternatively, the Division will accept payment into an in-lieu fee program or a mitigation bank. In these cases, proof of payment shall be provided to the Division before any impacts occur on site.

- * 13. If an environmental document is required under the National or State Environmental Policy Act (NEPA or SEPA), then this General Certification is not valid until a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) is issued by the State Clearinghouse.
14. In the twenty (20) coastal counties, the appropriate DWQ Regional Office must be contacted to determine if Coastal Stormwater Regulations will be required.
15. This General Certification does not relieve the applicant of the responsibility to obtain all other required Federal, State, or Local approvals.
16. The applicant/permittee and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act), and any other appropriate requirements of State and Federal Law. If the Division determines that such standards or laws are not being met, including failure to sustain a designated or achieved use, or that State or Federal law is being violated, or that further conditions are necessary to assure compliance, then the Division may reevaluate and modify this General Water Quality Certification.

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- * 17. When written authorization is required for use of this certification, upon completion of all permitted impacts included within the approval and any subsequent modifications, the applicant shall be required to return the certificate of completion attached to the approval. One copy of the certificate shall be sent to the DWQ Central Office in Raleigh at 1650 Mail Service Center, Raleigh, NC, 27699-1650.
- 18. Additional site-specific conditions, including monitoring and/or modeling requirements, may be added to the written approval letter for projects proposed under this Water Quality Certification in order to ensure compliance with all applicable water quality and effluent standards.
- 19. This certification grants permission to the director, an authorized representative of the Director, or DENR staff, upon the presentation of proper credentials, to enter the property during normal business hours.

This General Certification shall expire on the same day as the expiration date of the corresponding Nationwide and/or Regional General Permit. The conditions in effect on the date of issuance of Certification for a specific project shall remain in effect for the life of the project, regardless of the expiration date of this Certification.

Non-compliance with or violation of the conditions herein set forth by a specific project may result in revocation of this General Certification for the project and may also result in criminal and/or civil penalties.

The Director of the North Carolina Division of Water Quality may require submission of a formal application for Individual Certification for any project in this category of activity if it is determined that the project is likely to have a significant adverse effect upon water quality, including state or federally listed endangered or threatened aquatic species, or degrade the waters so that existing uses of the wetland or downstream waters are precluded.

Public hearings may be held for specific applications or group of applications prior to a Certification decision if deemed in the public's best interest by the Director of the North Carolina Division of Water Quality.

Effective date: March 19, 2012

DIVISION OF WATER QUALITY

By



Charles Wakild, P.E.

Director

History Note: Water Quality Certification (WQC) Number 3891 issued March 19, 2012 replaces WQC 3701 issued November 1, 2007; WQC Number 3632 issued March 2007; WQC Number 3403 issued March 2003; WQC Number 3361 issued March 18, 2002; WQC Number 3107 issued February 11, 1997; WQC Number 2734 issued May 1 1993; and WQC Number 2670 issued on January 21, 1992. This General Certification is rescinded when the Corps of Engineers reauthorizes any of the corresponding Nationwide and/or Regional General Permits or when deemed appropriate by the Director of the Division of Water Quality.

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**GENERAL CERTIFICATION FOR PROJECTS ELIGIBLE
FOR U.S. ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT NUMBER 33
(TEMPORARY CONSTRUCTION, ACCESS AND DEWATERING)
AND RIPARIAN AREA PROTECTION RULES (BUFFER RULES)**

Water Quality Certification Number 3893 is issued in conformity with the requirements of Section 401, Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality Regulations in 15A NCAC 02H .0500 and 15A NCAC 02B .0200 for the discharge of fill material to waters and wetland areas as described in 33 CFR 330 Appendix A (B) (33) and for the Riparian Area Protection Rules (Buffer Rules) in 15A NCAC 02B .0200.

The State of North Carolina certifies that the specified category of activity will not violate applicable portions of Sections 301, 302, 303, 306 and 307 of the Public Laws 92-500 and 95-217 if conducted in accordance with the conditions hereinafter set forth.

Activities meeting any one (1) of the following thresholds or circumstances require written approval for a 401 Water Quality Certification from the Division of Water Quality (the "Division"):

- a. Any stream relocation; or
- b. Any impact associated with a Notice of Violation or an enforcement action for violation(s) of DWQ Wetland Rules (15A NCAC 02H .0500), Isolated Wetland Rules (15A NCAC 02H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 02B .0200); or
- * c. Any impacts to streams and/or buffers in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan or Goose Creek Watersheds (or any other basin or watershed with Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless* the activities are listed as "EXEMPT" from these rules or a Buffer Authorization Certificate is issued through N.C. Division of Coastal Management (DCM) delegation for "ALLOWABLE" activities.

* In accordance with North Carolina General Statute 143-215.3D(e), written approval for a 401 Water Quality General Certification must include the appropriate fee. If a project also requires a CAMA Permit, then one payment to both agencies shall be submitted and will be the higher of the two fees.

Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval from the Division as long as they comply with the Conditions of Certification listed below. If any of these Conditions cannot be met, then written approval from the Division is required.

Conditions of Certification:

1. No Impacts Beyond those Authorized in the Written Approval or Beyond the Threshold of Use of this Certification

No waste, spoil, solids, or fill of any kind shall occur in wetlands, waters, or riparian areas beyond the footprint of the impacts depicted in the Pre-Construction Notification, as authorized in the written approval from the Division or beyond the thresholds established for use of this Certification without written authorization, including incidental impacts. All construction activities, including the design, installation, operation, and maintenance of sediment and erosion control Best Management Practices shall be performed so that no violations of state water quality standards, statutes, or rules occur. Approved plans and specifications for this project are incorporated by reference and are enforceable parts of this permit.

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2. Standard Erosion and Sediment Control Practices

Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices and if applicable, comply with the specific conditions and requirements of the NPDES Construction Stormwater Permit issued to the site:

- a. Design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
- b. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
- c. Reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.
- d. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.
- e. If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality (HQW), or Outstanding Resource (ORW) waters, then the sedimentation and erosion control designs must comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*.

3. No Sediment and Erosion Control Measures in Wetlands or Waters

Sediment and erosion control measures shall not be placed in wetlands or waters. Exceptions to this condition require application submittal to and written approval by the Division. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, then design and placement of temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands, stream beds, or banks, adjacent to or upstream and downstream of the above structures. All sediment and erosion control devices shall be removed and the natural grade restored within two (2) months of the date that the Division of Land Resources (DLR) or locally delegated program has released the specific area within the project.

4. Construction Stormwater Permit NCG010000

An NPDES Construction Stormwater Permit is required for construction projects that disturb one (1) or more acres of land. This Permit allows stormwater to be discharged during land disturbing construction activities as stipulated in the conditions of the permit. If your project is covered by this permit, full compliance with permit conditions including the erosion & sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required. A copy of the general permit (NCG010000), inspection log sheets, and other information may be found at <http://portal.ncdenr.org/web/wq/ws/su/npdeww#tab-w>.

The North Carolina Department of Transportation (NCDOT) shall be required to be in full compliance with the conditions related to construction activities within the most recent version of their individual NPDES (NCS000250) stormwater permit.

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5. Construction Moratoriums and Coordination

If activities must occur during periods of high biological activity (i.e. sea turtle nesting, fish spawning, or bird nesting), then biological monitoring may be required at the request of other state or federal agencies and coordinated with these activities.

All moratoriums on construction activities established by the NC Wildlife Resources Commission (WRC), US Fish and Wildlife Service (USFWS), NC Division of Marine Fisheries (DMF), or National Marine Fisheries Service (NMFS) to lessen impacts on trout, anadromous fish, larval/post-larval fishes and crustaceans, or other aquatic species of concern shall be implemented. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium.

Work within the twenty-five (25) designated trout counties or identified state or federal endangered or threatened species habitat shall be coordinated with the appropriate WRC, USFWS, NMFS, and/or DMF personnel.

6. Work in the Dry

All work in or adjacent to stream waters shall be conducted so that the flowing stream does not come in contact with the disturbed area. Approved best management practices from the most current version of the NC Sediment and Erosion Control Manual, or the NC DOT Construction and Maintenance Activities Manual, such as sandbags, rock berms, cofferdams, and other diversion structures shall be used to minimize excavation in flowing water. Exceptions to this condition require application submittal to and written approval by the Division.

7. Riparian Area Protection (Buffer) Rules

Activities located in the protected riparian areas (whether jurisdictional wetlands or not), within the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan, or Goose Creek Watersheds (or any other basin or watershed with buffer rules) shall be limited to "uses" identified within and constructed in accordance with 15A NCAC 02B .0233, .0259, .0243, .0250, .0267 and .0605, and shall be located, designed, constructed, and maintained to have minimal disturbance to protect water quality to the maximum extent practicable through the use of best management practices. All buffer rule requirements, including diffuse flow requirements, must be met.

8. If concrete is used during the construction, then all necessary measures shall be taken to prevent direct contact between uncured or curing concrete and waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to waters of the state due to the potential for elevated pH and possible aquatic life/ fish kills.
9. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to the most current version of *Stormwater Best Management Practices*. Exceptions to this condition require written approval by the Division.

10. Placement of culverts and other structures in Waters and Wetlands

Culverts required for this project shall be designed and installed in such a manner that the original stream profiles are not altered and allow for aquatic life movement during low flows. Existing stream dimensions (including the cross section dimensions, pattern, and longitudinal profile) must be maintained above and below locations of each culvert.

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Placement of culverts and other structures in waters and streams must be below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than or equal to 48 inches, to allow low flow passage of water and aquatic life.

When topographic constraints indicate culvert slopes of greater than 5%, culvert burial is not required, provided that all alternative options for flattening the slope have been investigated and aquatic life movement/ connectivity has been provided when possible (rock ladders, crossvanes, etc). Notification to the Division including supporting documentation to include a location map of the culvert, culvert profile drawings, and slope calculations shall be provided to the Division 60 days prior to the installation of the culvert.

When bedrock is present in culvert locations, culvert burial is not required provided that there is sufficient documentation of the presence of bedrock. Notification to the Division including supporting documentation such as, but not limited to, a location map of the culvert, geotechnical reports, photographs, etc shall be provided to the Division a minimum of 60 days prior to the installation of the culvert. If bedrock is discovered during construction, then the Division shall be notified by phone or email within 24 hours of discovery.

If other site-specific topographic constraints preclude the ability to bury the culverts as described above and/or it can be demonstrated that burying the culvert would result in destabilization of the channel, then exceptions to this condition require application submittal to, and written approval by, the Division of Water Quality, regardless of the total impacts to streams or wetlands from the project.

Installation of culverts in wetlands must ensure continuity of water movement and be designed to adequately accommodate high water or flood conditions. Additionally, when roadways, causeways, or other fill projects are constructed across FEMA-designated floodways or wetlands, openings such as culverts or bridges must be provided to maintain the natural hydrology of the system as well as prevent constriction of the floodway that may result in destabilization of streams or wetlands.

The establishment of native, woody vegetation and other soft stream bank stabilization techniques must be used where practicable instead of riprap or other bank hardening methods.

* 11. Compensatory Mitigation

In accordance with 15A NCAC 02H .0506 (h), compensatory mitigation may be required for losses of equal to or greater than 150 linear feet of streams (intermittent and perennial) and/or equal to or greater than one (1) acre of wetlands. For linear public transportation projects, impacts equal to or exceeding 150 linear feet per stream shall require mitigation.

Buffer mitigation may be required for any project with Buffer Rules in effect at the time of application for activities classified as "Allowable with Mitigation" or "Prohibited" within the Table of Uses.

A determination of buffer, wetland, and stream mitigation requirements shall be made for any General Water Quality Certification for this Nationwide and/or Regional General Permit. Design and monitoring protocols shall follow the US Army Corps of Engineers Wilmington District *Stream Mitigation Guidelines* (April 2003) or its subsequent updates. Compensatory mitigation plans shall be submitted to the Division for written approval as required in those protocols. The mitigation plan must be implemented and/or constructed before any impacts occur on site. Alternatively, the Division will accept payment into an in-lieu fee program or a mitigation bank. In these cases, proof of payment shall be provided to the Division before any impacts occur on site.

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12. Relocated stream designs should include the same dimensions, patterns, and profiles as the existing channel (or a stable reference reach if the existing channel is unstable), to the maximum extent practical. The new channel should be constructed in the dry and water shall not be turned into the new channel until the banks are stabilized. Vegetation used for bank stabilization shall be limited to native woody species, and should include establishment of a 30-foot wide wooded and an adjacent 20-foot wide vegetated buffer on both sides of the relocated channel to the maximum extent practical. A transitional phase incorporating appropriate erosion control matting materials and seedling establishment is allowable, however matting that incorporates plastic mesh and/or plastic twine shall not be used in wetlands, riparian buffers or floodplains as recommended by the North Carolina Sediment and Erosion Control Manual. Rip-rap, A-Jacks, concrete, gabions or other hard structures may be allowed if it is necessary to maintain the physical integrity of the stream; however, the applicant must provide written justification and any calculations used to determine the extent of rip-rap coverage. Please note that if the stream relocation is conducted as a stream restoration as defined in the US Army Corps of Engineers Wilmington District, April 2003 *Stream Mitigation Guidelines* (or its subsequent updates), the restored length may be used as compensatory mitigation for the impacts resulting from the relocation.
13. All temporary fill and culverts shall be removed and the impacted area returned to natural conditions within 60 days of the determination that the temporary impact is no longer necessary. The impacted areas shall be restored to original grade, including each stream's original cross sectional dimensions, plan form pattern, and longitudinal bed and bed profile, and the various sites shall be stabilized with natural woody vegetation (except for the approved maintenance areas) and restored to prevent erosion.
14. Pipes shall be installed under the road or causeway in all streams to carry at least the 25-year storm event as outlined in the most recent edition of the *North Carolina Sediment and Erosion Control Planning and Design Manual* or the *North Carolina Surface Mining Manual* so as not to restrict stream flow during use of this General Certification.
- * 15. If an environmental document is required under the National or State Environmental Policy Act (NEPA or SEPA), then this General Certification is not valid until a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) is issued by the State Clearinghouse.
16. In the twenty (20) coastal counties, the appropriate DWQ Regional Office must be contacted to determine if Coastal Stormwater Regulations will be required.
17. This General Certification does not relieve the applicant of the responsibility to obtain all other required Federal, State, or Local approvals.
18. The applicant/permittee and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act), and any other appropriate requirements of State and Federal Law. If the Division determines that such standards or laws are not being met, including failure to sustain a designated or achieved use, or that State or Federal law is being violated, or that further conditions are necessary to assure compliance, then the Division may reevaluate and modify this General Water Quality Certification.
- * 19. When written authorization is required for use of this certification, upon completion of all permitted impacts included within the approval and any subsequent modifications, the applicant shall be required to return the certificate of completion attached to the approval. One copy of the certificate shall be sent to the DWQ Central Office in Raleigh at 1650 Mail Service Center, Raleigh, NC, 27699-1650.

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- 20. Additional site-specific conditions, including monitoring and/or modeling requirements, may be added to the written approval letter for projects proposed under this Water Quality Certification in order to ensure compliance with all applicable water quality and effluent standards.
- 21. This certification grants permission to the director, an authorized representative of the Director, or DENR staff, upon the presentation of proper credentials, to enter the property during normal business hours.

This General Certification shall expire on the same day as the expiration date of the corresponding Nationwide and/or Regional General Permit. The conditions in effect on the date of issuance of Certification for a specific project shall remain in effect for the life of the project, regardless of the expiration date of this Certification.

Non-compliance with or violation of the conditions herein set forth by a specific project may result in revocation of this General Certification for the project and may also result in criminal and/or civil penalties.

The Director of the North Carolina Division of Water Quality may require submission of a formal application for Individual Certification for any project in this category of activity if it is determined that the project is likely to have a significant adverse effect upon water quality, including state or federally listed endangered or threatened aquatic species, or degrade the waters so that existing uses of the wetland or downstream waters are precluded.

Public hearings may be held for specific applications or group of applications prior to a Certification decision if deemed in the public's best interest by the Director of the North Carolina Division of Water Quality.

Effective date: March 19, 2012

DIVISION OF WATER QUALITY

By

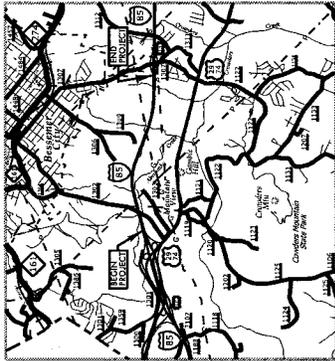


Charles Wakild, P.E.

Director

History Note: Water Quality Certification (WQC) Number 3893 issued March 19, 2012 replaces WQC Number 3688 issued November 1, 2007; WQC Number 3634 issued March 19, 2007; WQC Number 3366 issued March 18, 2002; WQC Number 3114 issued February 11, 1997; and WQC Number 2727 issued May 1, 1992. This General Certification is rescinded when the Corps of Engineers reauthorizes any of the corresponding Nationwide and/or Regional General Permits or when deemed appropriate by the Director of the Division of Water Quality.

See Sheet I-A For Index of Sheets



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GASTON COUNTY

LOCATION: NEW I-85 NBL WEIGH STATION FROM SR 1302
(CROWDERS MOUNTAIN RD) TO SR 1307 (EDGEWOOD ROAD)

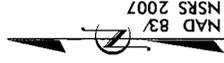
TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURES,
WIDENING, PAVEMENT, SIGNING; WEIGH STATION BUILDINGS, STATIC SCALES,
COMMERCIAL VEHICLE INFORMATION SYSTEMS NETWORKS (CVISN)
WEIGH-IN-MOTION (WIM) SCALE SYSTEM, & LIGHTING

STATE	NC	PROJECT NUMBER	1-4928
FEDERAL PROJECT NUMBER		DATE	1/14/14
PROJECT DESCRIPTION	WEIGH STATION BUILDINGS, STATIC SCALES, CVISN, WIM		
DESIGNER	HMS-85-110693		
DATE	4/19/13		
PROJECT TYPE	CONSTR.		

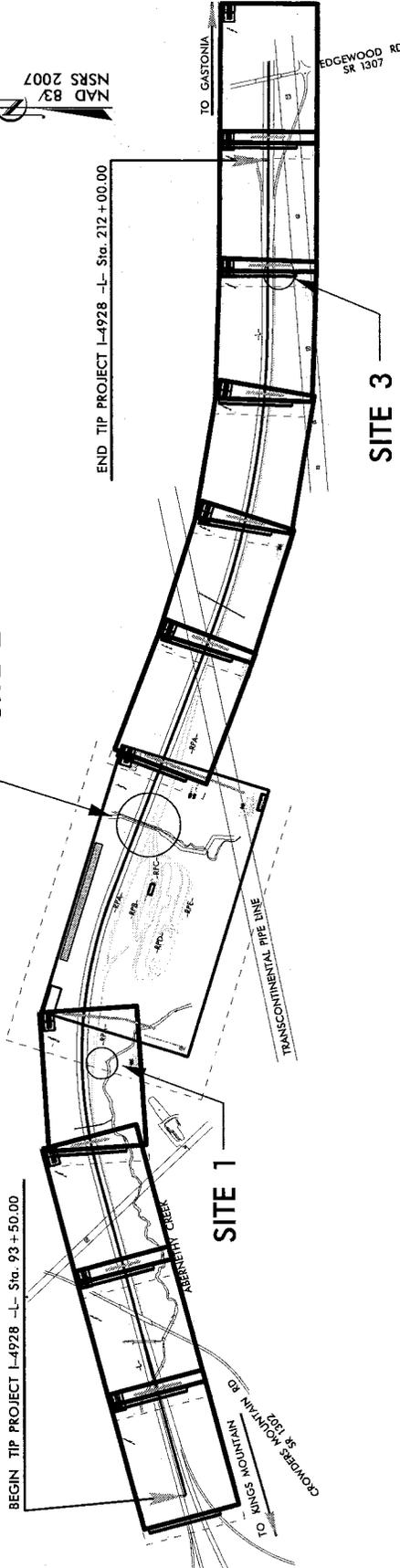
PERMIT DRAWING SHEET OF

BEGIN TIP PROJECT I-4928 -L- Sta. 93+50.00

SITE 2



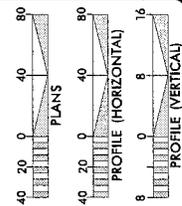
END TIP PROJECT I-4928 -L- Sta. 212+00.00



SITE 1

SITE 3

GRAPHIC SCALES



DESIGN DATA

ADT 2014	= 74,324
ADT 2035	= 98,500
DHV	= 10 %
D	= 55 %
T	= 23 %
V	= 70 MPH
* TTST 18% DUAL 5 %	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT I-4928 = 2.244 MILES
TOTAL LENGTH TIP PROJECT I-4928 = 2.244 MILES

DIVISION OF HIGHWAYS

Prepared in the Office of
1000 Birch Ridge Dr., Raleigh NC, 27610
RIGHT OF WAY DATE: September 20, 2012
LETTING DATE: February 18, 2014

HYDRAULICS ENGINEER

PROJECT ENGINEER: Christopher K. Haire, PE
PROJECT ENGINEER: Mohammed E. Makhoul, EL
PROJECT ENGINEER: Project Engineer

INCOMPLETE PLANS
DO NOT USE FOR BIDDING
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NOTE: THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III



DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
STATE HIGHWAY DESIGN ENGINEER

TIP PROJECT: I-4928

CONTRACT:

PROJECT REFERENCE NO. L-9278 SHEET NO. 6

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT CONSIDER FOR CONSTRUCTION

PRELIMINARY PLANS
DO NOT CONSIDER FOR CONSTRUCTION

PERMIT DRAWING
SHEET OF 2

NAD 83/NSRS 2007

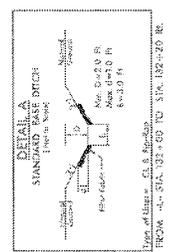
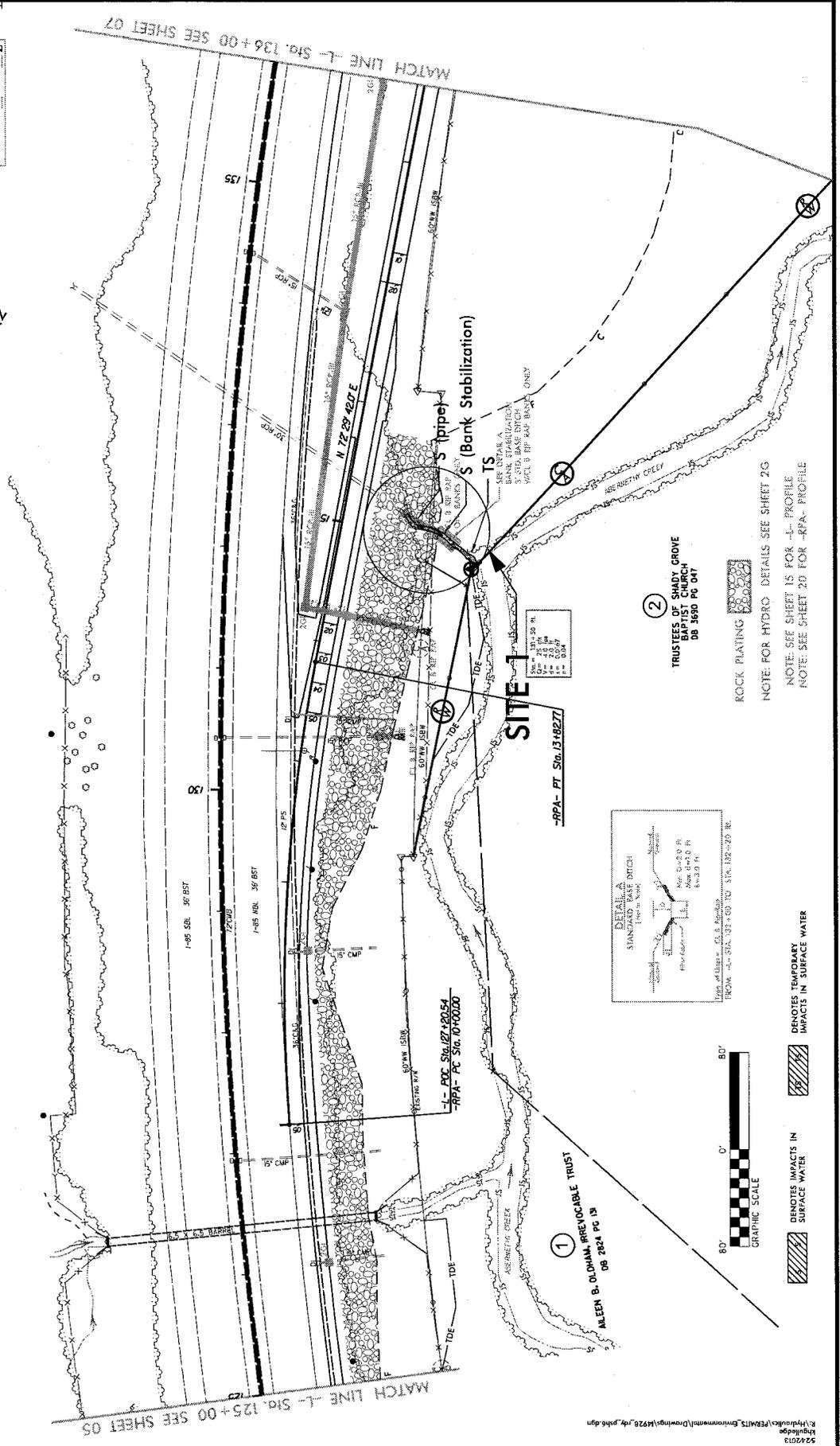
-RPA-

PI Stn 11+92.50
 Δ = 15.07 295 (RT)
 θ = 39.27 1.22
 L = 192.50
 R = 1460.00
 SE = SEE PLANS

-L-

PI Stn 122+88.34 PI Stn 134+81.75
 Δ = 12.20 000 (RT) Δ = 12.20 000 (RT)
 θ = 1.49 486 θ = 1.49 486
 L = 245.00 L = 245.00
 LT = 163.34 LT = 163.34
 ST = 8167 ST = 8167
 SE = EXISTING

PI Stn 146+15.85
 Δ = 1.49 486
 L = 245.00
 LT = 163.34
 ST = 8167
 SE = EXISTING



② TRUSTEES OF SHADY GROVE
 08 3650 PG 04T

ROCK PLATING

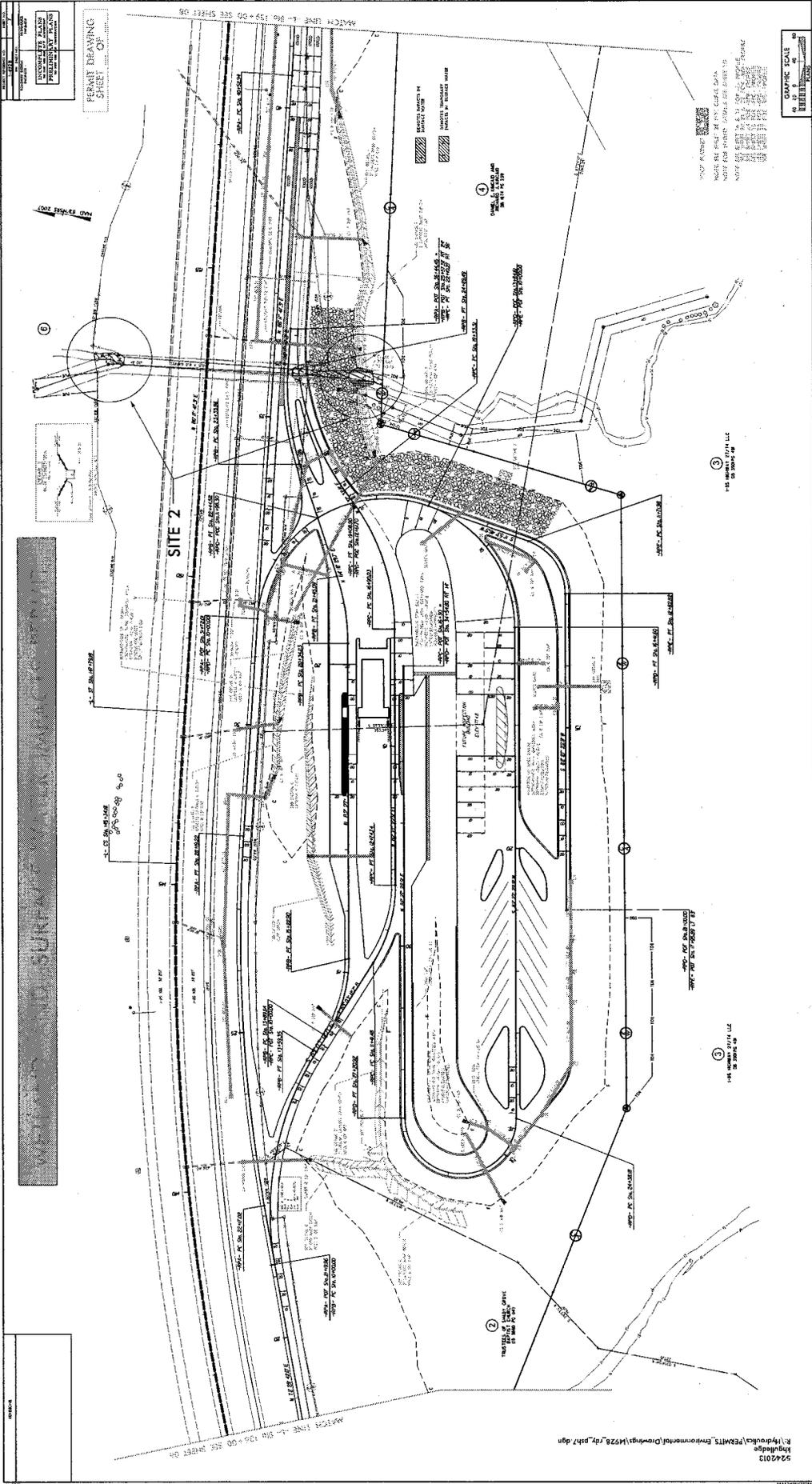
NOTE: FOR HYDRO DETAILS SEE SHEET 2/5
 NOTE: SEE SHEET 1/5 FOR L- PROFILE
 NOTE: SEE SHEET 2/0 FOR RPA- PROFILE

① ALEEN B. OLDHAM, IRREVOCABLE TRUST
 08 2824 PG 01

SITE 1

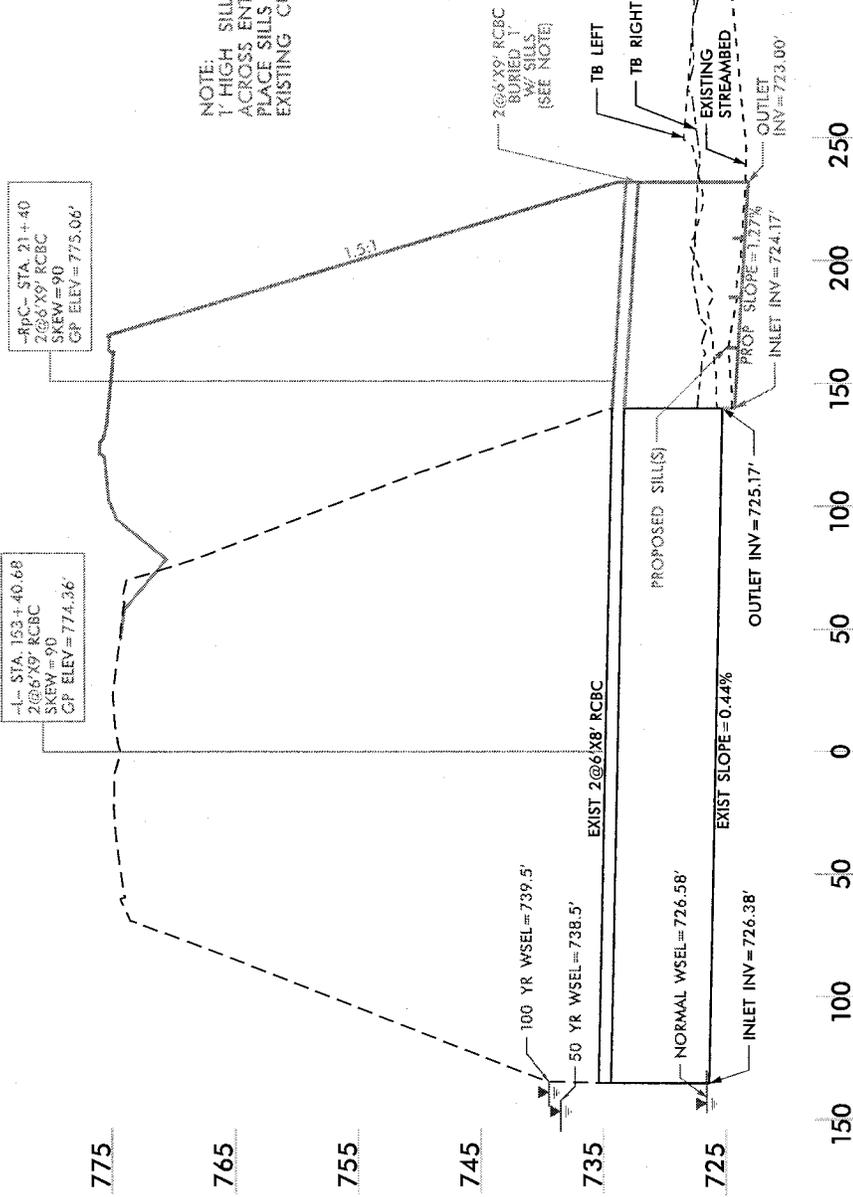
-RPA- PT Sta. 134827Z

L- POC Sta. 127+90.54
 RPA- PC Sta. 1070000



WETLAND AND SURFACE WATER IMPACTS PERMIT

PERMIT DRAWING
SHEET 8 OF 13



NOTE:
1' HIGH SILLS TO BE USED IN NEW EXTENSION ONLY,
ACROSS ENTIRE WIDTH OF BOTH CULVERT BARRELS.
PLACE SILLS AT +25', +45', AND +70' FROM END OF
EXISTING CULVERT. NO SILL AT OUTLET.

-1- STA. 153+40.68
200' X 9' RCBC
SKEW = 90
GP ELEV = 774.36'

-RpC- STA. 21+40
200' X 9' RCBC
SKEW = 90
GP ELEV = 775.06'

R-64

SITE 2 - PROFILE VIEW

GASTONIA - NEW I-85 NBL
WEIGH STATION FROM SRI302
(CROWDERS MTN RD) TO
SR 1307 (EDGEWOOD RD)

NCDOT
DIVISION OF HIGHWAYS
CLEVELAND / GASTON COUNTY
WBS NO.: 41188.1.1 (I-4928)

PROJECT REFERENCE NO.	SHEET NO.
1-1978	11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR CONSTRUCTION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PERMIT DRAWING
SHEET 10 OF 13

NAD 83/NSRS 2007

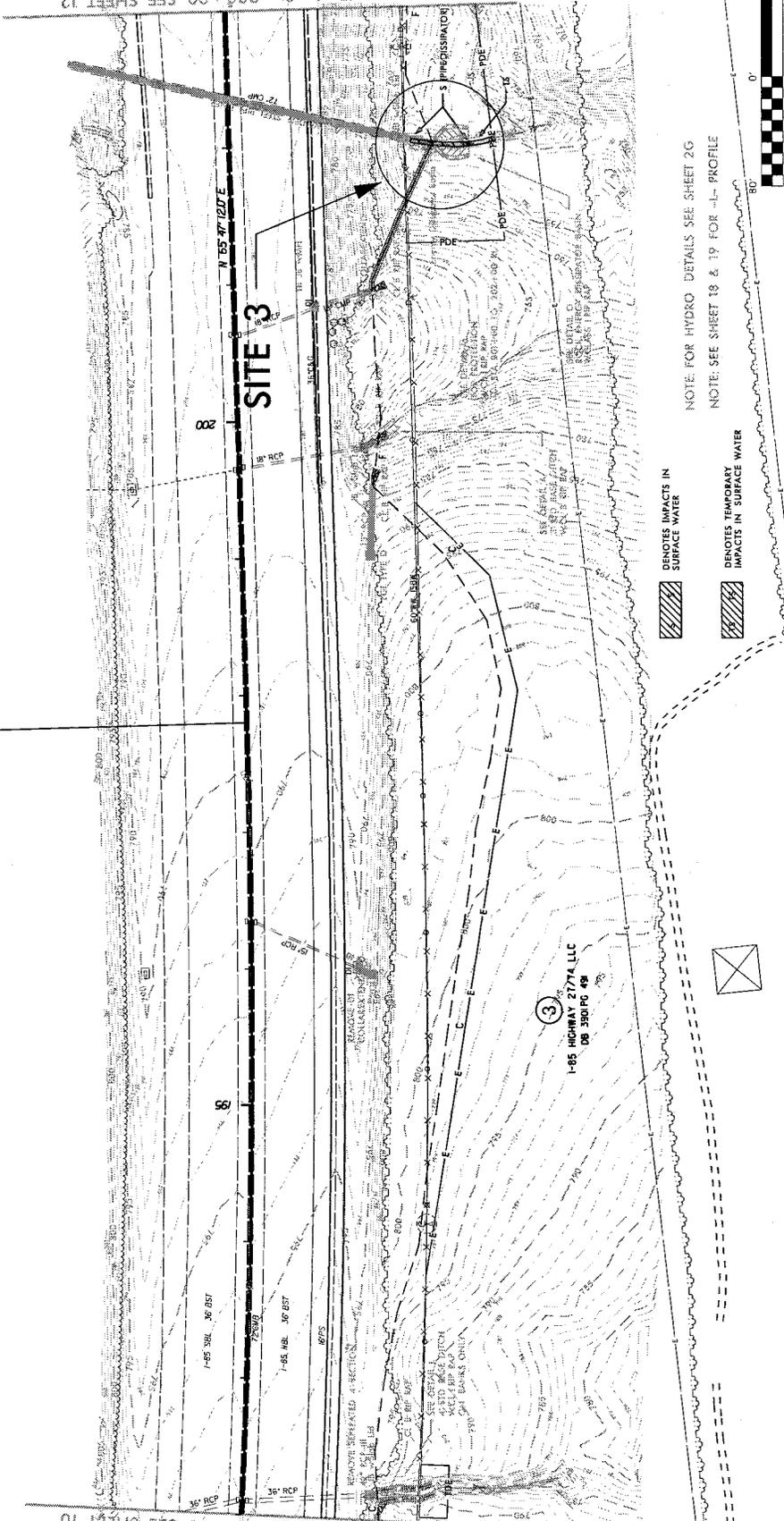
- L- PT Sta. 197+80.17
- PI S10 184,785.88
- A = 0.217751171
- L = 2136.597
- 7 = 1383.30
- R = 7463.00
- SE = EXISTING

MATCH LINE -L- Sta. 203+00 SEE SHEET 12

MATCH LINE -L- Sta. 192+00 SEE SHEET 10

-L- PT Sta. 197+80.17

SITE 3



NOTE FOR HYDRO DETAILS SEE SHEET 2G
NOTE: SEE SHEET 18 & 19 FOR -L- PROFILE

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACT IN SURFACE WATER



R-66

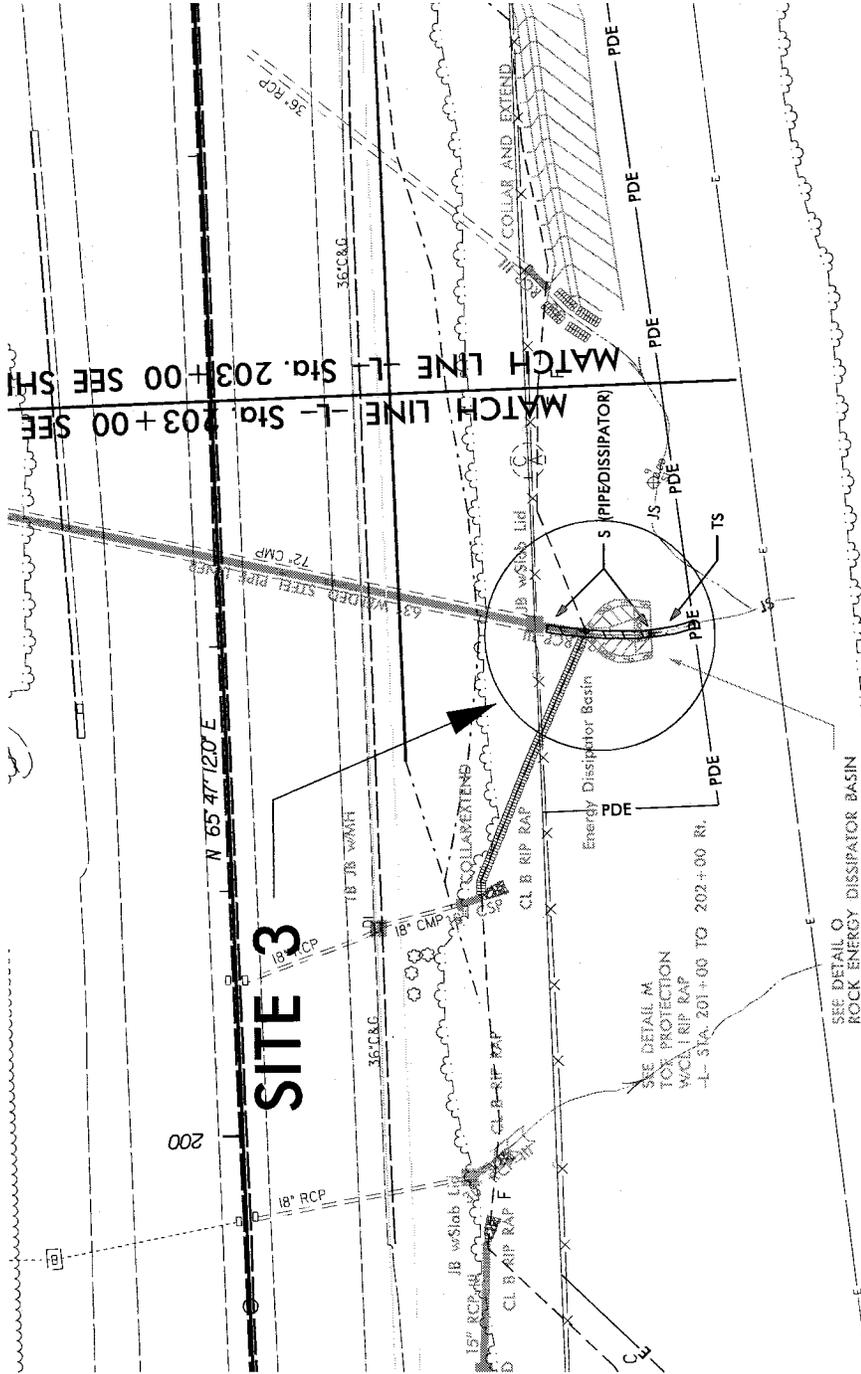
11/17/07

REVISIONS

11/17/07 11:58 AM

NCDOT
DIVISION OF HIGHWAYS
CLEVELAND/GASTON COUNTY
WBS NO: 41188.1.1 (I-4928)
GASTONIA - NEW I-85 NBL
WEIGH STATION FROM SR1302
(CROWDERS MTN RD) TO
SR1307 (EDGEWOOD RD)

WETLAND AND SURFACE WATER IMPACTS PERMIT



ENLARGEMENT - SITE 3
STREAM/SURFACE WATER IMPACTS



DENOTES IMPACTS IN
SURFACE WATER

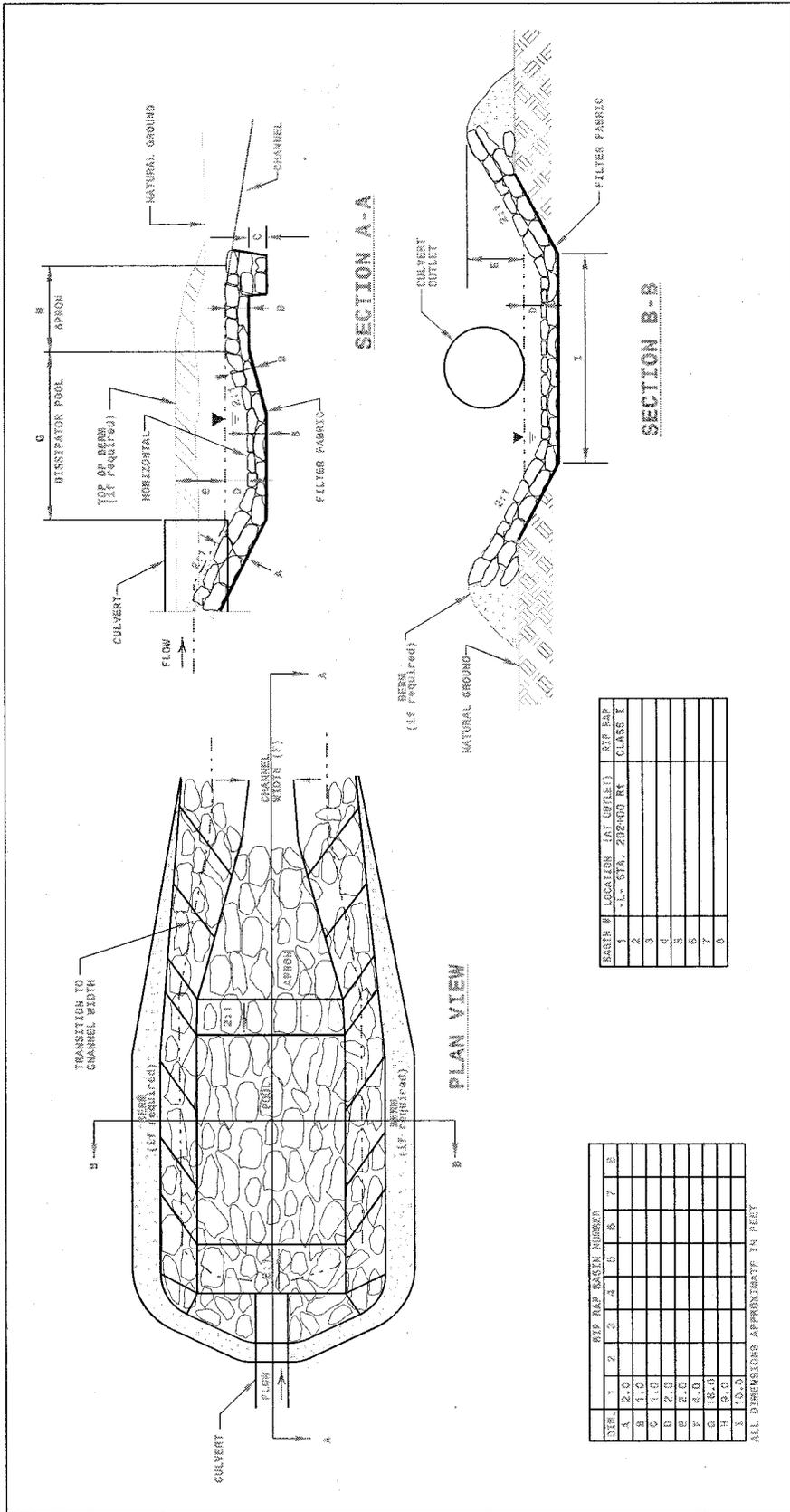


DENOTES TEMPORARY
IMPACTS IN SURFACE WATER



SEE DETAIL O
ROCK ENERGY DISSIPATOR BASIN
W/CLASS 1 RIP RAP

SEE DETAIL M
TOX PROTECTION
W/CL 1 RIP RAP
-L- STA. 201+00 TO 202+00 R.



BASIN #	LOCATION (AT OUTLET)	RIP RAP CLASS
1	-L- STA. 202+00 RT	CLASS 1
2		
3		
4		
5		
6		
7		
8		

DIR.	1	2	3	4	5	6	7	8
A	2.0							
B	1.0							
C	1.0							
D	2.0							
E	2.0							
F	2.0							
G	18.0							
H	8.0							
I	10.0							

ALL DIMENSIONS APPROXIMATE IN FEET

DETAIL 0 ROCK ENERGY DISSIPATOR BASIN DETAIL

NOT TO SCALE

STANDARD SPECIAL PROVISION
AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS

(5-20-08)

Z-2

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

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

Payment will be made on any contract terminated pursuant to the special provision in accordance with Subarticle 108-13(E) of the *2012 Standard Specifications*.

STANDARD SPECIAL PROVISION
NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY

(5-17-11)

Z-3

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

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

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

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

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

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

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

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

FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

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

Sericea Lespedeza
Oats (seeds)

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

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

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

Common or Sweet Sundangrass

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

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

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

Centipedegrass
Crownvetch
Pensacola Bahiagrass
Creeping Red Fescue

Japanese Millet
Reed Canary Grass
Zoysia

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

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

STANDARD SPECIAL PROVISION**ERRATA**

(1-17-12) (Rev. 1-21-14)

Z-4

Revise the *2012 Standard Specifications* as follows:

Division 2

Page 2-7, line 31, Article 215-2 Construction Methods, replace “Article 107-26” with “Article 107-25”.

Page 2-17, Article 226-3, Measurement and Payment, line 2, delete “pipe culverts.”

Page 2-20, Subarticle 230-4(B), Contractor Furnished Sources, change references as follows: **Line 1,** replace “(4) Buffer Zone” with “(c) Buffer Zone”; **Line 12,** replace “(5) Evaluation for Potential Wetlands and Endangered Species” with “(d) Evaluation for Potential Wetlands and Endangered Species”; and **Line 33,** replace “(6) Approval” with “(4) Approval”.

Division 3

Page 3-1, after line 15, Article 300-2 Materials, replace “1032-9(F)” with “1032-6(F)”.

Division 4

Page 4-77, line 27, Subarticle 452-3(C) Concrete Coping, replace “sheet pile” with “reinforcement”.

Division 6

Page 6-7, line 31, Article 609-3 Field Verification of Mixture and Job Mix Formula Adjustments, replace “30” with “45”.

Page 6-10, line 42, Subarticle 609-6(C)(2), replace “Subarticle 609-6(E)” with “Subarticle 609-6(D)”.

Page 6-11, Table 609-1 Control Limits, replace “Max. Spec. Limit” for the Target Source of $P_{0.075}/P_{be}$ Ratio with “1.0”.

Page 6-40, Article 650-2 Materials, replace “Subarticle 1012-1(F)” with “Subarticle 1012-1(E)”

Division 8

Page 8-23, line 10, Article 838-2 Materials, replace “Portland Cement Concrete, Class B” with “Portland Cement Concrete, Class A”.

Division 12

Page 12-7, Table 1205-3, add “FOR THERMOPLASTIC” to the end of the title.

Page 12-8, Subarticle 1205-5(B), line 13, replace “Table 1205-2” with “Table 1205-4”.

Page 12-8, Table 1205-4 and 1205-5, replace “THERMOPLASTIC” in the title of these tables with “POLYUREA”.

Page 12-9, Subarticle 1205-6(B), line 21, replace “Table 1205-4” with “Table 1205-6”.

Page 12-11, Subarticle 1205-8(C), line 25, replace “Table 1205-5” with “Table 1205-7”.

Division 15

Page 15-4, Subarticle 1505-3(F) Backfilling, line 26, replace “Subarticle 235-4(C)” with “Subarticle 235-3(C)”.

Page 15-6, Subarticle 1510-3(B), after line 21, replace the allowable leakage formula with the following: $W = LD\sqrt{P} \div 148,000$

Page 15-6, Subarticle 1510-3(B), line 32, delete “may be performed concurrently or” and replace with “shall be performed”.

Page 15-17, Subarticle 1540-3(E), line 27, delete “Type 1”.

Division 17

Page 17-26, line 42, Subarticle 1731-3(D) Termination and Splicing within Interconnect Center, delete this subarticle.

Revise the *2012 Roadway Standard Drawings* as follows:

1633.01 Sheet 1 of 1, English Standard Drawing for Matting Installation, replace “1633.01” with “1631.01”.

STANDARD SPECIAL PROVISION**PLANT AND PEST QUARANTINES****(Imported Fire Ant, Gypsy Moth, Witchweed, And Other Noxious Weeds)**

(3-18-03) (Rev. 10-15-13)

Z-04a

Within Quarantined Area

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

Originating in a Quarantined County

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

Contact

Contact the N.C. Department of Agriculture/United States Department of Agriculture at 1-800-206-9333, 919-733-6932, or <http://www.ncagr.gov/plantind/> to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include

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

STANDARD SPECIAL PROVISION**AWARD OF CONTRACT**

(6-28-77)

Z-6

“The North Carolina Department of Transportation, in accordance with the provisions of *Title VI of the Civil Rights Act of 1964* (78 Stat. 252) and the Regulations of the Department of Transportation (*49 C.F.R., Part 21*), issued pursuant to such act, hereby notifies all bidders that it will affirmatively insure that the contract entered into pursuant to this advertisement will be awarded to the lowest responsible bidder without discrimination on the ground of race, color, or national origin”.

STANDARD SPECIAL PROVISION**MINORITY AND FEMALE EMPLOYMENT REQUIREMENTS**

Z-7

NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (*EXECUTIVE NUMBER 11246*)

1. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, see as shown on the attached sheet entitled "Employment Goals for Minority and Female participation".

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in *41 CFR Part 60-4* shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in *41 CFR 60-4.3(a)*, and its effort to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project or the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the executive Order and the regulations in *41 CFR Part 60-4*. Compliance with the goals will be measured against the total work hours performed.

2. As used in this Notice and in the contract resulting from this solicitation, the "covered area" is the county or counties shown on the cover sheet of the proposal form and contract.

**EMPLOYMENT GOALS FOR MINORITY
AND FEMALE PARTICIPATION**

Economic Areas

Area 023 29.7%

Bertie County
Camden County
Chowan County
Gates County
Hertford County
Pasquotank County
Perquimans County

Area 024 31.7%

Beaufort County
Carteret County
Craven County
Dare County
Edgecombe County
Green County
Halifax County
Hyde County
Jones County
Lenoir County
Martin County
Nash County
Northampton County
Pamlico County
Pitt County
Tyrrell County
Washington County
Wayne County
Wilson County

Area 025 23.5%

Columbus County
Duplin County
Onslow County
Pender County

Area 026 33.5%

Bladen County
Hoke County
Richmond County
Robeson County
Sampson County
Scotland County

Area 027 24.7%

Chatham County
Franklin County
Granville County
Harnett County
Johnston County
Lee County
Person County
Vance County
Warren County

Area 028 15.5%

Alleghany County
Ashe County
Caswell County
Davie County
Montgomery County
Moore County
Rockingham County
Surry County
Watauga County
Wilkes County

Area 029 15.7%

Alexander County
Anson County
Burke County
Cabarrus County
Caldwell County
Catawba County
Cleveland County
Iredell County
Lincoln County
Polk County
Rowan County
Rutherford County
Stanly County

Area 0480 8.5%

Buncombe County
Madison County

Area 030 6.3%

Avery County
Cherokee County
Clay County
Graham County
Haywood County
Henderson County
Jackson County
McDowell County
Macon County
Mitchell County
Swain County
Transylvania County
Yancey County

SMSA Areas

Area 5720 26.6%
Currituck County

Area 9200 20.7%
Brunswick County
New Hanover County

Area 2560 24.2%
Cumberland County

Area 6640 22.8%
Durham County
Orange County
Wake County

Area 1300 16.2%
Alamance County

Area 3120 16.4%
Davidson County
Forsyth County
Guilford County
Randolph County
Stokes County
Yadkin County

Area 1520 18.3%
Gaston County
Mecklenburg County
Union County

Goals for Female

Participation in Each Trade

(Statewide) 6.9%

STANDARD SPECIAL PROVISION**REQUIRED CONTRACT PROVISIONS FEDERAL - AID CONSTRUCTION CONTRACTS**

FHWA - 1273 Electronic Version - May 1, 2012

Z-8

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

- A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).
The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.
Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.
Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).
2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.
3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.
4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are

incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

- a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.
 - b. The contractor will accept as its operating policy the following statement:
"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."
2. **EEO Officer:** The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.
3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:
- a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.
 - b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.
 - c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.
 - d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
 - e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.
4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.
- a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.
 - b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.
 - c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.
5. **Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:
- a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.
 - b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
 - c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
 - d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.
6. **Training and Promotion:**
- a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.
 - b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).
 - c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
 - d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. **Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:
- The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.
 - The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.
 - The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.
 - In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.
8. **Reasonable Accommodation for Applicants / Employees with Disabilities:** The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.
9. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.
- The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.
 - The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.
10. **Assurance Required by 49 CFR 26.13(b):**
- The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.
 - The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.
11. **Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.
- The records kept by the contractor shall document the following:
 - The number and work hours of minority and non-minority group members and women employed in each work classification on the project;
 - The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and
 - The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;
 - The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

- All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the

Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

- b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:
 - (i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
 - (ii) The classification is utilized in the area by the construction industry; and
 - (iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
 - (2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
 - (3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
 - (4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.
- c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
- d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.
2. **Withholding.** The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.
 3. **Payrolls and basic records**
 - a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.
 - b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the

payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

- (2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
 - (i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;
 - (ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;
 - (iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
 - (3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.
 - (4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.
- c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

- a. Apprentices (programs of the USDOL). Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- b. Trainees (programs of the USDOL). Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

- In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.
 - d. Apprentices and Trainees (programs of the U.S. DOT). Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.
5. **Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.
 6. **Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.
 7. **Contract termination; debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
 8. **Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.
 9. **Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.
 10. **Certification of eligibility.**
 - a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
 - b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
 - c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. **Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
2. **Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.
3. **Withholding for unpaid wages and liquidated damages.** The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.
4. **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).
 - a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees

from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
 - (2) the prime contractor remains responsible for the quality of the work of the leased employees;
 - (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
 - (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.
- b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.
2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.
 3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.
 4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.
 5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.
2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).
3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

- a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
- c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.
- d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
- e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).
- f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
- g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.
- h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.
- i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

- a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:
 - (1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;
 - (2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
 - (3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and
 - (4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

- (Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)
- a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.
 - b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

- c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.
- d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).
- e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
- f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.
- g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.
- h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.
2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:
 - a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
 - b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.
3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

STANDARD SPECIAL PROVISION**ON-THE-JOB TRAINING**

(10-16-07) (Rev. 5-21-13)

Z-10

Description

The North Carolina Department of Transportation will administer a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternate OJT Program. All contractors (existing and newcomers) will be automatically placed in the Alternate Program. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level. Instead, these requirements will be applicable on an annual basis for each contractor administered by the OJT Program Manager.

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

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

Minorities and Women

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

Assigning Training Goals

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year. A sample agreement is available at www.ncbowd.com/section/on-the-job-training.

Training Classifications

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions. Preference shall be given to providing training in the following skilled work classifications:

Equipment Operators	Office Engineers
Truck Drivers	Estimators
Carpenters	Iron / Reinforcing Steel Workers
Concrete Finishers	Mechanics
Pipe Layers	Welders

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

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

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

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

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

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

Records and Reports

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

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

Trainee Interviews

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

Trainee Wages

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

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

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

Achieving or Failing to Meet Training Goals

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

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

Measurement and Payment

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

STANDARD SPECIAL PROVISION
MINIMUM WAGES
GENERAL DECISION NC140090 01/03/2014 NC90

Z-90

Date: January 3, 2014

General Decision Number: NC140090 01/03/2014 NC90

Superseded General Decision Numbers: NC20130090

State: North Carolina

Construction Type: HIGHWAY

COUNTIES:

Anson
Cabarrus
Gaston
Mecklenburg
Union

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects, railroad construction, bascule, suspension and spandrel arch bridges designed for commercial navigation, bridges involving marine construction, and other major bridges).

Modification Number
0

Publication Date
01/03/2014

SUNC2011-071 09/16/2011

	Rates	Fringes
CARPENTER (Form Work Only)	14.70	
CEMENT MASON/CONCRETE FINISHER		
Anson, Cabarrus, and Gaston Counties	12.87	
Mecklenburg County	12.62	
Union County	12.75	
INSTALLER (Guardrail) (includes Guardrail/Post Driver Work)	11.16	
IRONWORKER (Reinforcing)	14.88	
LABORER		
Asphalt, Asphalt Distributor, Raker, and Spreader	11.78	
Common or General		
Anson and Cabarrus Counties	11.14	
Gaston County	10.63	
Mecklenburg County	11.55	
Union County	10.32	
Concrete Saw	14.26	
Landscape	10.35	
Luteman	12.88	
Mason Tender (Cement/Concrete)	11.25	
Pipelayer	12.93	
Traffic Control (Cone Setter)	12.53	
Traffic Control (Flagger)	9.99	

	Rates	Fringes
POWER EQUIPMENT OPERATORS		
Backhoe/Excavator/Trackhoe		
Anson, Cabarrus, and Gaston Counties	14.21	
Mecklenburg County	13.79	
Union County	14.53	
Broom/Sweeper	13.97	
Bulldozer		
Anson, Cabarrus, and Gaston Counties	15.46	
Mecklenburg County	15.90	
Union County	14.96	
Crane	19.11	
Curb Machine	14.43	
Distributor	14.99	
Drill	16.68	
Grader/Blade		
Anson, Cabarrus, Gaston, and Union Counties	17.99	
Mecklenburg County	18.65	
Loader		
Anson, Cabarrus, Gaston, and Union Counties	14.46	
Mecklenburg County	14.43	
Mechanic	17.13	
Milling Machine	15.80	
Oiler	14.36	
Paver	16.65	
Roller		
Anson, Cabarrus, Gaston, and Union Counties	13.22	
Mecklenburg County	13.29	
Scraper	15.85	
Screed	15.23	
Tractor	14.47	
TRUCK DRIVER		
4 Axle Truck	11.90	
Distributor	16.75	
Dump Truck		
Anson, Cabarrus, and Gaston Counties	13.46	
Mecklenburg County	13.79	
Union County	13.49	
Flatbed Truck	15.02	
Lowboy Truck		
Anson, Cabarrus, Gaston, and Mecklenburg Counties	15.26	
Union County	15.23	
Off the Road Truck	15.00	
Single Axle Truck	12.13	
Tack Truck	16.52	
Water Truck	13.16	

Welders – Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters, PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

STANDARD SPECIAL PROVISION
MINIMUM WAGES
GENERAL DECISION NC140031 01/03/2014 NC31

Z-31

Date: January 3, 2014

General Decision Number: NC140031 01/03/2014 NC31

Superseded General Decision Numbers: NC20130031

State: North Carolina

Construction Type: BUILDING

COUNTIES:

Gaston

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Modification Number
0

Publication Date
01/03/2014

* ELEC0379-009 09/02/2013

Rates Fringes

ELECTRICIAN..... \$ 23.40 13%+5.70

On smokestacks where electrical work performed is above 40 ft. from the ground: \$0.50 per hour additional.

Work from swinging scaffolds, bosun chairs, or raw structural steel: \$0.50 per hour additional.

IRON0848-005 12/01/2012

Rates Fringes
\$ 21.80 9.75

IRONWORKER, STRUCTURAL.....

PLUM0421-002 07/01/2013

Rates Fringes
\$ 24.85 9.65

PLUMBER/PIPEFITTER (Excluding HVAC System Installation).....

SUNC2011-012 08/24/2011

Rates Fringes
\$ 19.76 9.18

BRICKLAYER.....

CARPENTER, Excludes Drywall Hanging, and Form Work. \$ 15.57 0.00

CEMENT MASON/CONCRETE FINISHER... \$ 16.41 0.00

DRYWALL HANGER..... \$ 13.83 0.00

FORM WORKER.....	\$ 14.09	0.00
HVAC MECHANIC (Installation of HVAC Unit Only, Excludes Installation of HVAC Pipe and Duct).....	\$ 17.36	2.23
LABORER: Common or General.....	\$ 11.88	2.15
LABORER: Landscape & Irrigation.....	\$ 9.13	0.28
LABORER: Pipelayer.....	\$ 13.35	2.80
LABORER: Mason Tender-Brick/Cement/Concrete	\$ 12.00	0.00
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 16.00	2.48
OPERATOR: Bulldozer.....	\$ 16.00	1.87
OPERATOR: Crane.....	\$ 19.77	4.48
OPERATOR: Forklift.....	\$ 13.86	0.00
OPERATOR: Grader/Blade.....	\$ 15.72	1.49
OPERATOR: Loader.....	\$ 16.17	0.25
PAINTER: Brush, Roller and Spray.....	\$ 14.13	2.88
ROOFER.....	\$ 12.50	0.81
SHEET METAL WORKER (HVAC Duct Installation Only).	\$ 17.32	1.56
SHEET METAL WORKER, Excludes HVAC Duct and Unit Installation	\$ 15.96	1.01
SPRINKLER FITTER (Fire Sprinklers).....	\$ 15.52	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.
=====

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters, PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination.

The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
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Washington, DC 20210

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3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

County : Gaston

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
ROADWAY ITEMS						
0001	0000100000-N	800	MOBILIZATION	Lump Sum	L.S.	
0002	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum	L.S.	
0003	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM INSPECTIONS BUILDING: COMPLETE GENERAL CONSTRUCTION & ALL SYSTEMS AS INDICATED	Lump Sum	L.S.	
0004	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM SCALE BUILDING & SCALE BOOTH: COMPLETE GEN. CONST. & ALL SYSTEMS AS INDICATED	Lump Sum	L.S.	
0005	0001000000-E	200	CLEARING & GRUBBING ... ACRE(S)	Lump Sum	L.S.	
0006	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUB- BING	3 ACR		
0007	0022000000-E	225	UNCLASSIFIED EXCAVATION	210,900 CY		
0008	0036000000-E	225	UNDERCUT EXCAVATION	3,500 CY		
0009	0106000000-E	230	BORROW EXCAVATION	225,000 CY		
0010	0134000000-E	240	DRAINAGE DITCH EXCAVATION	1,840 CY		
0011	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	15,330 SY		
0012	0192000000-N	260	PROOF ROLLING	15 HR		
0013	0195000000-E	265	SELECT GRANULAR MATERIAL	3,500 CY		
0014	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZA- TION	8,900 SY		
0015	0223000000-E	275	ROCK PLATING	8,500 SY		
0016	0318000000-E	300	FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES	628 TON		
0017	0320000000-E	300	FOUNDATION CONDITIONING GEO- TEXTILE	2,080 SY		

County : Gaston

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0018	0354000000-E	310	**** RC PIPE CULVERTS, CLASS ***** (12", V)	116 LF		
0019	0354000000-E	310	**** RC PIPE CULVERTS, CLASS ***** (36", V)	272 LF		
0020	0360000000-E	310	12" RC PIPE CULVERTS, CLASS III	488 LF		
0021	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	3,368 LF		
0022	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	240 LF		
0023	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	396 LF		
0024	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	8 LF		
0025	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	20 LF		
0026	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	4 LF		
0027	0426000000-E	310	72" RC PIPE CULVERTS, CLASS III	24 LF		
0028	0448400000-E	310	24" RC PIPE CULVERTS, CLASS IV	120 LF		
0029	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	32 LF		
0030	0546000000-E	310	*** CAA PIPE CULVERTS, ***** THICK (4", 0.064")	56 LF		
0031	0582000000-E	310	.15" CS PIPE CULVERTS, 0.064" THICK	90 LF		
0032	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	520 LF		
0033	0986000000-E	SP	GENERIC PIPE ITEM NCDOT APPROVED PIPE LINER	253 LF		

County : Gaston

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0034	0995000000-E	340	PIPE REMOVAL	295 LF		
0035	1011000000-N	500	FINE GRADING	Lump Sum	L.S.	
0036	1044000000-E	501	LIME TREATED SOIL (SLURRY METHOD)	29,870 SY		
0037	1066000000-E	501	LIME FOR LIME TREATED SOIL	300 TON		
0038	1099500000-E	505	SHALLOW UNDERCUT	1,500 CY		
0039	1099700000-E	505	CLASS IV SUBGRADE STABILIZATION	3,000 TON		
0040	1110000000-E	510	STABILIZER AGGREGATE	500 TON		
0041	1115000000-E	SP	GEOTEXTILE FOR PAVEMENT STABILIZATION	4,000 SY		
0042	1121000000-E	520	AGGREGATE BASE COURSE	394 TON		
0043	1176000000-E	542	SOIL CEMENT BASE	29,870 SY		
0044	1187000000-E	542	PORTLAND CEMENT FOR SOIL CEMENT BASE	822 TON		
0045	1209000000-E	543	ASPHALT CURING SEAL	8,970 GAL		
0046	1220000000-E	545	INCIDENTAL STONE BASE	500 TON		
0047	1330000000-E	607	INCIDENTAL MILLING	800 SY		
0048	1489000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0B	5,910 TON		
0049	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	12,190 TON		
0050	1508000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0D	5,760 TON		
0051	1524200000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5D	9,310 TON		

County : Gaston

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0052	1525000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A	2,480 TON		
0053	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	1,225 TON		
0054	1577000000-E	620	POLYMER MODIFIED ASPHALT BINDER FOR PLANT MIX	535 TON		
0055	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	300 TON		
0056	1840000000-E	665	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)	24,000 LF		
0057	1858000000-E	710	*****" PORT CEM CONC PAVEMENT, RAMPS (WITH DOWELS) (11-1/2")	41,250 SY		
0058	1891000000-E	SP	GENERIC PAVING ITEM NONWOVEN GEOTEXTILE INTERLAYER	11,000 SY		
0059	1902000000-N	710	SURFACE TESTING CONCRETE PAVEMENT	Lump Sum	L.S.	
0060	1924000000-N	725	FIELD LABORATORY RENTAL, PORT CEM CONC PAVEMENT	Lump Sum	L.S.	
0061	2000000000-N	806	RIGHT OF WAY MARKERS	13 EA		
0062	2022000000-E	815	SUBDRAIN EXCAVATION	168 CY		
0063	2033000000-E	815	SUBDRAIN FINE AGGREGATE	168 CY		
0064	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	1,000 LF		
0065	2070000000-N	815	SUBDRAIN PIPE OUTLET	2 EA		
0066	2077000000-E	815	6" OUTLET PIPE	12 LF		
0067	2099000000-E	816	SHOULDER DRAIN	5,000 LF		
0068	2110000000-E	816	4" SHOULDER DRAIN PIPE	5,000 LF		
0069	2121000000-E	816	4" OUTLET PIPE FOR SHOULDER DRAINS	260 LF		

County : Gaston

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0070	2132000000-N	816	CONCRETE PAD FOR SHOULDER DRAIN PIPE OUTLET	6 EA		
0071	2143000000-E	818	BLOTTING SAND	15 TON		
0072	2209000000-E	838	ENDWALLS	7 CY		
0073	2253000000-E	840	PIPE COLLARS	6 CY		
0074	2264000000-E	840	PIPE PLUGS	1 CY		
0075	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	68 EA		
0076	2297000000-E	840	MASONRY DRAINAGE STRUCTURES	11.8 CY		
0077	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	42 LF		
0078	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	9 EA		
0079	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	21 EA		
0080	2366000000-N	840	FRAME WITH TWO GRATES, STD 840.24	2 EA		
0081	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	9 EA		
0082	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	5 EA		
0083	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	9 EA		
0084	2396000000-N	840	FRAME WITH COVER, STD 840.54	3 EA		
0085	2462000000-E	SP	*** SLUICE GATE (18")	2 EA		
0086	2462000000-E	SP	*** SLUICE GATE (24")	1 EA		

County : Gaston

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0087	2462000000-E	SP	*** SLUICE GATE (36")	1 EA		
0088	2473000000-N	SP	GENERIC DRAINAGE ITEM OIL / WATER SEPARATOR	1 EA		
0089	2535000000-E	846	***X *** CONCRETE CURB (9" X 18")	860 LF		
0090	2542000000-E	846	1'-6" CONCRETE CURB & GUTTER	1,790 LF		
0091	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	5,310 LF		
0092	2591000000-E	848	4" CONCRETE SIDEWALK	230 SY		
0093	2627000000-E	852	4" CONCRETE ISLAND COVER	250 SY		
0094	2724000000-E	857	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	80 LF		
0095	2753000000-E	846	GENERIC PAVING ITEM SPECIAL SHOULDER BERM GUTTER	1,963 LF		
0096	2910000000-N	SP	CONVERT EXISTING TRAFFIC BEAR- ING DROP INLET TO TRAFFIC BEARING JUNCTION BOX	1 EA		
0097	3000000000-N	SP	IMPACT ATTENUATOR UNIT, TYPE 350	1 EA		
0098	3030000000-E	862	STEEL BM GUARDRAIL	8,550 LF		
0099	3045000000-E	862	STEEL BM GUARDRAIL, SHOP CURVED	750 LF		
0100	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	15 EA		
0101	3165000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE ***** (350, TL-2)	2 EA		
0102	3210000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE CAT-1	12 EA		
0103	3270000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE 350	10 EA		

County : Gaston

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0104	3285000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE M-350	2 EA		
0105	3317000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE B-77	4 EA		
0106	3360000000-E	863	REMOVE EXISTING GUARDRAIL	5,400 LF		
0107	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	10,270 LF		
0108	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	649 EA		
0109	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	155 EA		
0110	3628000000-E	876	RIP RAP, CLASS I	1,600 TON		
0111	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	3,030 SY		
0112	3659000000-N	SP	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON	2 EA		
0113	4048000000-E	902	REINFORCED CONCRETE SIGN FOUNDATIONS	8 CY		
0114	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDATIONS	2 CY		
0115	4057000000-E	SP	OVERHEAD FOOTING	84 CY		
0116	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	7,812 LB		
0117	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	1,207 LB		
0118	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	1,034 LF		
0119	4078000000-E	903	SUPPORTS, 2-LB STEEL U-CHANNEL	2 EA		
0120	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (107+50 -L-)	Lump Sum	L.S.	
0121	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (119+44 -L-)	Lump Sum	L.S.	

County : Gaston

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0122	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (135+90 -L-)	Lump Sum	L.S.	
0123	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (182+30 -L-)	Lump Sum	L.S.	
0124	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (AT 74 WEST EXIT)	Lump Sum	L.S.	
0125	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (NORTH OF 74 EAST EXIT)	Lump Sum	L.S.	
0126	4096000000-N	904	SIGN ERECTION, TYPE D	22 EA		
0127	4102000000-N	904	SIGN ERECTION, TYPE E	21 EA		
0128	4108000000-N	904	SIGN ERECTION, TYPE F	2 EA		
0129	4109000000-N	904	SIGN ERECTION, TYPE *** (OVERHEAD) (A)	2 EA		
0130	4109000000-N	904	SIGN ERECTION, TYPE *** (OVERHEAD) (B)	2 EA		
0131	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	12 EA		
0132	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	7 EA		
0133	4114000000-N	904	SIGN ERECTION, MILEMARKERS	2 EA		
0134	4116100000-N	904	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (B)	2 EA		
0135	4138000000-N	907	DISPOSAL OF SUPPORT, STEEL BEAM	2 EA		
0136	4149000000-N	907	DISPOSAL OF SIGN SYSTEM, OVERHEAD	3 EA		

County : Gaston

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0137	4152000000-N	907	DISPOSAL OF SIGN SYSTEM, STEEL BEAM	2 EA		
0138	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	4 EA		
0139	4158000000-N	907	DISPOSAL OF SIGN SYSTEM, WOOD	2 EA		
0140	4234000000-N	907	DISPOSAL OF SIGN, A OR B (OVERHEAD)	4 EA		
0141	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	683 SF		
0142	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	636 SF		
0143	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	40 SF		
0144	4415000000-N	1115	FLASHING ARROW BOARD	3 EA		
0145	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	2 EA		
0146	4430000000-N	1130	DRUMS	400 EA		
0147	4435000000-N	1135	CONES	215 EA		
0148	4445000000-E	1145	BARRICADES (TYPE III)	32 LF		
0149	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	3 EA		
0150	4480000000-N	1165	TMA	3 EA		
0151	4485000000-E	1170	PORTABLE CONCRETE BARRIER	10,000 LF		
0152	4510000000-N	SP	LAW ENFORCEMENT	150 HR		
0153	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	650 EA		
0154	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	660 LF		
0155	4688000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)	23,823 LF		

County : Gaston

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0156	4690000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 120 MILS)	6,991 LF		
0157	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	3,107 LF		
0158	4720000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 120 MILS)	1,081 LF		
0159	4721000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (120 MILS)	4 EA		
0160	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	9 EA		
0161	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	8,533 LF		
0162	4815000000-E	1205	PAINT PAVEMENT MARKING LINES (6")	107,600 LF		
0163	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	1,020 LF		
0164	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	72 LF		
0165	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	2 EA		
0166	4855000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (6")	53,000 LF		
0167	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	478 EA		
0168	5010000000-E	1401	100' HIGH MOUNT STANDARD	3 EA		
0169	5020000000-N	1401	PORTABLE DRIVE UNIT	1 EA		
0170	5070000000-N	1405	STANDARD FOUNDATION ***** (R1)	12 EA		
0171	5070000000-N	1405	STANDARD FOUNDATION ***** (R2)	3 EA		
0172	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (3")	165 LF		

County : Gaston

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0173	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (4")	245 LF		
0174	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (6")	325 LF		
0175	5185000000-E	1410	** #2 W/G FEEDER CIRCUIT (4)	770 LF		
0176	5190000000-E	1410	***** FEEDER CIRCUIT (4 - #1 W/G)	1,275 LF		
0177	5190000000-E	1410	***** FEEDER CIRCUIT (4 - #2/0 W/G)	1,335 LF		
0178	5220000000-E	1410	** #2 W/G FEEDER CIRCUIT IN ***** CONDUIT (4, 2)	8,210 LF		
0179	5225000000-E	1410	** #1 W/G FEEDER CIRCUIT IN ***** CONDUIT (4, 2)	6,825 LF		
0180	5230000000-E	1410	***** FEEDER CIRCUIT IN ** CONDUIT (4 - #2/0 W/G, 3")	3,215 LF		
0181	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (PC30)	13 EA		
0182	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (PC36)	9 EA		
0183	5260000000-N	SP	GENERIC LIGHTING ITEM RAMP B PIT ELECTRICAL WORK	Lump Sum	L.S.	
0184	5260000000-N	SP	GENERIC LIGHTING ITEM RAMP B STATIC SCALE PLATFORM	Lump Sum	L.S.	
0185	5260000000-N	SP	GENERIC LIGHTING ITEM RAMP B STATIC SCALE SYSTEM	Lump Sum	L.S.	
0186	5260000000-N	SP	GENERIC LIGHTING ITEM RAMP C PIT ELECTRICAL WORK	Lump Sum	L.S.	
0187	5260000000-N	SP	GENERIC LIGHTING ITEM RAMP C STATIC SCALE PLATFORM	Lump Sum	L.S.	

County : Gaston

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0188	5260000000-N	SP	GENERIC LIGHTING ITEM RAMP C STATIC SCALE SYSTEM	Lump Sum	L.S.	
0189	5262000000-E	SP	GENERIC LIGHTING ITEM HIGH MOUNT FOUNDATIONS	21 CY		
0190	5270000000-N	SP	GENERIC LIGHTING ITEM 1 POLE, 120VAC EQUIPMENT DIS- CONNECT	8 EA		
0191	5270000000-N	SP	GENERIC LIGHTING ITEM 15KVA POWER TRANSFORMER	1 EA		
0192	5270000000-N	SP	GENERIC LIGHTING ITEM 2 POLE, 240VAC EQUIPMENT DIS- CONNECT	1 EA		
0193	5270000000-N	SP	GENERIC LIGHTING ITEM HIGH MOUNT LUMINAIRE - LED	18 EA		
0194	5270000000-N	SP	GENERIC LIGHTING ITEM LIGHT CONTROL EQUIPMENT, TYPE WS, 120/208V	1 EA		
0195	5270000000-N	SP	GENERIC LIGHTING ITEM LIGHT STANDARD, TYPE MLTS, 35' MH, 6'SA	15 EA		
0196	5270000000-N	SP	GENERIC LIGHTING ITEM ROADWAY LIGHT STANDARD LUMI- NAIRE-LED	15 EA		
0197	5691700000-E	1520	18" SANITARY GRAVITY SEWER	554 LF		
0198	5775000000-E	1525	4' DIA UTILITY MANHOLE	2 EA		
0199	5811000000-E	1530	ABANDON 18" UTILITY PIPE	570 LF		
0200	5816000000-N	1530	ABANDON UTILITY MANHOLE	3 EA		
0201	5836400000-E	1540	36" ENCASEMENT PIPE	390 LF		
0202	5872400000-E	1550	TRENCHLESS INSTALLATION OF 36" IN SOIL	160 LF		
0203	5872410000-E	1550	TRENCHLESS INSTALLATION OF 36" NOT IN SOIL	160 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0204	6000000000-E	1605	TEMPORARY SILT FENCE	1,200 LF		
0205	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	770 TON		
0206	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	4,400 TON		
0207	6012000000-E	1610	SEDIMENT CONTROL STONE	2,935 TON		
0208	6015000000-E	1615	TEMPORARY MULCHING	58 ACR		
0209	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	3,500 LB		
0210	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED- ING	18.5 TON		
0211	6024000000-E	1622	TEMPORARY SLOPE DRAINS	3,500 LF		
0212	6029000000-E	SP	SAFETY FENCE	1,500 LF		
0213	6030000000-E	1630	SILT EXCAVATION	16,200 CY		
0214	6036000000-E	1631	MATTING FOR EROSION CONTROL	52,000 SY		
0215	6037000000-E	SP	COIR FIBER MAT	650 SY		
0216	6042000000-E	1632	1/4" HARDWARE CLOTH	3,500 LF		
0217	6070000000-N	1639	SPECIAL STILLING BASINS	4 EA		
0218	6071010000-E	SP	WATTLE	3,400 LF		
0219	6071020000-E	SP	POLYACRYLAMIDE (PAM)	1,875 LB		
0220	6071030000-E	1640	COIR FIBER BAFFLE	4,200 LF		
0221	6071050000-E	SP	*** SKIMMER (1-1/2")	14 EA		
0222	6071050000-E	SP	*** SKIMMER (2")	4 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0223	6084000000-E	1660	SEEDING & MULCHING	60	ACR	
0224	6087000000-E	1660	MOWING	20	ACR	
0225	6090000000-E	1661	SEED FOR REPAIR SEEDING	600	LB	
0226	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	2	TON	
0227	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	1,425	LB	
0228	6108000000-E	1665	FERTILIZER TOPDRESSING	42.75	TON	
0229	6111000000-E	SP	IMPERVIOUS DIKE	270	LF	
0230	6114500000-N	1667	SPECIALIZED HAND MOWING	70	MHR	
0231	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	100	EA	
0232	7060000000-E	1705	SIGNAL CABLE	260	LF	
0233	7279000000-E	1715	TRACER WIRE	7,955	LF	
0234	7301000000-E	1715	DIRECTIONAL DRILL (*****) (1, 2")	115	LF	
0235	7301000000-E	1715	DIRECTIONAL DRILL (*****) (2, 2")	620	LF	
0236	7301000000-E	1715	DIRECTIONAL DRILL (*****) (4, 2")	45	LF	
0237	7312000000-N	1716	JUNCTION BOX (***** (SPECIAL-SIZED)	8	EA	
0238	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	32	EA	
0239	7360000000-N	1720	WOOD POLE	1	EA	
0240	7420000000-E	1722	2" RISER WITH WEATHERHEAD	6	EA	
0241	7444000000-E	1725	INDUCTIVE LOOP SAWCUT	458	LF	

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0242	7516000000-E	1730	COMMUNICATIONS CABLE (**FIBER) (36)	8,200 LF		
0243	7540000000-N	1731	SPLICE ENCLOSURE	8 EA		
0244	7552000000-N	1731	INTERCONNECT CENTER	12 EA		
0245	7566000000-N	1733	DELINEATOR MARKER	16 EA		
0246	7613000000-N	SP	SOIL TEST	9 EA		
0247	7614100000-E	SP	DRILLED PIER FOUNDATION	45 CY		
0248	7901000000-N	1753	CABINET BASE EXTENDER	3 EA		
0249	7980000000-N	SP	GENERIC SIGNAL ITEM 5/8" X 10' GROUNDING ELECTRODE	26 EA		
0250	7980000000-N	SP	GENERIC SIGNAL ITEM AVI ANTENNA	6 EA		
0251	7980000000-N	SP	GENERIC SIGNAL ITEM AVI READER	6 EA		
0252	7980000000-N	SP	GENERIC SIGNAL ITEM BASE MOUNTED EQUIPMENT CABINET	3 EA		
0253	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV CABINET	5 EA		
0254	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV CAMERA ASSEMBLY	5 EA		
0255	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV CAMERA ASSEMBLY (FIXED MOUNT)	3 EA		
0256	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV WOOD POLE	5 EA		
0257	7980000000-N	SP	GENERIC SIGNAL ITEM COMPUTER WORKSTATION (INSTALL)	4 EA		
0258	7980000000-N	SP	GENERIC SIGNAL ITEM DIGITAL HARDWARE VIDEO ENCODER	8 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0259	7980000000-N	SP	GENERIC SIGNAL ITEM DMS PEDESTAL TYPE STRUCTURE	1 EA		
0260	7980000000-N	SP	GENERIC SIGNAL ITEM ENCLOSED COMMUNICATIONS RACK	3 EA		
0261	7980000000-N	SP	GENERIC SIGNAL ITEM EQUIPMENT CABINET FOUNDATION	3 EA		
0262	7980000000-N	SP	GENERIC SIGNAL ITEM ETHERNET EDGE SWITCH	13 EA		
0263	7980000000-N	SP	GENERIC SIGNAL ITEM JUNCTION BOX (OVER-SIZED)	27 EA		
0264	7980000000-N	SP	GENERIC SIGNAL ITEM LANE CONTROL SIGNAL	4 EA		
0265	7980000000-N	SP	GENERIC SIGNAL ITEM MANAGED ETHERNET SWITCH	1 EA		
0266	7980000000-N	SP	GENERIC SIGNAL ITEM METAL POLE WITH HINGED MAST ARM	5 EA		
0267	7980000000-N	SP	GENERIC SIGNAL ITEM METAL POLE WITH HINGED MAST ARM DESIGN	5 EA		
0268	7980000000-N	SP	GENERIC SIGNAL ITEM METAL POLE WITH MONOTUBE GANTRY STRUCTURE	2 EA		
0269	7980000000-N	SP	GENERIC SIGNAL ITEM METAL POLE WITH MONOTUBE GANTRY STRUCTURE DESIGN	2 EA		
0270	7980000000-N	SP	GENERIC SIGNAL ITEM NEW ELECTRICAL SERVICE (OVER- HEAD)	1 EA		
0271	7980000000-N	SP	GENERIC SIGNAL ITEM NEW ELECTRICAL SERVICE (UNDER- GROUND)	1 EA		
0272	7980000000-N	SP	GENERIC SIGNAL ITEM OVER-HEIGHT VEHICLE DETECTION SYSTEM	2 EA		
0273	7980000000-N	SP	GENERIC SIGNAL ITEM PATCH PANEL (ETHERNET)	12 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0274	7980000000-N	SP	GENERIC SIGNAL ITEM PIEZOELECTRIC AXLE SENSOR	6 EA		
0275	7980000000-N	SP	GENERIC SIGNAL ITEM PIEZOELECTRIC QUARTZ SENSOR SET	6 EA		
0276	7980000000-N	SP	GENERIC SIGNAL ITEM POLE MOUNTED EQUIPMENT CABINET	5 EA		
0277	7980000000-N	SP	GENERIC SIGNAL ITEM PRINTER (INSTALL)	1 EA		
0278	7980000000-N	SP	GENERIC SIGNAL ITEM SERVER (INSTALL)	2 EA		
0279	7980000000-N	SP	GENERIC SIGNAL ITEM SERVICE DISCONNECT	4 EA		
0280	7980000000-N	SP	GENERIC SIGNAL ITEM SPLICE CENTER (36-FIBER)	1 EA		
0281	7980000000-N	SP	GENERIC SIGNAL ITEM STEEL PEDESTAL POLE	3 EA		
0282	7980000000-N	SP	GENERIC SIGNAL ITEM UPS	6 EA		
0283	7980000000-N	SP	GENERIC SIGNAL ITEM VEHICLE SIGNAL HEAD (12" 2-SECTION, RED-GREEN)	6 EA		
0284	7980000000-N	SP	GENERIC SIGNAL ITEM WALL-MOUNTED COMMUNICATIONS RACK	1 EA		
0285	7985000000-N	SP	GENERIC SIGNAL ITEM ADVANCE LOCATION WIM ELECTRON- ICS	Lump Sum	L.S.	
0286	7985000000-N	SP	GENERIC SIGNAL ITEM ALPR SYSTEM	Lump Sum	L.S.	
0287	7985000000-N	SP	GENERIC SIGNAL ITEM CCTV SOFTWARE	Lump Sum	L.S.	
0288	7985000000-N	SP	GENERIC SIGNAL ITEM CENTRAL CONTROL SOFTWARE	Lump Sum	L.S.	

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0289	7985000000-N	SP	GENERIC SIGNAL ITEM COMPLIANCE LOCATION WIM ELEC- TRONICS	Lump Sum	L.S.	
0290	7985000000-N	SP	GENERIC SIGNAL ITEM DMS	Lump Sum	L.S.	
0291	7985000000-N	SP	GENERIC SIGNAL ITEM NETWORK MANAGEMENT SOFTWARE	Lump Sum	L.S.	
0292	7985000000-N	SP	GENERIC SIGNAL ITEM OPEN/CLOSED DMS PANEL	Lump Sum	L.S.	
0293	7985000000-N	SP	GENERIC SIGNAL ITEM SCALE HOUSE WIM ELECTRONICS	Lump Sum	L.S.	
0294	7985000000-N	SP	GENERIC SIGNAL ITEM SYSTEM WARRANTY	Lump Sum	L.S.	
0295	7985000000-N	SP	GENERIC SIGNAL ITEM TRAINING	Lump Sum	L.S.	
0296	7990000000-E	SP	GENERIC SIGNAL ITEM DROP CABLE (6 FIBER)	1,819 LF		
0297	7990000000-E	SP	GENERIC SIGNAL ITEM ETHERNET CABLE	955 LF		
0298	7990000000-E	SP	GENERIC SIGNAL ITEM FOUR-WIRE COPPER FEEDER CON- DUCTORS	2,536 LF		
0299	7990000000-E	SP	GENERIC SIGNAL ITEM LEAD-IN CABLE	228 LF		
0300	7990000000-E	SP	GENERIC SIGNAL ITEM UNDERGROUND CONDUIT (1, 2")	559 LF		
0301	7990000000-E	SP	GENERIC SIGNAL ITEM UNDERGROUND CONDUIT (2, 2")	5,649 LF		
0302	7990000000-E	SP	GENERIC SIGNAL ITEM UNDERGROUND CONDUIT (3, 2")	1,917 LF		
0303	7990000000-E	SP	GENERIC SIGNAL ITEM UNDERGROUND CONDUIT (4, 2")	85 LF		
0304	7992000000-E	SP	GENERIC SIGNAL ITEM DMS OVERHEAD FOOTINGS	8 CY		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0305	8881000000-E	SP	GENERIC STRUCTURE ITEM CLASS AA CONCRETE (WEIGH BRIDGE - STATIC SCALE)	509 CY		
0306	8889000000-E	SP	GENERIC STRUCTURE ITEM EPOXY COATED REINFORCING STEEL (WEIGH BRIDGE - STATIC SCALE)	35,037 LB		
0307	8889000000-E	SP	GENERIC STRUCTURE ITEM REINFORCING STEEL (WEIGH BRIDGE - STATIC SCALE)	37,175 LB		
0308	8892000000-E	SP	GENERIC STRUCTURE ITEM GROOVING CONCRETE SLABS	6,422 SF		

CULVERT ITEMS

0309	8126000000-N	414	CULVERT EXCAVATION, STA ***** (153+40.68 -L-)	Lump Sum	L.S.	
0310	8133000000-E	414	FOUNDATION CONDITIONING MATER- IAL, BOX CULVERT	170 TON		
0311	8196000000-E	420	CLASS A CONCRETE (CULVERT)	224.6 CY		
0312	8245000000-E	425	REINFORCING STEEL (CULVERT)	29,302 LB		
0313	8889000000-E	SP	GENERIC STRUCTURE ITEM POLYURETHANE GROUT INJECTION	12,500 LB		

