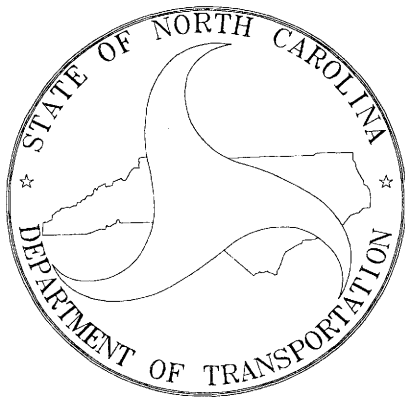


SPECIFICATIONS FOR: ~~11~~ 25 A

I-95 REST AREA & VENDING NASH COUNTY, NORTH CAROLINA

Project No. 39914.3.1



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Architect / Engineer:

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

5 December 06

SET NO. ____

39914.3.1 / Nash County I-95 Rest Area & Vending

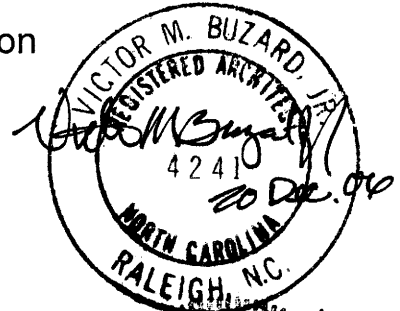
PROJECT: I-95 REST AREA & VENDING
NC Department of Transportation
Nash County, NC

PROJECT NO.: 39914.3.1

DATE: 5 December 06

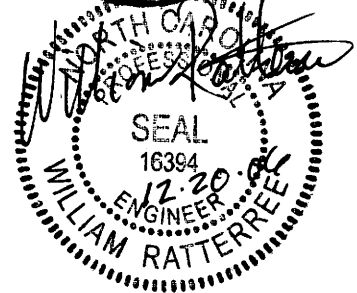
OWNER: NC Department of Transportation

ARCHITECT: Facilities Design, NCDOT
Raleigh, NC (919) 715-0400
Victor M. Buzard, Jr., Architect



ENGINEERS:

STRUCTURAL: Facilities Design, NCDOT
Raleigh, NC (919) 715-0400
W. E. Ratterree, PE



**PLUMBING,
MECHANICAL &
ELECTRICAL:** Facilities Design, NCDOT
Raleigh, NC (919) 715-0400
L. Wayne Holley, PE

*PME Specifications
(15A, 15B, and 16)
Sealed Dec. 18, 2006.
See those sections for
seals.*

*L. W. Holley
Dec. 20, 2006*

39914.3.1 / Nash County I-95 Rest Area & Vending

TABLE OF CONTENTS

27

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
	<u>DIVISION 1 - GENERAL REQUIREMENTS</u>	
01010	Summary of the Work	1
01026	Payment and Completion Procedures	3
01200	Progress Documentation and Procedures	6
01300	Submittals	8
	<u>DIVISION 2 - SITE WORK</u>	
02072	Minor Demolition for Remodeling	11
02200	Earthwork	13
02280	Soil Treatment	16
02712	Subdrainage Systems for Structures	18
	<u>DIVISION 3 - CONCRETE</u>	
03310	Structural Concrete	19
	<u>DIVISION 4 - MASONRY</u>	
04220	Veneer, Glass and Concrete Unit Masonry	23
	<u>DIVISION 5 - METALS</u>	
	Not Used	
	<u>DIVISION 6 - WOOD AND PLASTICS</u>	
06100	Rough Carpentry	25
06200	Finish Carpentry	27
	<u>DIVISION 7 - THERMAL & MOISTURE PROTECTION</u>	
07160	Bituminous Dampproofing	29
07210	Building Insulation	31
07311	Asphalt Shingles	33
07460	Siding	35
07625	Sheet Metal Gutters and Downspouts	37
07900	Joint Sealers	39
	<u>DIVISION 8 - DOORS AND WINDOWS</u>	
08110	Steel Doors and Frames	41
08211	Solid Core Flush Wood Doors	43
08460	Automatic Entrance Doors	44
08550	Wood Windows	46
08620	Unit Skylights	49
08710	Door Hardware	51
08800	Glazing	54
	<u>DIVISION 9 - FINISHES</u>	
09260	Gypsum Board System	57
09300	Tile	59
09660	Resilient Sheet Flooring	62
09900	Painting	64

39914.3.1 / Nash County I-95 Rest Area & Vending

TABLE OF CONTENTS

	<u>DIVISION 10 - SPECIALTIES</u>	
10100	Visual Display Boards	68
10170	Plastic Toilet Compartments	69
10425	Signs	71
10522	Fire Extinguishers, Cabinets, and Accessories	74
10810	Toilet Accessories	76
	<u>DIVISION 11 - COMPENSATION FOR GENERAL CONTRUCTION</u>	
11100	Compensation for General Construction	78
	<u>DIVISION 12 - FURNISHINGS</u>	
	Not Used	
	<u>DIVISION 13 - SPECIAL CONSTRUCTION</u>	
	Not Used	
	<u>DIVISION 14 - CONVEYING SYSTEMS</u>	
	Not Used	
	<u>DIVISION 15 - PLUMBING AND MECHANICAL</u>	
15A	Plumbing Work	79
1540	Compensation for Plumbing	94
15B	Mechanical Work (HVAC)	95
1590	Compensation for Mechanical	110
	<u>DIVISION 16 - ELECTRICAL</u>	
16	Electrical Work	111
1620	Compensation for Electrical	130
	<u>ROADSIDE ENVIRONMENTAL UNIT</u>	
	Site Improvements	131

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 the construction of a new Rest Area Buildings as **Phase 1** and **Phase-2** as converting the existing Rest Area buildings for Vending usage (approximately 1,935 and 1,427 sq. ft. respectively).
 - 1. At I-95 just west of Rocky Mount, NC, in Nash County, NC.
 - 2. As shown in contract documents for the I-95 Rest Area & Vending prepared by Facilities Design, NCDOT.
 - a. Dated 5 December 06.
- B. The Work consists of:
 - 1. Two (2) new one story, wood framed w/ brick veneer, unprotected construction, slab-on-grade building with matching exterior materials to the existing Rest Area buildings, and remodeling of the two (2) existing Rest Area buildings into a Vending buildings.
 - 2. Concrete entrance sidewalks (see Landscape Spec's).
 - 3. Building and immediate site rough and finish grading of all disturbed areas (see Landscape Spec's).

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 lanes of I-95.
- B. Exit ramps, drives and parking spaces shall remain open for the public's use.
- C. The existing rest area building will remain in use for the public during the Phase 1 construction. Phase 2 can not start until Phase 1 is complete and is opened for the public's use.
- D. The construction limits and storage areas will be separated from the public by 5' high chain link safety fencing provided by the Contractor and adjusted for each of the project Phases.
- 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.

PART 2 - PRODUCTS (NOT USED)**PART 3 - EXECUTION****3.01 PRECONSTRUCTION MEETING**

- A. A pre-construction meeting will be held at a time and place designated by the Architect / Engineer, for the purpose of identifying responsibilities of the Owner's and the Architect's personnel and explanation of administrative procedures. The Contractor shall bring the P, M, and E subcontractors to the meeting.

3.02 SECURITY PROCEDURES

- A. Limit access to the site to persons involved in the work, see item 1.03 D. above.
- B. Provide secure storage for materials for which the owner has made payment and which are stored on site.
- C. 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.

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. The Owner will retain from each progress payment an amount equal to 10 percent of the value of the work covered by the progress payment.
 - 1. At substantial completion the contractor may apply for release of retainage, bringing the total of payments to 100 percent of the contract sum, less those amounts that are withheld to cover incomplete or incorrect work and unsettled claims, as defined elsewhere.
- F. 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.
- G. 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 contractor for the purpose of obtaining certification of substantial completion. This list is also referred to as a "Punchlist."
- 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 6 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 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 Punchlist 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 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, 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.
 2. Operation and maintenance data.
 3. Demonstration reports.
 4. Instruction reports.
 5. Project record documents.
 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 4 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 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 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 Engineer will notify the contractor if schedule is not satisfactory; revise and resubmit.
 - 1. Resubmit within 7 days.
- D. Make and distribute copies of schedule to the 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 Engineer at least one week in advance of date of meeting; the Engineer.
- 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 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.
- 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 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 used in 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: 36 by 48 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:
 - 1. 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 Engineer has enough information to properly review the submittals.
- B. Coordinate submittals of different types for the same product or system so that the 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 14 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 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. 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 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 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 Engineer.
- C. Distribution:
 - 1. Make extra copies for operation and maintenance data submittals, as required.

END OF SECTION 01300

DIVISION 2 - SITE WORK**SECTION 02072 - MINOR DEMOLITION FOR REMODELING****PART 1 - GENERAL****1.01 SUMMARY****A. Section Includes:**

1. Demolition and removal of portions of the existing Rest Area buildings or structures; including the tile / masonry entrance walls, floor tile, brick & block walls, roof truss sections at solar panels, plumbing, mechanical heating and cooling equipment, electrical systems, louver, and doors.
 - a. The Contractor shall carefully remove Southbound solar panels and controls and turn over to the Owner in good condition.
 - b. Site Clearing including sidewalks, tree and stump removal are by the Contractor; (see Landscape Spec's).
2. Owner shall have the right to salvage the Contractor removed solar panels and controls, toilet fixtures, and toilet partitions.
 - a. Removal of existing small shrubbery (may be by NCDOT - Division 4).
 - b. New landscaping (shrubbery and trees) by Owner.

1.02 SUBMITTALS**A. Project Record Documents:**

1. Identify location of capped utilities.

1.03 PROJECT CONDITIONS**A. Existing Conditions:**

1. After the project is begun, the contractor is responsible for the condition of structures to be demolished. The owner does not warrant that the condition of structures to be demolished will not have changed since the time of inspection for bidding purposes.

PART 2 - PRODUCTS (NOT USED)**PART 3 - EXECUTION****3.01 EXAMINATION**

- A. Verify that utilities have been disconnected and sealed.
- B. Survey existing conditions and correlate with drawings and specifications to determine extent of demolition required; see Mechanical and Electrical drawings. Salvage costs shall be reflected in the Contractor's bid.
- C. Insofar as is practicable, arrange operations to reveal unknown or concealed structural conditions for examination and verification before removal or demolition.

3.02 PREPARATION

- A. Traffic: Do not obstruct walks or public ways without the written permission of governing authorities and of the owner. Where routes are permitted to be closed, provide alternate routes if required.
- B. Protection:
 1. Provide for the protection of persons passing around or through the area of demolition.
 2. Perform demolition so as to prevent damage to adjacent improvements and facilities to remain.
- C. Construct and maintain shoring, bracing, and supports as necessary to ensure the stability of structures.
- D. Damages: Without cost to the owner and without delay, repair any damages caused to facilities to remain.

3.03 UTILITY SERVICES

- A. Arrange with utility companies and shut off indicated utilities serving structures; maintain utilities at existing

- A. Arrange with utility companies and shut off indicated utilities serving structures; maintain utilities at existing site lighting, storage building, vending building(existing Rest Area building), and new Rest Area building.
- B. Disconnect and cap indicated utilities before starting demolition operations.
- C. Identify location of capped utilities on project record documents.

3.04 POLLUTION CONTROLS

- A. Control as much as practicable the spread of dust and dirt.
- B. Observe environmental protection regulations.
- C. Do not allow water usage that results in freezing or flooding.
- D. Do not allow adjacent improvements to remain to become soiled by demolition operations.

3.05 DEMOLITION - GENERAL

- A. Remove: Unless items are otherwise indicated to be reinstalled or salvaged, remove and scrap.
- B. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare for service; reinstall in the same location (or in the location indicated).
- C. Remove and Install New: Remove and dispose of items indicated and install new items in the same location (or in the location indicated).
- D. Remove and Salvage: Items indicated to be salvaged will remain the Owner's property. Carefully remove and clean items indicated to be salvaged; protect against damage; Owner may salvage some of the toilet fixtures, and toilet partitions.
- E. Remove and Scrap: Remove and dispose of items indicated.
 - 1. Items of value to the contractor: Do not store removed items on site.
- F. Existing to Remain: Construction or items indicated to remain shall be protected against damage during demolition operations. Where practicable, and with the architect's permission, the contractor may elect to remove items to a suitable storage location during demolition and then properly clean and reinstall the items.
- G. Perform work in a systematic manner.
- H. Perform selective demolition using methods which are least likely to damage work to remain and which will provide proper surfaces for patching.

3.06 DEMOLITION ON OR BELOW GRADE

- A. Where portions of concrete slabs-on-grade are to be removed, first outline the portion with a concrete saw to a depth of at least 1 inch.

3.07 FILLING BELOW-GRADE AREAS AND VOIDS

- A. Below-grade areas and voids resulting from demolition of structures shall be filled or excavated further, as appropriate, according to requirements specified elsewhere in Division 2.

3.08 DISPOSAL OF DEMOLISHED MATERIALS

- A. Promptly dispose of materials resulting from demolition operations. Do not allow materials to accumulate on site.
- B. Transport concrete or masonry debris resulting from demolition operations and dispose off the Owner's property.
- C. Transport all other materials resulting from demolition operations and legally dispose of off-site.
- D. Do not burn removed materials on project site.
- E. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

3.09 CLEANING

- A. Clean soil, smudges, and dust from surfaces to remain.
- B. Return structures and surfaces to remain to condition existing prior to commencement of demolition.

END OF SECTION 02072

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 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 4, 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 new construction in progress.

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 entire slab area and perimeter 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.
- 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.

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. 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.

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.

3.04 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

DIVISION 3 - CONCRETE

SECTION 03310 - STRUCTURAL CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

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

1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for the following:
 - 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 June 2006, 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.
 - 2. Welded Wire Fabric: ASTM A 185, cold-drawn steel, plain.

STRUCTURAL CONCRETE

- 3. Tie wire: Black annealed type, 16-1/2 gage or heavier.

03310-1

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 154, and as follows:
 1. Polyethylene sheet, not less than 6 mils thick.
- 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, slab and walks: 3000 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. Cover with sand to depth shown on drawings.

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. 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.

- D. 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 FINISHING FORMED SURFACES

- A. Repairs, General: Repair surface defects, including tie holes, immediately after removing formwork.
1. Smooth rubbed finish: Apply to surfaces indicated no later than 24 hours after form removal.
 - a. Wet concrete surfaces to be finished and rub with Carborundum brick or other abrasive until uniform color and texture are achieved.
 - b. Do not apply separate grout mixture.

3.05 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 overtrowel. 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.

3.06 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.

3.07 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 – VENEER, GLASS & CONCRETE UNIT MASONRY****PART 1 - GENERAL****1.01 SUMMARY**

- A. Section Includes:
1. Face brick, glass block, and concrete masonry units.
 2. Mortar and grout.
 3. Reinforcement, anchorage, and accessories.

PART 2 - PRODUCTS

- A. Facing Brick: ASTM C 216, and shall match existing brick veneer used on the existing Rest Area building. Submit samples and provide a sample wall, 3'x4', for approval by the Architect/Engineer, for verification and before proceeding.

2.02 GLASS BLOCK

- A. Hollow Glass Block: Non-load-bearing blocks comprising two half-blocks of pressed glass fused to produce a partial vacuum, with manufacturer's standard factory-applied edge coating, and complying with the design based on **Pittsburg Corning Corp., "Decora Pattern with LX Filter"**, 8" sq. x 4" thick (equal to Saint-Gobain or A.J. Weck GmbH u. Co.).

2.03 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards for types required, 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. Type I: Moisture-controlled units.
 - b. Medium weight.
 - c. Exposed faces: Manufacturer's standard color and texture.

2.04 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. White color for glass block units.
- F. Standard gray color for brick units.

2.05 REINFORCEMENT AND ANCHORAGE

- A. Joint Reinforcement and Anchorage Materials: Steel wire: ASTM A 82, Hot-dip galvanizing (after fabrication): ASTM A 153, Class B-2. rod diameter 0.1483 inch, and Glass Block Panel Anchors: Standard 20 gage perforated steel strips galvanized after fabrication per ASTM A 153, Class B, and as recommended by manufacturer of masonry units.

2.06 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-lbf load in tension or compression without deforming.
- D. Asphalt Emulsion: Water-based type, as recommended by manufacturer of glass masonry units.
- E. Flexible Sheet Flashing: Perm-A-Barrier Wall Flashing by W. R. Grace & Company, 40 mil thick x 18" wide rolls.

2.07 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 M.
 - 3. Locations indicated on the drawings: Type S. Include waterproofing admixture in pointing mortar for glass block exterior panels.
 - 4. Applications as follows: Type N, exterior, above-grade walls.

PART 3 - EXECUTION**3.01 INSTALLATION PROCEDURES**

- A. Existing and new Facing Brick: Match existing joints.
- 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.
- C. 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 6 - WOOD AND PLASTICS**SECTION 06100 - ROUGH CARPENTRY****PART 1 - GENERAL****1.01 SUMMARY**

- A. Section Includes:
 - 1. Rough carpentry for:
 - a. Wood framing.
 - b. Miscellaneous lumber for attachment and support of other work.
 - c. Sheathing.
 - 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; for all structural framing of roof joists and headers.

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 8: 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. 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.
 - 1. The following products, 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.
 - b. "Tyvek"; E. I. du Pont de Nemours and Company, Inc.
 - c. "Amowrap"; Amoco Foam Products Co.
- 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. Staples not permitted.
 - 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 06200 - FINISH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

- A. Wood trim (window & display case), corner boards and plastic changing tables.
- B. Exterior trim; PVC / vinyl fascia, soffit, and gable siding panels see Section 07460.
- C. Fiberglass Reinforced Plastic, FRP, Panels for the service sink walls.

1.02 SUBMITTALS

- A. Plastic Laminate:
 - 1. Product data.
 - 2. Samples for verification: 8- by 10-inch piece of each type, pattern, and color.
- B. Coordinate installation of woodwork with other work to avoid damage.

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 Wood Molding," Wood Molding and Millwork Producers (WMMP).
 - 1. Specie(s):
 - a. Plain sawn red oak at display cases and window picture frame trim.
 - b. "Pine": Plain sawn Spruce or Idaho white pine at window extensions, and storage shelving.
 - 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. Hardwood: Red Oak, Grade in accordance with National Hardwood Lumber Association grading rules.
 - 4. For transparent finish, use only solid pieces of lumber; WM 4 N-grade.
 - 5. For opaque finish, pieces which are glued up may be used; WM 4 N- or P-grade.
 - 6. Moisture content: Not greater than that required by applicable grading rules; provide kiln-dried lumber.
 - 7. Provide lumber dressed on all exposed faces, unless otherwise indicated.
 - 8. Do not use twisted, warped, bowed, or otherwise defective lumber.
 - 9. Sizes indicated are nominal, unless otherwise indicated.
 - 10. 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.

2.03 FIBERGLASS REINFORCED PLASTIC (FRP) PANELS:

- A. FRP Panels: Equal to Kemply, Glasbord-P, Class R fire rating, 4'x8'x0.09" thick, embossed surface, color #48, Pearl Grey, with fasteners, adhesive, and vinyl edge molding. To be used at two walls at the service sink.

2.04 PVC TRIM

- A. PVC Trim shall include trimboards, fascia, and soffits. Trim boards to be KOMA Trimboards by Kommerling or equal. Soffit is to be by Williamsburg Beaded Soffit, 0.042" thick x 9-1/8" wide x 12' long vinyl, color to match existing building or equal..

2.05 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.

PART 3 - EXECUTION

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.
 - 2. Use diagonal (scarfed) joints in lengths of trim.
 - 3. Cope or miter at inside corners and miter at outside corners; fit tightly.
 - 4. Allowed variation in plumb and level: Not more than 1/8 inch in 8 feet.
- H. Panel Type Paneling:
 - 1. Arrange panels for best appearance.
 - 2. Install with tight joints, unless otherwise indicated.
 - 3. Install by face-nailing with fine finishing nails countersunk and filled.

3.03 PROTECTION

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

END OF SECTION 06200

SECTION 07160 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Substrate preparation.
 - 2. Bituminous dampproofing.
 - 3. Edge and penetration detailing material.

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.

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.

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. 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: Manufactured by extrusion process with integral high density skin:
 - 1. Type VII (ASTM C 578): 60.0 psi compressive strength.
 - 2. Total R-value: 7.5.]
 - 3. Manufacturers: Products of the following manufacturers, 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. Unfaced blanket/batt: Type I (ASTM C 665), passing ASTM E 136 combustion test requirements.
 - 2. Total R-value: 19 at exterior walls; 30 at ceilings.]
 - 3. Products of the following manufacturers, 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.
- E. Vapor Retarder: Polyethylene film.
 - 1. Laboratory-tested vapor transmission rating: 0.2 perm.
 - 2. Thickness: 6 mils.
 - 3. Color: Natural.

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. Under-slab installation: Do not install insulation before compaction of subgrade is verified. Provide installation capable of sustaining subsequent construction work without damage or displacement.
- D. Insulation Blankets/Batts:
 - 1. Application: Wood-framed construction:
 - a. Unfaced insulation: Friction-fit insulation between framing members.
- E. Vapor Retarder:
 - 1. Comply with membrane manufacturer's recommendations for installation of membrane as vapor retarder in application indicated.
 - 2. Install vapor retarder in a manner which will maximize continuity of protection against vapor transmission. Extend membrane tightly and uniformly to building framing and to other objects (pipes, electrical boxes, etc.) impinging on the plane of the membrane.
 - 3. Install vapor retarder on warm side of insulation unless otherwise indicated.

END OF SECTION 07210

SECTION 07311 - ASPHALT SHINGLES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Asphalt shingle roofing for the new Rest Area, and Vending (existing old restrooms).
 - 2. Eave edging.
- B. Related Sections:
 - 1. Soffit vent, see Section 07460 and Gutters, Section 07625.

1.02 SUBMITTALS

- A. Product data.
- B. Samples: For verification, submit sufficient number of samples to demonstrate range of color and texture anticipated for selected finish.

1.03 WARRANTY

- A. Submit manufacturer's standard 30 year shingle warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Asphalt Shingles:
 - 1. Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Celotex Corporation.
 - b. Elk Corporation.
 - c. GAF Building Materials Corporation.
 - d. **CertainTeed Roofing Products; CertainTeed Corp***.
- B. Rubberized Asphalt Ice Protection Membrane:
 - 1. The following products, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. "WinterGuard Waterproofing Underlayment"; CertainTeed Corporation.
 - b. "Weather Watch Underlayment"; GAF Building Materials Corporation.
 - c. "Ice & Water Shield"; W. R. Grace & Company.

2.02 MATERIALS

- A. Asphalt Shingles: Mineral-surfaced, self-sealing, laminated multi-ply overlay construction glass fiber base.
 - 1. Comply with ASTM D 3018, Type I.
 - 2. Fire resistance: Class A, UL labeled.
 - 3. Wind resistance: Passes UL 997.
 - 4. Style: Three-dimensional laminated straight edge strip shingle.
 - 5. Color: Shall **match existing**.
 - 6. Provide factory prefabricated or field fabricated hip and ridge shingles to match field shingles, at contractor's option.
- B. Underlayment: Asphalt-saturated organic roofing felt, ASTM D 226, No. 15 unperforated, Type I, 36-inch-wide rolls.
 - 1. Provide UL-listed material approved for use in roofing assembly to achieve specified fire rating.
- C. Ice Protection Underlayment: Rubberized asphalt sheet membrane, self-adhering, minimum 40 mils thick, 36-inch-wide rolls; minimum tensile strength 250 psi, in accordance with ASTM D 146.
- D. Asphalt Plastic Cement: ASTM D 4586, fibrated asphalt cement, asbestos free.
- E. Ridge Vent: Shingle-Ridge Vent with external baffle; Air Vent Inc., ShingleVent II.

- F. Eave Edging: Aluminum eave edging with baked on enamel paint, brown color.
- G. Nails: 11 or 12 gage, aluminum or hot-dipped galvanized, with barbed shanks, minimum 3/8 inch diameter head; length as necessary to penetrate through sheathing, or 3/4 inch into solid decking.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Review substrate to receive shingles for obstructions, loose sheathing, or voids in sheathing. Repair or replace unacceptable work which may affect proper material installation.

3.02 PREPARATION

- A. Remove projections and debris from substrate before starting installation; lay sheet metal over minor voids and nail to substrate.
- B. Coordinate shingle installation with flashing and other work integral with shingles.

3.03 INSTALLATION

- A. Install shingles in accordance with shingle manufacturer's instructions or NRCA's "The NRCA Steep Roofing Manual," whichever is more restrictive.
- B. Single Layer Underlayment: Apply one layer of felt horizontally over substrate, with 2 inch minimum side laps and 4 inch minimum end laps. Secure with roofing nails until shingles are installed.
- C. Ice Protection Underlayment: Install self-adhering ice protection underlayment along full length of eaves from the eave edge to a point 24 inch minimum beyond the 4/12 upper roof slope, and at valley's in accordance with underlayment manufacturer's installation instructions.
- D. Flashing: Install the following types of flashing to conform with installation details and instruction of "The NRCA Steep Roofing Manual."
 - 1. Step flashing at vertical walls, continuous at gable vent, and eave edging at all roof edges.
- E. Ridge Vent: Install as recommended by the manufacturer.
- F. Valley Construction: Woven valleys, using specified shingles.
- G. Asphalt Shingles:
 - 1. Start shingle installation with row of inverted shingles without tabs or layer of roll roofing placed along full length of eave and fastened.
 - 2. Coursing - roof: Install shingles in accordance with "The NRCA Steep Roofing Manual."
 - a. Pattern: As recommended by the shingle manufacturer for the type of shingles specified.

END OF SECTION 07311

SECTION 07460 – SIDING**PART 1 - GENERAL****1.01 SUMMARY**

- A. Section Includes:
 - 1. PVC fascia, vinyl siding, trim, and soffit.

1.02 REFERENCES

- A. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 1997a.
- B. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association; 1998.

1.03 SUBMITTALS

- A. Product Data: Submit product data and manufacturer's recommended installation instructions.
- B. Samples: Submit two 12-inch samples for each siding material and finish.
- C. Contract Closeout Submittals: Warranty.

1.04 WARRANTY

- A. General: Warranties shall be in addition to, and not a limitation of, other rights the owner may have against the contractor.
- B. PVC Fascia / Vinyl, Siding, Trim, Soffit Panels: Furnish manufacturer's standard warranty.
 - 1. Warranted against defects in PVC/vinyl for a minimum of 50 years (life time if available).

PART 2 - PRODUCTS**2.01 PVC, VINYL & WOOD PRODUCTS**

- A. Manufacturer: Provide products complying with requirements of the contract documents and made by the following: Kommerling, Amcraft Building Products, Williamsburg Beaded Soffit, .
- B. PVC Trim (equal to KOMA Trimboards by Kommerling) for both rest area buildings including trim boards and fascia; siding and soffit (equal to Amcraft Building Products; www.amcraft.com; Williamsburg Beaded Soffit, .042" thick x 9-1/8" wide x 12' long, vinyl, color to match existing building).
- C. Smooth face trim panels:
 - 1. Interior Bands: Clear Red Oak wood trim or rotary-cut Red Oak plywood w/ solid Oak edging.
 - a. Red Oak plywood, 3/4"x12" size, shown at interior Lobby upper wall bands, stain and varnish.
- D. Fasteners:
 - 1. Unprimed or factory primed siding: Hot-dip galvanized box nails.
 - 2. Length and spacing as indicated.

2.03 UNDERLAYMENT AND ACCESSORIES

- A. House wrap over exterior OSB sheathing, see Rough Carpentry.
- B. Soffit Vents: Continuous 2" aluminum or PVC soffit vents, "Gray" color equal to Air Vent Inc., miter at corners, or perforated or self venting soffit panels.
- C. Nails: Hot dipped galvanized type; non-staining, of size and strength to securely and rigidly retain the work.

PART 3 - EXECUTION**3.01 PVC, VINYL & WOOD FASCIA & TRIM INSTALLATION**

- A. General:
 - 1. Install siding in accordance with manufacturer's instructions.
 - 2. Position cut ends over bearing surfaces.
- B. Installation:
 - 1. Drive nails 90 degrees to surface. Drive nail heads to siding surface without breaking siding surface. Do not overdrive. Do not countersink.
 - 2. Nail at each framing line, positioning nails as per manufacturer's installation instructions.

- C. Install panel siding sheets horizontally with edges and ends over firm bearing, blind nail where possible.
- D. Maximum Variation From Plumb and Level: 1/4 inch per 10 feet.
- E. Prepare for site finishing specified in Section 09900.

END OF SECTION 07460

SECTION 07625 - SHEET METAL GUTTERS AND DOWNSPOUTS**PART 1 - GENERAL****1.01 SUMMARY**

A. Section Includes:

1. Gutters and downspouts for the new Rest Area buildings and existing Vending buildings.

1.02 SUBMITTALS

A. Product Data.

- B. Samples: Submit 6-inch-square samples of each type of metal and finish required.

PART 2 - PRODUCTS**2.01 MATERIALS**A. **Englert LeafGuard* or 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: "Brown".
3. Provide strippable plastic protective film on prefinished surface.

2.02 ACCESSORY MATERIALS

- A. Fasteners: Corrosion-resistant metal of same material as the material being fastened, or other material recommended by sheet metal manufacturer. Match finish and color of exposed fastener heads to finish and color of sheet material being fastened.
- B. Joint Adhesive: Two-component noncorrosive epoxy adhesive, recommended by metal manufacturer for sealing of nonmoving joints.
- C. Bituminous Coating: Heavy bodied, sulfur-free, asphalt-based paint; FS TT-C-494.

2.03 FABRICATION - GENERAL

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

2.04 GUTTERS AND DOWNSPOUTS

- A. Fabricate from prefinished aluminum sheet.
 1. Downspouts: 3 inch by 4 inch size.
- B. Provide expansion joints in gutters at spacing not to exceed 30 feet.
- C. Provide sheet metal baffles 6 inches high with legs 18 inches long at gutter corners below roof valleys.
- D. Gutter Supports: Brackets.
- E. Downspout Supports: Brackets.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Except as indicated otherwise, comply with sheet metal manufacturer's installation instructions and recommendations in the SMACNA "Architectural Sheet Metal Manual."

3.02 CLEANING AND PROTECTION

- A. Repair or replace work which is damaged or defaced, as directed by the Engineer.
- B. Protect sheet metal work as recommended by the installer so that completed work will be clean, secured, and without damage at substantial completion.

END OF SECTION 07625

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 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 Engineer from manufacturer's standard colors.
- B. Manufacturers: Products of the manufacturers listed, 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 glazed wall tile.

2.03 SILICONE-LATEX SEALANTS

- A. Silicone-Latex Emulsion Sealant: One-part, nonsag, mildew-resistant, paintable at H.M. frames and gray to match wall tile; complying with ASTM C 834 use at fiber-cement siding and 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 manufacturers' installation instructions and recommendations, except where more restrictive requirements are specified.

3.03 SCHEDULE OF JOINT SEALERS

- A. Exterior Joints at fiber-cement siding and 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.
- 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 (color to match gray wall tile) and at fixtures.
 - 2. Use bond-breaker tape.
 - 3. 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 doors and frames.

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. Fire-Rated Door Assemblies: In compliance with NFPA 80 and labeled per ASTM E 152 by agency acceptable to governing authorities.

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. Steelcraft Manufacturing Company/Masco Industries.

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. Primer Paint: Manufacturer's standard rust-inhibitive coating, suitable to receive finish coatings specified.

2.03 FABRICATION

- A. Exposed Door Faces: Fabricate from cold-rolled steel.
- B. Frames: Fabricate from cold-rolled or hot-rolled steel.

- C. Seal top and bottom edges integrally with door construction, or use minimum 16 gage steel channels to form flush closure.
- D. Exposed Screws and Bolts: Where required, provide only countersunk, flat Phillips-head fasteners.
- E. Hardware Preparation: Comply with DHI A115 series specifications.
 - 1. Locations: Comply with final shop drawings.
- F. 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. Interior Doors:
 - 1. Grade II - Heavy-Duty, Model 1 - Full Flush.
 - 2. Minimum thickness: 18 gage interior, and 16 gage exterior with insulated cores at exterior.

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, and 14 gage exterior.
 - 2. Construction: Mitered and welded corners.
- B. Guards: Weld protective covers to back of hardware openings at locations where grout, plaster, or other materials might interfere with hardware operation.

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: General: Adhere to provisions of SDI 105.
 - 1. Seal all exterior door frames with polyurethane foam sealant.
 - 2. Anchors: Provide 3 wall anchors per jamb at hinge and strike levels and minimum 18 gage base anchors.
 - 3. Fire-rated openings: Comply with requirements of NFPA 80.
- C. Door Installation:
 - 1. General: Comply with requirements and clearances specified in SDI 100.
 - 2. Fire-rated doors: Comply with NFPA 80 requirements and clearances.

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.
- B. 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.

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).

1.03 WARRANTIES

- A. Warranty:
1. Solid core wood-faced interior doors: Lifetime warranty.

PART 2 - PRODUCTS

2.01 SOLID CORE WOOD-FACED DOORS

- A. Description:
1. Interior door, non-rated.
 2. Faces: Veneers for transparent finish.
 - a. Species: Red Oak.
 - b. Cut: Rotary cut.
 3. Finish: Transparent finish specified elsewhere.
 4. Grade: Custom.
 5. Construction: 7 ply.
 6. Core: Particleboard, bonded to stiles and rails, sanded.
- B. Manufacturers:
1. Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. GlenMar Door Manufacturing Company.
 - b. Graham Manufacturing Corporation.
 - c. Mohawk Flush Doors, Inc.
 - d. Weyerhaeuser Company.

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.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install doors in accordance with manufacturer's recommended procedures and requirements of referenced standard.
- B. Fitting of Doors:
1. Accurately align and fit doors for trouble free operation throughout range of door swing.
- C. 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: ¼ 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

SECTION 08460 - AUTOMATIC ENTRANCE DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Automatic sliding doors, with frames (2-sets at each Vestibule); a total of 4-units for the project.
- B. Actuators and safety devices.

1.02 REFERENCES

- A. BHMA A156.10 - American National Standard for Power Operated Pedestrian Doors; Builders Hardware Manufacturers Association; 1999 (ANSI/BHMA A156.10).
- B. BHMA A156.19 - American National Standard for Power Assist and Low Energy Power Operated Doors; Builders Hardware Manufacturers Association; 1997 (ANSI/BHMA A156.19).
- C. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 1998.
- D. NFPA 70 - National Electrical Code; National Fire Protection Association; 1999.
- E. UL (ECMD) - Electrical Construction Materials Directory; Underwriters Laboratories Inc.; current edition.
- F. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Underwriters Laboratories Inc.; 1995.

1.03 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
- C. Product Data: Provide data on system components, sizes, features, and finishes.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and manufacturer's hardware and component templates.
- E. Maintenance Data: Include manufacturer's parts list and maintenance instructions for each type of hardware and operating component.
- F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

1.05 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a 1 year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty for motor and compressor.

1.06 MAINTENANCE SERVICE

- A. Provide service and maintenance of operating equipment for one year from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Automatic Entrance Doors: Dormatic, Horton* Series 2003, Type 110, or Stanely.
 - 1. Substitutions: See Section 01600 - Product Requirements.

2.02 AUTOMATIC ENTRANCE DOORS

- A. Automatic Sliding Door Type 1A: Single leaf track-mounted, electric operation, extruded aluminum glazed door, with frame, and operator concealed overhead.
- B. Finish: Brown painted fluorocarbon, 20-year finish or Dark Bronze anodized aluminum finish.

2.03 LAMINATED GLASS

- A. Laminated Glass: 1/4" thick laminated safety glass, see Section 08800.

2.04 DOOR OPERATORS

- A. Door Operators - General Requirements: Comply with BHMA A156.10, BHMA A156.19 and UL 325, as applicable.
- B. Door Locking: Not required.
- C. Egress Function: Provide standard breakaway emergency egress function.

2.05 ACTUATORS

- A. Proximity Detector Actuator: Microwave; distance of control sensitivity adjustable.

2.06 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Electrical Characteristics:
- B. Motors: NEMA MG 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.

PART 3 EXECUTION**3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions.
- B. Coordinate installation of components with related and adjacent work; level and plumb.

3.03 ADJUSTING

- A. Adjust door equipment for correct function and smooth operation.

3.04 CLEANING

- A. Remove temporary protection, clean exposed surfaces.

3.05 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation, operating components, adjustment features, and lubrication requirements.

END OF SECTION

SECTION 08550 - WOOD WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Factory fabricated metal clad wood windows with operating sash.
- B. Operating hardware.
- C. Insect screens.

1.02 RELATED SECTIONS

- A. Section 07900 - Joint Sealers: Perimeter sealant and back-up materials.
- B. Section 09900 - Paints and Coatings: Site finishing wood surfaces.

1.03 REFERENCES

- A. AAMA/NWWDA 101/I.S.2 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors; American Architectural Manufacturers Association; 1997.
- B. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; 1995.
- C. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 1991.
- D. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference; 1997.
- E. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference; 1996.
- F. FS L-S-125 - Screening, Insect, Nonmetallic; Federal Specifications and Standards; Revision B, 1972.
- G. NWWDA I.S.4 - Water-Repellent Preservative Non-Pressure Treatment for Millwork; National Wood Window and Door Association; 1994.

1.04 PERFORMANCE REQUIREMENTS

- A. Performance Requirements: As specified in PART 2, with the following additional requirements:
- B. Design and size windows to withstand dead loads and positive and negative wind loads acting normal to plane of wall calculated in accordance with ASCE 7, and the NC Building Code, when tested in accordance with ASTM E 330, using test loads equal to 1.5 times the design wind loads and 10 second duration of maximum load.
- C. Deflection: Limit member deflection to flexure limit of glass with full recovery of glazing materials.
- D. Design windows to accommodate, without damage to components or deterioration of seals, movement between window and perimeter framing and deflection of lintel.
- E. Air Infiltration: Limit air leakage through assembly to 0.3 cu ft/min/sq ft (5.0 cu m/h/sq m) of wall area, measured at a reference differential pressure across assembly of 1.57 psf (75 Pa) as measured in accordance with ASTM E 283.
- F. Water Leakage: None, when measured in accordance with ASTM E 331.

1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Show component dimensions.
- C. Shop Drawings: Indicate opening dimensions.

1.06 QUALITY ASSURANCE

- A. Manufacturer and Installer: Company specializing in manufacturing residential wood windows with minimum three years of documented experience.

1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Protect factory finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C).

1.09 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same.
- C. Warranty: Include coverage for:
 - 1. Degradation of color finish.
 - 2. Delamination or separation of finish cladding from window member.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. **Pella Corp.***
- B. Other Acceptable Manufacturers:
 - 1. Pozzi.
 - 2. Marvin.
 - 3. Substitutions: See page SGC-1 – Supplementary General Conditions.
 - 4. Optional Manufacturer: Inline Fiberglass Ltd.; fiberglass awning windows equal in type of glazing system, accessories, and sizes indicated; American Southeast Window & Glass at (919) 231-1561.

2.02 WINDOW COMPONENTS

- A. Windows: Wood frame and sash, factory fabricated and assembled.
 - 1. Performance Requirements: AAMA/NWWDA 101/I.S.2 C30
 - 2. Exterior Surfaces: Metal clad, Brown.
 - 3. Interior Surfaces: Unfinished, for transparent finish specified in Section 09900.
 - 4. Configuration: As indicated on drawings and awning type.
 - 5. Factory glazed; dry glazing method.
- B. Insect Screen Frame: Rolled aluminum frame of rectangular sections; fit with adjustable hardware; nominal size similar to operable glazed unit.
- C. Insect Screens: Woven nonmetallic mesh; FS L-S-125; 14/18 mesh, PVC strands; black color.
- D. Operable Sash Weatherstripping: Resilient PVC; permanently resilient, profiled to effect weather seal.

2.03 MATERIALS

- A. Wood: Clear pine, clear preservative treated to NWWDA I.S.4 of type suitable for transparent or opaque finish.
- B. Metal Cladding: Formed aluminum, factory finished, factory fit to profile of wood members.
- C. Glass and Glazing Materials: As described below:
 - 1. Glass in Exterior Lights: Type Obscure and/or clear, double glazing, "Smart Glazing II" or 3/4" insulated glass with low "E" coating, Shading coefficient: 0.88, Winter U-value: 0.48, minimum. Provide obscure glass in the exterior pane and clear glass in the interior pane at all restroom windows.
- D. Sealant and Backing Materials: As specified in Section 07900 of Types described below.

2.04 HARDWARE

- A. Awning Sash: Metal and nylon spiral friction slide cylinder, each sash, each jamb.
- B. Sash lock: Lever handle with cam lock with removable handle to prevent tampering.
- C. Operator: Rotary type operator.

2.05 FABRICATION

- A. Fabricate frame and sash members with mortise and tendon joints. Glue and steel pin joints to hairline fit, weather tight.
- B. Transparent Finish: Scarf joints permitted if wood matches in color and grain texture.
- C. Provide weather stop flange at entire perimeter of unit.
- D. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet allowing installation and dynamic movement of perimeter seal.

- E. Arrange fasteners to be concealed from view.
- F. Provide internal drainage of glazing spaces to exterior through weep holes.
- G. Assemble insect screen frame, miter and reinforce frame corners. Fit mesh taut into frame and secure. Fit frame with four spring loaded steel pin retainers.
- H. Single weatherstrip operable units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

- A. Install 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 sills, and jamb extensions.
- E. Install operating hardware.
- F. Install glass; Factory glazed.

3.03 ADJUSTING

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

3.04 CLEANING

- A. Remove protective material from factory finished 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 manufacturer.

END OF SECTION

SECTION 08620 - UNIT SKYLIGHTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fixed wood clad skylights.

1.02 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide structural, thermal, and daylighting performance values.

1.03 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
Provide five year manufacturer warranty for including leakage due to defective skylight materials or workmanship.

1.04 QUALITY ASSURANCE

- A. Skylight Units shall comply with the 1999 NC State Building Code, Volume I, sections 2405.3.2 and 2407 for sloped glazing construction and wind loading.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Unit Skylights:
 1. **Velux-America Inc.**
 2. Andersen Window Co.
 3. Pella Corporation.

2.02 COMPONENTS

- A. Unit Skylight Type Wood: Factory-assembled glazing in wood frame; double glazed insulated glass .
 1. Nominal Size: [22x54] inches, Model No. FS 74-108 2.
 2. Wood: Select kiln-dried solid and clear. No finger joints, preservative impregnated for opaquw interior finish.
 3. Maintenance-Free Exterior Cladding: Roll-formed (0.65 aluminum) or vinyl prefinished product engineered and fabricated to fit exterior exposed surfaces.
 4. Glazing: 5/8-inch **obscure** / clear, low E Argon gas filled-gas, insulated, tempered over laminated glass, "U"-value = 0.44, Glazing Code: No. 9914.
 5. Baked Acrylic Enamel Finish: Thermally cured organic coating meeting the requirements of AAMA 603, "Dark Brown" color.
 6. Interior finish: Factory primed to receive field applied coating specified in Section 09900.
 7. Fittings: Surface treatment with electro-galvanized, chromate passivated yellow.
 8. Mounting Brackets: Factory installed stamped steel, surface treatment electro-galvanized, chromate passivated yellow.
 9. Flashing: Type EDL step flashing for use with shingles, 4/12 slope, minimum 4" curb construction.
 10. Fasteners: For attachment of roof accessories to supporting structure; hot dip galvanized zinc plated or cadmium plated steel, or stainless steel.

2.03 ACCESSORIES

- A. Anchorage Devices: Type recommended by manufacturer, concealed.

2.04 FABRICATION

- A. Fabricate free of visual distortion and defects.
- B. Fabricate to achieve leakproof, weathertight assembly.

- C. Fabricate components to allow for expansion and contraction with minimum clearance and shim spacing around perimeter of assembly.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Place skylight units and secure. Install counterflashing according to the manufacturer's installation instructions.
- B. Overlap shingles with flashing to achieve watertight assembly.

3.02 CLEANING

- A. Remove protective material from prefinished aluminum surfaces.
- B. Wash down exposed surfaces; wipe surfaces clean.

END OF SECTION

SECTION 08710 - DOOR HARDWARE

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, including existing 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.
- 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, 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

SECTION 08800 - GLAZING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Insulated, display, and obscure glass.
 - 2. Glazing accessories.
- B. Types of work in this section include work for:
 - 1. Exterior entry door and sidelights; see Section 08410-Metal-Framed Storefronts.
 - 2. Sliding glass entry door; see Section 08460.

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.
 - 2. For laminated glass: Development of visible delamination.

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. Laminated glass: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Falconer-Lewistown, Inc.
 - b. Globe Amerada Glass Company.
 - c. Guardian Industries Corporation.
 - d. Viracon, Inc.

2.02 GLASS TYPES

- A. Glass Types - General: Provide glass types fabricated of the glass products indicated.
 - 1. Exterior glass thickness: 6 mm (1/4 inch nominal), unless otherwise indicated.
 - 2. Where safety glazing is required by governing authorities, provide certified safety glazing.
 - 3. Cut or drill holes in laminated units.
- B. Glass Type I - 1: Single units at sliding entry doors and sidelights.
 - 1. Total thickness: 1/4 inch, nominal.
 - 2. Exterior and interior pane: **Laminated glass**.
 - a. Two-ply.
 - b. Thickness of plies: 6 mm.
 - c. All plies: **Heat-strengthened float glass**.
 - d. Color: Outer and inner ply: Clear.

- e. Interlayer thickness: 0.05 inch.
- 3. Shading coefficient: 0.96.
- 5. Winter U-value: 1.09, minimum.
- 6. Acceptable glazing methods:
 - a. Structural adhesive glazed.
- C. Glass Type SG - 2: Polycarbonate sheet, with mar-resistant coating; thickness: ¼ inch.
 - 1. Provide certified safety glazing and use at display cases.
 - 2. Color: Clear.
 - 2. Acceptable glazing methods: Sealant, both sides.
- D. Glass Type SG - 3: Obscure glass at Unisex Restroom door; thickness: ¼ inch safety 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.
 - 3. Exception: For structural adhesive glazed units use only a dual seal system, using materials determined by structural adhesive manufacturer to be compatible with structural adhesive.
- B. Float Glass: Quality q3, unless otherwise indicated.
 - 1. Heat-strengthened: ASTM C 1048, Kind HS, Type I.
- C. Laminated Units: Multiple plies laminated together with interlayer, using heat and pressure, without air pockets or contaminants between plies.
 - 1. Interlayer for all-glass units: Polyvinyl butyral sheet, specifically designed for lamination and with demonstrated long-term ability to maintain physical and visual properties under installed conditions.
- D. Polycarbonate Sheet: Rigid, flat polycarbonate sheet; thicknesses as indicated.
 - 1. Flammability: Average extent of burning less than 1 inch, when tested in accordance with ASTM D 635, using the thickness of material to be used on the project.
 - 3. UV- and mar-resistant coating: Apply on all surfaces exposed to air.
- D. Transom Grilles: Provide white coated aluminum grilles on all transom lights match grilles on sidelights.

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: Noncuring, nonskinning, 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. Cover exposed polycarbonate surfaces with heavy paper secured with tape, without touching glazing.
 - 1. Clean polycarbonate surfaces using only methods recommended by manufacturer.

END OF SECTION 08800

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.

1.02 QUALITY ASSURANCE

- A. Regulatory Requirements: Where required, provide fire-rated assemblies as listed in the following:
 - 1. Underwriters Laboratories Inc.'s (UL) "Fire Resistance Directory."

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 (fire-resistant type).
- B. Manufacturers: Products of the following manufacturers, 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 paper 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.

PART 3 - EXECUTION

3.01 INSTALLATION OF GYPSUM BOARD

- 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.
- B. Installation on Wood Framing:
1. Single-layer application: Install gypsum board by the following method:
 - a. Screw attachment.

3.02 FINISHING

- A. General: Comply with ASTM C 840 and GA-216 except where exceeded by other requirements.
- B. Finish gypsum board in accordance with the following level of finish per GA-214, except where indicated otherwise on the drawings:
 1. Level 3: 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.

END OF SECTION 09260

SECTION 09300 - TILE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Glazed wall tiles.
 - 2. Glazed paver tiles.

1.02 DESIGN REQUIREMENTS

- A. Fire-Rated Construction: At locations indicated, provide fire-rated assemblies tested per ASTM E 119 and acceptable to governing authorities for designated fire ratings.

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 2 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: Match colors indicated or as scheduled on drawings as manufactured by the **Dal-Tile Corporation** or comparable equal (American Olean Tile).
 - 1. Tile trim and accessories: Match color and finish of adjoining flat tile.

2.02 TILE PRODUCTS

- A. Glazed Paver Tile; Provide Flat Tile with abrasive glazed finish (non-slip):
 - 1. The design is based on the following products:
 - a. Type 1: Main floor tile.
 - 1. Manufacturer: "Glazed Pavers"; Dal-Tile Corporation.
 - 2. Pattern: Vitrestone Select.
 - 3. Size: 8" x 8" x 5/16".
 - 4. Color: #SV02, White Granite field.
 - b. Type 2: Diamond accent tile and sanitary base.
 - 1. Manufacturer: "Glazed Pavers"; Dal-Tile Corporation.
 - 2. Pattern: Designer Color.
 - 3. Size: 8" x 8" x 5/16".
 - 4. Color: #DC14, Black.
 - c. Type 3: Wall tile at Lobby and Corridor wainscot.
 - 1. Manufacturer: "Glazed Pavers"; Dal-Tile Corporation.
 - 2. Pattern: Designer Color.
 - 3. Size: 8" x 8" x 5/16".
 - 4. Color: #DC05, Ice Gray.
 - 2. Trim units: Match color and finish of accent tile (6" high base):
 - a. Shapes and sizes: Manufacturer's standard, as indicated; coordinated with indicated size and coursing of adjoining flat tile, where applicable:
 - 1. Bullnose.
 - 2. Cove base.
- B. Glazed Wall Tile; Flat Tile:
 - 1. The design is based on the following product:
 - a. Tile: Manufacturer: Wall Tile"; Dal-Tile Corporation.

2. Pattern: Semi-Gloss.
3. Size: 6" x 6" x 5/16".
4. Color: #K176, Ice Grey (main wall); accent bands, #ODMI, Vermillion and #D190, Arctic White.
- b. Comparable products of other manufacturers will be considered for substitution.
2. Trim units: Match color and finish of adjacent flat tile:
 - a. Shapes and sizes: Manufacturer's standard, as indicated; coordinated with indicated size and coursing of adjacent tile, where applicable:
 1. Surface bullnose.

2.03 SETTING MATERIALS

- A. **Latex-Portland Cement Mortar:** Two-component, dry grout mix and liquid latex additive, field-mixed; complying with ANSI A118.4, for floors and walls.
 1. All components premeasured and prepackaged.
 2. Liquid latex additive: Manufacturer's standard water emulsion.
 3. Mix in accordance with manufacturer's recommendations.

2.04 GROUTING MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10.
- B. Latex-Portland Cement Grout: One-component dry grout mix, field-mixed with water; or two-component, dry grout mix and liquid latex additive, field-mixed; complying with ANSI A118.6.
 1. All components premeasured and prepackaged.
 2. Dry latex additive: Polyvinyl acetate or ethylene vinyl acetate.
 3. 100% Solids **Epoxy Grout at all floors and sanitary base**; complying with ANSI A118.3.
 4. Liquid latex additive: Manufacturer's standard water emulsion.
 5. Mix in accordance with manufacturer's recommendations.
 6. Colors: #941, Raven (floor & base), and #949, Silverado (wall tile) by Custom Building Products; (or equals by Bonsal or Hydroment).

2.05 ELASTOMERIC SEALANTS

- A. Compatibility: Provide sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates for project performance conditions.
- B. Silicone Sealant: 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: Comply with ANSI A118.9, equal to Durock Brand Cement Board by USG, Den-Shield by Georgia-Pacific; 1-800-327-2344, or James Hardie Cement Backer Board.
 1. Thickness shall equal 5/8"; may be furred to match drywall material above.
- 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.
- C. Tile Sealer: Sealer's Choice Gold by Aquamix; apply to all floor and base grout joints.

2.05 MISCELLANEOUS MATERIALS

- A. Cementitious Backer Units: Comply with ANSI A118.9...
- 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, Thin-Bed:
 - 1. Tile: Glazed paver.
 - 2. Installation method:
 - a. Concrete subfloor: TCA F113.
 - b. Bond coat: Latex-portland cement mortar, ANSI A108.5.
 - c. Joints shall be ¼" wide.
 - 3. Grout: Epoxy Grout at all floors and sanitary base; complying with ANSI A118.3.
- B. Interior Wall, Thin-Bed:
 - 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.
 - 4. Grout: Latex-portland cement.
- D. 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.
- E. Tile Sealer: Apply Sealer's Choice Gold to all floor and base grout joints with a paint brush as recommended by the manufacturer to completely seal the grouted joints. Test joints with water after application showing beads if completely sealed. Apply sealer after grout has cured are cover with protective paper to just before the building Pre-Final Inspection.

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 accent color or trim units, which ever is the greatest quantity.
 - 2. Wall Tile: 2 percent of each variety installed and/or a minimum of 10 units of each accent color or trim units, which ever is the greatest quantity.

END OF SECTION 09300

SECTION 09660 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.01 SUMMARY

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

1.02 SUBMITTALS

- A. Product Data: Submit technical data from each manufacturer of resilient products required.
- B. 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 Engineer.

1.03 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.

1.04 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. 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. Manufacturer: Armstrong World Industries, Inc.
 - a. Comparable products of other manufacturers will be considered for substitution.
 - 2. Pattern or style: "Imperial Texture"; Standard Excelon.
 - 3. Size and gage: 12" x 12" x 1/8" thickness.
 - 4. Color: **#51972, Mono Gray**.

2.02 RESILIENT BASE MATERIALS

- A. Rubber Wall Base: FS SS-W-40, Type I, and as follows:
 - 1. Manufacturers: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Flexco Company.
 - b. Johnsonite, Inc.
 - c. The R. C. Musson Rubber Company.
 - d. **Roppe Corporation* (color# P100, Black)**.
 - 2. Height: 4 inches.
 - 3. Style: Standard toe base.
 - 4. Corners: Preformed or molded units matching base in color and finish.

2.03 MISCELLANEOUS ACCESSORIES

- A. Adhesive: Type recommended by manufacturer of resilient product for specific substrate conditions.

2.04 COLORS AND PATTERNS

- A. Provide colors and patterns of resilient flooring materials as scheduled on drawings.

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

- A. Perform a subfloor Bond and Moisture Test (Calcium Chloride Test) as described in publication #F-5061, "Armstrong Guaranteed System", or other manufacturer's published recommendations to determine if surfaces are ready to receive resilient flooring; as recommended by the flooring manufacturer.
- B. Comply with manufacturer's published recommendations for installation in each area, extending resilient flooring into spaces which are partially concealed. Cut and fit tightly to fixtures, pipes, and other obstructions, as well as to walls and partitions.
- C. 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 ½ tile and 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 opposite directions.

3.03 INSTALLATION OF RESILIENT BASE

- A. Apply resilient base securely in locations indicated, using maximum lengths available.

3.04 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 2-coats of high quality commercial protective polish to clean resilient flooring surfaces; such as Armstrong S-480 Floor Polish.

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. Floor tile: 2 percent of each variety installed and/or a minimum of 10 units, which ever is the greatest quantity.
 - 2. Base: 2 percent of each variety installed and/or a minimum of 10 feet, which ever is the greatest quantity.

END OF SECTION 09660

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. Concrete: 8-inch square samples.
 - 4. Wood: 8-inch square samples for surfaces; 8-inch long samples for trim.
 - 5. 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. 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, ICI* - Lifemaster.**
- B. Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered in accordance with standard substitution procedures:
 - 1. Devoe & Reynolds Company - Lifemaster.
 - 2. Benjamin Moore & Company – Pristine EcoSpec.
 - 3. Sherwin Williams Company – Health Spec.

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. **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 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. 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 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 acrylic.
 - a. Bottom coat: Ultra-Hide 1260 Airless High-Build Flat Interior Primer / Finish; 1.1DFM.
 - b. Intermediate coat: Same as top coat.
 - c. Top coat: Devflex PF 4020PF Interior/Exterior Semi-gloss waterborne acrylic (color # 30GY 88/014, "White on White" at all Restrooms and upper Lobby and Corridor).

B. Wood: Doors, windows, horizontal band/trim & display cabinet, shelving.

1. Varnish, satin (stained wood doors).
 - a. Stain: WoodPride 1700 Interior Oil Wood Finishing Stain, (color "Winter White").
 - b. Bottom and intermediate coats: WoodPride 1908 Interior Polyurethane Gloss Varnish.
 - c. Top coat: WoodPride 1902 Interior Polyurethane Satin Varnish.

C. Ferrous Metal: Hollow metal doors & frames.

1. Lifemaster Pro HB Acrylic Coating, semigloss:
 - a. Bottom coat: Devco Coatings DevGuard 4160 Multi-Purpose Tank & Structural Primer.
 - b. Intermediate coat: Same as top coat.
 - c. Top coat: Devflex PF 4020PF Interior/Exterior Semi-gloss waterborne acrylic (4 mils dry thickness, 148 s.f. / gal.); (Color: # 00NN 05/000, "Dark Secret" at Pipe Chase doors & frames, and at metal frames at wood doors).

3.09 SCHEDULE OF COATINGS FOR EXTERIOR NONTRAFFIC SURFACES**A. Wall panel siding, soffit panels & fascia trim.**

1. Acrylic / Latex, semi-gloss.
 - a. Bottom coat: Same as top coat.
 - b. Top coat: Ultra-Hide Duras 2210 Exterior Acrylic Semi-gloss Finish; 1.5 DFM.
(Siding & trim color shall match existing trim color; equal to # 50BG 45/010, "Cloud Cover," 1.4 DFM).

END OF SECTION 09900

DIVISION 10 - SPECIALTIES

SECTION 10100 - VISUAL DISPLAY BOARDS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Tack boards, see Detail on Sheet A3 and Section 06200-Finish Carpentry.

1.02 SUBMITTALS

- A. Product Data:
 - 1. Manufacturer's technical data and Manufacturer's installation and breaking-in instructions.
 - 2. Submit shop drawings of Display Case with Oak frame, tack board, hardware, and glazing.

1.03 PROJECT CONDITIONS

- A. Environmental Requirements:
 - 1. Install boards only when interior air and substrates have reached equilibrium moisture and temperature approximating that of normal occupied conditions.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Natural Cork Tack Boards:
 - 1. Seamless, ¼-inch-thick cork sheet, laminated to ¼-inch-thick hardboard.
- B. Wood Trim: See Section 06200-Finish Carpentry and Section 09900-Painting for stain and varnish.
- C. Adhesives: As recommended by manufacturer for the materials and substrates to be joined.
- E. Felt Seal: ¼" wide continuous felt strip adhered to the sides and bottom face of the Display Case Oak inner frame to seal out dust when in contact with the Display Case door in the closed position.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces to receive units are true and plumb. Correct inadequate surfaces before installation of boards.
- B. Verify that moisture and temperature levels of substrate and environment have stabilized.

3.02 INSTALLATION

- A. General:
 - 1. Install off-site fabricated units as instructed by manufacturer.
 - 2. Provide any necessary installation accessories, including blocking, backing, anchors, etc.
 - 3. Join parts forming neatly fitted hairline joints.

3.03 PROTECTION

- A. Cover completed work with building paper or other covering recommended by manufacturer.
- B. Protect boards from damage until substantial completion.

END OF SECTION 10100

SECTION 10170 - PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Water-closet compartments and urinal screens.
 - 2. Restroom counters and bench.

1.02 SUBMITTALS

- A. Product Data.
- B. Shop Drawings.
- C. Panel Color Verification Samples: Submit 6-inch-square samples of each panel finish type and color to be installed.
- D. Manufacturer's Instructions.
- E. Maintenance Data.

1.03 QUALITY ASSURANCE

- A. Regulatory Requirements: Products and finished installations to be used by handicapped persons must comply with requirements of the NC State Building Code, Volume I-C, Accessibility Code, 1999 Edition.

1.04 COORDINATION

- A. Use manufacturer's instructions and data to determine anchorage requirements for panel systems. In a timely manner, distribute to affected installers of related work those system components and anchorage devices provided by panel manufacturer for incorporation into other work.

PART 2 - PRODUCTS

2.01 PANEL SYSTEMS

- A. Compartments: Provide compartments fabricated of partitions and erected using the following panel systems at locations indicated on the drawings:
 - 1. Solid plastic, floor-anchored and overhead-braced with full length wall brackets.
- B. Screen Systems: Provide screens erected using the following panel systems at locations indicated on the drawings:
 - 1. Solid plastic; floor anchored and overhead braced pilasters with full length wall brackets.

2.02 PANEL MATERIALS

- A. Solid Plastic:
 - 1. Panel material: High-density polyethylene or polypropylene, of homogeneous composition and color throughout. Minimum thickness of material 1 inch. Provide seamless panels with eased edges.
 - 2. Panel, shoes, and mounting brackets colors:
 - a. **"Santana": Black.**
 - 3. Hardware, head rails, and accessories: Manufacturer's standard styles. The following materials will be acceptable:
 - a. Chromium-plated nonferrous cast alloy ("Zamac").
 - b. Extruded aluminum, anodized and polished.
 - 4. Manufacturers: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable (colors shall match those specified):
 - a. Comtec Industries.
 - b. **Santana Products Company***.
 - c. The Sanymetal Products Company, Inc.

2.03 ACCESSORIES

- A. General: Provide hardware and accessories as necessary to properly install panel systems indicated.
1. Hinge: Self-closing, full piano type hinge, recess-mounted within door; adjustable to permit door to rest at any angle.
 2. Latch for non-handicapped compartments:
Surface-mounted type, with emergency access feature.
Provide stop and keeper with rubber bumper.
 3. Latch for handicapped compartments: Surface-mounted sliding latch (for inner side of compartment doors), with emergency access feature, designed for use by handicapped persons.
 4. Door pull for handicapped compartments (for outer side of compartment doors): Suitable for use by handicapped persons.
 5. Combination coat hook with rubber bumper: Provide unit of sufficient length to prevent compartment door from striking installed toilet accessories.
 6. Leveling-and-anchorage devices: Rust-resistant steel devices as recommended by panel manufacturer for installation of panels in conditions indicated.
 7. Pilaster shoes: Plastic, finish to match compartments. Minimum shoe height: 3 inches.
 8. Fasteners: Tamper-resistant rust-proof, exposed fasteners as recommended by panel manufacturer for installation of panels and hardware in conditions indicated. Finish to match hardware.
 9. Overhead bracing: Antigrip headrail bracing fabricated from continuous extruded aluminum, clear anodized finish.
 10. Brackets: All panels shall be mounted with continuous panel brackets of matching plastic, and anchored to wall blocking.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Perform installation in accordance with manufacturer's instructions, except where more restrictive requirements are shown, specified, or are necessary for project conditions.

END OF SECTION 10170

SECTION 10425 - SIGNS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Plastic plaques, plastic letters, and individual exterior aluminum letters signs.
 - 2. Project sign.
- B. Provide signage as indicated on the signage schedules.
- C. Provide quantities for both building sites; the BNL and SBL; and 1-extra sign per sign type to be furnished to the Owner.

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. Plastic Signs: Substitutions: See Article 8 – Supplementary Instructions to Bidders.
 - 1. Advance Printing Products, Inc.
 - 2. **Best Manufacturing Co***.
 - 3. Mohawk Sign Systems, Inc.

2.02 RAISED LETTER SIGNS

- A. Base Material: **Red, #575** solid color acrylic plastic (Sign Plaques):
 - 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 NC State Building Code, Volume I-C, Accessibility Code, 1999 Edition, including Braille.
 - 2. Character Color: **#950, 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 INDIVIDUAL PLASTIC LETTERS

- A. Material: **Red, #575 and White, #950** solid color acrylic plastic:
 - 1. Thickness: 1/8-1/4 inch.
 - 2. Height: 9 inches.
 - 3. Edges: Square.
- B. Character Style:
 - 1. Character Color: **Red, #575 and White, #950**.
 - 2. Character Font: Helvetica.
 - 3. Character Case: Upper case only.

2.04 INDIVIDUAL ALUMINUM GRAPHICS

- A. Material: White painted color on aluminum cast letters for exterior information signage above the entrance doors, approx. 84" to 92" AFF as indicated on the exterior elevations:
 - 1. Size: 1/4 inch thick x 6 and 3 inches high w/ square edges and min. 3/4" projection.
- B. Character Style and Copy:
 - 1. Character Font: Helvetica, upper and lower case only; "I-95 NASH COUNTY REST AREA" (1-set 6" high), "I-95 Nash County Rest Area" (1-set 3" high) & "VENDING" (2-sets 6" high).

2.05 ACCESSORIES

- A. Mounting Hardware: Chrome plated brass screws and double sided tape, permanent adhesive.
- B. Provide projected mounting for individual exterior letters; 2-set projected on the wood fascia.

2.05 SIGN SCHEDULE:

- A. Sign plaques shall read as follows:

<u>Location/Room No.</u>	<u>Copy</u>	<u>Quantity</u>
110	STORAGE	2
108	MECHANICAL	2
107	RESTROOM**	3
104/106	WOMEN *	2
112/114	MEN *	2

* Provide the male or female caricature at signs noted above with white figure and border on Red background, 8"x 8" size, mount to glass block (1-extra sign shall be furnished to the Owner).

** Provide both caricatures (male & female) at signs noted above with white figure and border on Red background, 8"x 8" size. Provide the following copy beneath "FAMILY ASSISTANCE RESTROOM" and "KNOCK WHEN ENTERING".

- B. Interior Plastic Individual Letters, at 6" high; all 6" high above doorways (at bulkheads, Red, #575) and 12" high arrows only at Pipe Chase doors (White, #950), shall read:

<u>Location/Room No.</u>	<u>Copy</u>	<u>Quantity</u>
104/106	WOMEN	2
112/114	MEN	2
105/113	< >	4

- C. Project Sign: Provide the project sign as shown on the drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General:
 - 1. Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
 - 2. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
 - 3. Install project sign in locations indicated and using mounting methods indicated.
- B. Plastic Plaques and Individual Letters:
 - 1. Mount plaques using the standard method recommended by the manufacturer for the type of wall surface indicated.
 - 2. Concealed mounting: Use double-sided foam tape and mount plaques at 60" above the floor adjacent to doors 2" from the latch side of the jamb for plaques and center individual letters as indicated.

3.02 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

I-95 REST AREA & VENDING

NC DEPARTMENT OF TRANSPORTATION

ARCHITECT / ENGINEER:

FACILITIES DESIGN

NCDOT

CONTRACTORS:

GENERAL CONTRACTOR

PLUMBING CONTRACTOR

HVAC CONTRACTOR

ELECTRICAL CONTRACTOR

6" HIGH COPY

2" HIGH COPY

1-1/2" HIGH COPY

5" HIGH COPY

2" HIGH COPY

1-1/2" HIGH COPY

2" HIGH COPY

Helvetica Med. Style

All Copy #90RR 11/257

4' x 6' x 3/4" EXTERIOR PLYWOOD, PAINTED
White, 30GY 88/014 BACKGROUND W/
2 - 4" x 4" TREATED WOOD POSTS (3' BELOW
GRADE), BOTTOM OF SIGN PANEL 3' ABOVE
GRADE.

COLORS: # 90RR 11/257, "Tomahawk Red", (GLIDDEN) - COPY,
30GY 88/014, "White On White" (GLIDDEN)-BACKGROUND

END OF SECTION 10425

SECTION 10522 - FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES**PART 1 - GENERAL****1.01 SUMMARY**

- A. Fire extinguishers and cabinet located in Storage rooms.

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. Amerex Corporation.
 - b. Buckeye Fire Equipment Co.
 - c. Fire-End & Croker Corporation.
 - d. General Fire Extinguisher Corporation.
 - e. Walter Kidde, The Fire Extinguisher Co.
- B. Fire Extinguishers:
 - 1. Rating: 4A:60B:C.
 - 2. Type: Multipurpose dry chemical (ammonium phosphate).
 - a. Stored pressure type.
 - 3. Cabinet 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.
 - d. Samson Metal Products, Inc.
- B. Cabinets:
 - 1. To house one extinguisher.
 - 2. Size: Inside minimum box dimensions: 24"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.
 - c. Surface mounted door handle, finished to match door.
 - d. Friction or roller catch.
 - 5. Trim (box flange or frame): Aluminum, satin anodized.

6. Manufacturer's standard vertical lettering identifying contents of cabinet.
 - a. Letters silk screen painted.
 - b. Letter color: 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 cabinets at locations indicated.
- C. Install with door handle not more than 48" above finish floor.

END OF SECTION 10522

SECTION 10810 - TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
1. Towel Dispenser/Waste Receptacle and Waste receptacles.
 2. Recessed Multipurpose Units.
 3. Mirrors.
 4. Grab bars.
 5. Toilet Paper Dispenser.
 6. Sanitary Napkin Disposal Units.
 7. Combination utility shelf / mop and broom holders.
 8. Hand Dryers.
 9. Soap Dispensers.

1.02 SUBMITTALS

- A. Product Data.
B. Shop Drawings.
C. Manufacturer's Instructions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. For each distinct type of toilet accessory, provide accessories fabricated by a single manufacturer.
B. All model numbers specified are products of **Bradley Corporation***, unless otherwise noted*.
C. Only equivalent products of the following other manufacturers, provided they comply with requirements of the contract documents, will be considered acceptable:
1. American Specialties, Inc.
 2. Bobrick Washroom Equipment, Inc.

2.02 TOILET ACCESSORIES

- A. Towel Dispenser/Waste Receptacle: Semi-Recessed, 22 gauge stainless steel, seamless beveled flange, hold 800 multi-fold or 600 c-fold paper towels, waste receptacle is open top with removable 12-gallon capacity and provide **molded plastic insert liner** model 39003-31.
1. Product: B-3944 manufactured by **Bobrick**.
- B. Waste Receptacle: Semi-Recessed, 22 gauge stainless steel, seamless beveled flange, waste receptacle is open top with removable 12-gallon capacity and provide **molded plastic insert liner** model 39003-31.
1. Product: B-3644 manufactured by **Bobrick**. (use in Family Restroom 107)
- C. Recessed Multipurpose Unit: Mirror/Towel Dispenser (600 C-fold)/Soap Dispenser(100 fl.oz.), recessed flush with wall, stainless steel; seamless wall flanges, continuous piano hinges.
1. Product: Model 130 manufactured by Bradley. (use in Family Restroom 107)
- D. Mirrors: Stainless steel framed, 6 mm thick float glass mirror.
1. Size: 24" x 60"- quantity 1 per restroom.
20" x 36"- quantity 4 per restroom
 2. Frame: 0.05 inch channel shapes, with mitered and welded and ground corners, and tamperproof hanging system; No.4 finish.
 3. Product: Model 780-2460 and 780-2036, manufactured by **Bradley**.
- E. Grab Bar 1:
1. Basis of design: 001 - 42".
 - a. Stainless steel, nonslip gripping surface and concealed mounting, Bradex Model 832, by **Bradley**.
- F. Grab Bar 2:
1. Basis of design: 001 - 36".
 - a. Stainless steel, nonslip gripping surface and concealed mounting, Bradex Model 832, by **Bradley**.

- G. Toilet Paper Dispenser:
 - 1. Basis of design: **Georgia Pacific Quick View** Modal 56T or equal.
 - a. Twin Jumbo tissue dispenser, surface mounted, holds 2- 9" diameter rolls side by side with locking cover, made of high impact plastic.
- H. Partition Mounted Sanitary Napkin Disposal:
 - 1. Basis of design: 4721-15.
 - a. Stainless steel.
 - b. Serves 2-compartments.
- I. Semi-Recessed Sanitary Napkin Disposal:
 - 1. Basis of design: **Bradley** 4722-10-15.
 - a. Stainless steel.
 - b. Single end compartments.
- J. Combination Utility Shelf/Mop and Broom Holder:
 - 1. Basis of design: x 24".
 - a. Stainless steel.
 - b. With 3-spring loaded rubber cam mop/broom holders, Bradex Model 9953, by **Bradley**.
- K. Hand Dryers:
 - 1. Basis of design: **Excel** Xlerator Hand Dryer Model XL-GR, www.exceldryer.com/products/xlerator.asp.
 - a. Automatic hand dryer, Graphite finish, 110/120v, 12.5amp, 1500w, 60 Hz.
 - b. Mount 41" above finish floor.
- L. Recessed Soap Dispenser:
 - 1. Basis of design: **Bradley** Model 644.
 - a. Stainless steel -overall dimensions 6" W x 10" H x 4" D.
 - b. 40 oz. Liquid soap capacity

2.03 MATERIALS

- A. Stainless steel: Type-304 stainless steel with satin finish, typical for all accessories.
- B. Mounting Devices and Fasteners: Provide toilet accessory manufacturer's recommended items for substrates and conditions indicated.

2.04 FABRICATION

- A. Manufacturer's Trademarks and Model Numbers: Permanently affix manufacturer's name and model number to unexposed surface of accessory.

PART 3 - EXECUTION

3.01 INSTALLATION

- 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.
- B. Accessories Installed for Use by Handicapped Persons: Install as indicated on drawings and in accordance with the NC State Building Code, Volume I-C, Accessibility Code, 1999 Edition.

END OF SECTION 10810

DIVISION 11 - COMPENSATION FOR GENERAL CONSTRUCTION

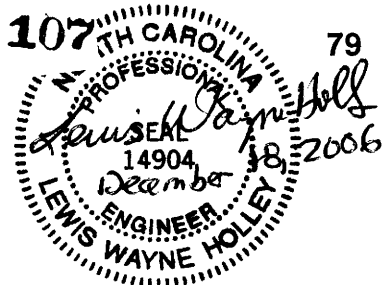
SECTION 11100 - COMPENSATION FOR GENERAL CONSTRUCTION

1.01 COMPENSATION

- A. The work of furnishing materials and constructing the I-95 NBL/SBL Rest Area Buildings in accordance with the plans and specifications; completed and accepted, will be paid for at the contract unit prices for "General Construction of NBL/SBL Rest Area Building" & "General Construction of NBL/SBL Vending Building ". Such price and payment will be full compensation for all work of constructing NBL/SBL Rest Area & Vending buildings; 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:

"General Construction of NBL/SBL Rest Area Building".....Lump Sum

"General Construction of NBL/SBL Vending Building".....Lump Sum



SECTION 15A - PLUMBING

PART 1 - GENERAL

1.1 Scope of Work

- a. Requirements of the General and Special Conditions apply to all work in this Section. Contractor shall provide all labor, materials, equipment, all tap-on fees or meter costs, and services as indicated on the drawings for water, waste, or specified herein, or reasonably necessary for, or incidental to, a complete job.
- b. These specifications and the accompanying drawings shall include the providing of all labor, tools, materials, fixtures, transportation, appurtenances and service necessary and incidental to the installation of a complete and cooperative system as indicated and intended on the drawings and as herein specified.
- c. Contractor shall coordinate the work and equipment of this Section with the work and equipment specified elsewhere in order to assure a complete and satisfactory installation. Work such as excavation, backfill, concrete, flashing, etc. which is required by the work of this section shall be provided by the Contractor responsible for this Section unless otherwise indicated. Contractor shall provide specification sheets for all his equipment requiring electrical power to the Electrical Contractor within seven (7) days after the award of contract.
- d. Minor details not usually shown or specified, but necessary for the proper installation and operation shall be included in the work, the same as if herein specified or shown. The Drawings and Specifications are considered complementary one to the other; and work implied by one and not by the other shall be supplied and installed as though specifically called for by both. Since the plans are diagrammatic only and not intended to show all details, the Contractor shall make any necessary changes to avoid beams, columns, footings, vents, ducts, or other obstruction, without additional cost to the Department of Transportation (DOT/Owner).

1.2 CODES, RULES, PERMITS AND FEES

- a. The Contractor shall give all necessary notices, obtain all permits and pay all government sales taxes, fees, and other costs including utility connections or extension, in connection with his work; and file all necessary plans, prepare all documents, and obtain all necessary approvals of all governmental departments having jurisdiction; and obtain all required certificates of inspection for his work and deliver same to the Architect before request for acceptance and final payment for the work. Copies shall be included in the closeout documents.
- b. The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, and drawings required to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on Drawings and/or specified.
- c. All materials provided and all work installed shall comply with the National Fire Codes of the National Fire Protection Association, and with the requirements of all governmental departments having jurisdiction.
- d. The entire plumbing system shall be installed in complete accordance with the North Carolina Plumbing Code and Energy Conservation Code, Latest Editions, and in all cases shall be minimum requirements of all Governing Health Agencies.

- e. All material and equipment for the electrical portion of the plumbing systems shall bear the UL approval label, or shall be listed by Third Party Agencies Accredited by the NCBCC to label Electrical, Plumbing, and Mechanical Equipment as of July 1, 1995, in every case where they have established a standard for the particular type of material to be installed.

1.3 DEFINITION

The word "Contractor" as used in this Section of the Specifications refers to the Plumbing Contractor unless specifically noted otherwise. The word "provide" means furnish, fabricate, complete, install, erect, including labor and incidental materials necessary to complete in place and ready for operation or use the items referred to or described herein, and/or as shown or referred to on the Contract Drawings.

1.4 CONTRACTOR'S QUALIFICATIONS

It is assumed that the Contractor has had sufficient general knowledge and experience to anticipate the needs for construction of this nature. The Contractor shall provide all items required to complete the construction in accordance with reasonable interpretation of the intent of the Drawings and Specifications. Any minor items required by code, law, or regulations shall be provided whether or not specified or specifically shown where it is a part of a major item of equipment, a part of the control system specified, shown on the plans, or required for proper functioning of the equipment or system.

1.5 SURVEYS AND MEASUREMENTS

- a. The Contractor shall base all measurements, both horizontal and vertical, from established benchmarks. All work shall agree with these established lines and levels. Verify all measurements at the site, and check correctness of same as related to the work.
- b. Should the Contractor discover any discrepancy between actual measurements and those indicated that prevents following good practice or the intent of the Drawings and Specifications, then he shall notify the Engineer, and he shall not proceed with his work until he has received instructions from the Engineer.

1.6 PLANS

- a. Plumbing plans are diagrammatic except where dimensions are shown. See Architectural drawings for building dimensions and ceiling plans.
- b. See Demolition Plan Drawing VA-4 for demolition requirements for the Vending Building.

1.7 SHOP DRAWINGS

- a. Refer to the General Conditions and "Maintenance and Operating Instructions" section for additional requirements.
- b. All items submitted to Engineer for review shall bear stamp or notation indicating Contractor's prior review and approval including Contractor's signature(s) and date reviewed. This includes the specific Contractor/Trade responsible for purchasing and installing the items. The Contractor approvals indicate the submittal is in full compliance with the plans and specifications UNLESS specifically noted otherwise for specific exceptions or specific substitutions proposed.
- c. Where manufacturer's standard publications or other specifications are submitted, they shall bear

sufficient notations to define specific material proposed including ratings, performance (electrical, mechanical, and hydraulic, as applicable), outline dimensions, colors, operating description (including all controls), layout, model numbers, listings, standards applicable, and accessories.

Marketing information or other general literature is NOT sufficient to obtain Engineer approval. Incomplete submittals will be rejected without review. The contractor (NOT the equipment vendor) is responsible for submittal preparation, review, and completeness prior to submittal.

- d. Submit manufacturer's certified performance data for all equipment.
- e. Coordinate installation drawings with other parts of the work whether specified in this Section or other Sections.
- f. All approved Shop Drawings and Submittals shall be included in the closeout documents.

1.8 ELECTRICAL

- a. All motors not supplied from motor control centers shall have trip-protected starters provided with equipment. All disconnects shall be fused.
- b. All items of plumbing equipment electrically operated shall be in complete accordance with Section entitled, "DIVISION 16 - ELECTRICAL". Plumbing equipment, other than individual mounted motors, shall be factory wired so that it is only necessary to bring connections to a single set of terminals.
- c. Plumbing equipment electrical components shall be bonded together and connected to the electrical system ground.

1.9 MAINTENANCE AND OPERATING INSTRUCTIONS

- a. Submit to the Engineer for approval three (3) bound sets of maintenance data on all equipment. Each set shall contain an equipment list including equipment location by floor and room designation. After approval, turn over to the Owner's representative in the closeout documents.
- b. Instruct the Owner's representative in operation and maintenance of systems and equipment to include as a minimum all equipment and systems, i.e. water heater, water cooler, flush valves, tempering valve, backflow preventer, pressure regulator, recirculating water pump/piping system (as applicable), protective devices/systems, emergency shutdown/isolation, waste handling & sewage systems, and sensors.

1.10 QUALITY ASSURANCE

- a. **Brand Names:** Where materials, equipment, apparatus, or other products are specified by manufacturer, brand name, type or catalog number, such designation is to establish standards of desired quality and style, and shall be the basis of the bid. Materials so specified shall be provided under the Contract unless changed by written approval. Where two or more designations are listed, choice shall be optional with Contractor.
- b. **Supervision:** Contractor shall have in charge of the work at all times during the Construction a thoroughly competent foreman with broad experience in the work to be performed under this Contract. Anyone deemed not capable by the Architect or Engineer shall be replaced immediately upon request. After a satisfactory foreman has been assigned, then he shall not be withdrawn

without written permission from the Architect and Engineer.

- c. Quality of Work: The installation of this entire system shall be in an organized and workmanlike manner. Careless and inferior work will not be tolerated. Changes and replacements required because of careless and inferior work shall be at the expense of the Contractor.
- d. Patents: Contractor shall be responsible for the cost of any damage suits that may arise in connection with infringement on patent rights or injunctions affecting any material or equipment installed by him under this work.
- e. Measurements: All fixtures and equipment are located and shown on the plans as nearly as possible in their exact locations. This Contractor shall verify the locations and measurements before installation to insure the most workmanlike installation possible and avoid conflict with work of other trades. Any uncertainties and conflicts shall be submitted to the Engineer for final decision.

PART 2 - PRODUCTS

- 2.1 Provide equipment complete with components and accessories necessary to its satisfactory operation, meet listing requirements, meet Code requirements, meet Plans and Specifications, and meet or exceed all intended functions and performance requirements.
- 2.2 Listing of a manufacturer's name in this Section does not infer conformity to all requirements of the Contract Documents nor waive requirements thereof.

2.3 SOIL, WASTE, DRAIN, AND VENT PIPING AND FITTINGS

- a. Materials shall conform to following requirements: Use PVC-DWV ASTM D-2665, Schedule 40, for sanitary drainage and vent piping. PVC piping shall carry the NSF seal of approval. Use solvent cement complying with ASTM (D2564) 72 for joining PVC pipe and fittings. Apply primer to PVC pipe and fittings in strict accordance with manufacturer's recommendations before making solvent cement joints.
- b. Drainage Pipe Slope & Arrangement:

Horizontal waste and vent pipes smaller than 3 inches shall be at a uniform grade/slope of 1/4 inch per foot minimum; and horizontal waste and vent pipes 3 inches and larger shall be at a uniform grade/slope of not less than 1/8 inch per foot minimum.

End of circuit vent pipe connections from any fixture (or line of fixtures) connected to a vent line serving other fixtures shall be made no less than 6" above the flood level rim of the highest fixture on that stack to prevent use of any vent line as a waste line.

All change of direction in soil pipe and waste pipe shall be made with long radius fittings with "Y" branches and 1/8" bends, or 1/16" bends.
- c. Threaded pipe joints: Threaded joints shall have American National taper screw threaded with graphite and oil compound applied to male thread.
- d. Floor drains: Floor drains shall be cast iron with waffle pattern nickel alloy round strainer cover and an optional secondary strainer or sediment bucket insert. Provide deep seal cast iron P-trap for floor drains. Use J.R Smith #2005-A or equal by Josam, Zurn, or Wade.

Provide all floor drains with 1/2" trap primer tap (including accessories and tubing/pipe necessary

for operation) provide hose bibb for manual priming where easily accessible (not allowed for absorbent floor type).

- e. Sleeves: Water, sewer, and vent pipe pass through walls, foundations, floors, or ceilings shall use schedule 40 steel pipe sleeves that are larger than pipe size. Sleeves shall be at least 1/2 inch greater than the insulation. Sleeves shall extend 1/4" above floor. Sleeves through ceiling and walls shall be flush.
- f. Cleanouts: Cleanouts in slab on grade shall be cast-iron floor cleanouts with double drainage flange, weep holes, polished bronze rim, and perforated floor plate (with "C.O." cast in plate). Secure to internal raised head by countersunk screws.

Cleanouts shall be provided at the base of each soil stack, waste stack, and at each change of direction greater than 45 degrees. On straight pipes they shall be not more than 75 feet apart.

- g. Exterior cleanouts:

Cleanouts in "no traffic" areas shall be in a 24"x24" concrete pad. Exterior cleanouts in traffic/driveway areas shall be heavy duty cast-iron (CI) with a clean-out cover (labeled "sewer cleanout") that is flush with finished grade. Exterior cleanouts located in concrete surfaces such as in walkways shall be brass finish and flush with grade. Use Josam Leveze Kleenatron series 56020 or equal by Wade or Smith.

Cleanouts in building sewer above grade and exterior building sewer shall be the same material as the pipe, Schedule 80 minimum, and shall have a threaded cap with a raised square head for removal. Fittings and cap shall be installed in strict accordance with manufacturer's recommendations.

- h. Vent pipe flashing: Pipe flashing shall be a pre-manufactured unit of same materials as roof system and sized to fit the vent pipe penetrating the roof.
- i. Pipe Hangers: Use hanger rod and adjustable split ring for soil, waste, and vent piping. Use adjustable clevis for water piping. Use clamp hanger for vertical pipe.
- j. Inserts: Locate and provide inserts to receive hanger rods in concrete slabs, where applicable.
- k. Escutcheons: Pipes passing through floors shall use 1/2" deep cup type chrome plated cast brass floor plates with setscrew. Pipes passing through walls and ceilings in finished areas shall use chrome plated, spring type escutcheons.
- l. Pipe Supports and Spacing:

1. All support components shall conform to Manufacturer's Standardization Society Specification SP-58. Hangers shall adequately support the piping system. They shall be located near or at changes in piping direction and concentrated loads. They shall provide vertical adjustment to maintain pitch required for proper drainage. They shall allow for expansion and contraction of the piping.

2. Support drainage pipes every 4', at end branches, and at a change of direction or elevation. Maintain vertical piping in straight alignment. Support trap arm in excess of 3 feet in length as close to trap as possible.

3. For support from Ceilings and Beams - Use Pipe Hanger Flange.

4. Intermediate Attachments - Continuous threaded rod shall be used wherever possible. No chain, wire or perforated strap shall be used.

- m. Piping under handicap lavatories shall be insulated as required to meet the ADA code. Use TrueBro "Lav-Guard" or equal "trap wrap" by Brocar Products or "skal guard" by TCI Products, or equal.
- n. Backfilling: After piping has been tested, inspected, and approved, backfilling shall be done in six-inch increments. Each six inch layer shall be firmly machine tamped in place. Each layer shall be compacted to a density that will prevent excessive settlement or shrinkage. Backfill for ditches shall be leveled off after being thoroughly tamped.

2.4 WATER PIPING AND FITTINGS

Materials for supply piping and fittings shall conform to the specification requirements:

- a. Hot and cold interior water piping above grade shall be **Type "L"** copper in accordance with ANSI/ASTM Specifications B-88 hard drawn. Use **Type "K"** Copper (soft drawn-annealed) **below grade** with no joints allowed. Fittings shall be wrought copper ANSI Standard B-16.22. Notching or mitering is **NOT** allowed. The tubing type and manufacturer's name shall be on each piece of tubing and fitting. Appropriate fittings shall be used for all turns, joints, or other arrangement. Tubing that is out of round or flattened is not acceptable.
- b. Joints in copper pipe smaller than 1-1/4" shall be made up by cleaning the surfaces of the pipe and fittings with steel wool or sand paper, and then applying non-acid flux and 95-5 solder (95% TIN, 5% antimony) to the joint. Joints in copper piping 1-1/4" and larger shall be silver brazed. Brazed joints shall be heated uniformly until brazing material is melted. The joints shall be clean, neat, smooth, and watertight.
- c. All exterior water service pipe shall be **Type "K"** Copper, soft drawn (per above description) or schedule 80 PVC for buried (36" BFG) only pipe.

PVC piping installed under a roadway or parking area shall be encased in a schedule 40 steel pipe sleeve.
- d. Backfilling: Backfill only after piping (and other buried work) are tested, inspected, and approved. Backfilling shall be done in six-inch increments. Each six inch layer shall be firmly machine tamped in place. Each layer shall be compacted to a density that prevents excessive settlement or shrinkage. Backfill for ditches shall be leveled after thoroughly tamping.
- e. Sleeves: Water, sewer, and vent pipe passing through walls, foundations, floors, or ceilings shall use schedule 40 steel pipe sleeves larger than utility pipe. Water line sleeve inside diameter shall be at least 1/2 inch greater than the water pipe insulation. Sleeves shall extend 1/4" above floor. Sleeves shall be flush at ceilings and wall surfaces.
- f. Water Hammer Arresters: Shock arresters shall be placed in cold water supply to each group of fixtures. Shock absorbers shall be sized and located according to the manufacturer's recommendations. Water hammer arresters shall be of all stainless steel construction and certified by plumbing and drainage institute standard PDI-WH201 and Sanitary Engineering Standard ASSE-1010. Water hammer arrester(s) shall have a minimum PDI unit rating C.
- g. Escutcheons: Piping passing through floors shall use 1/2" deep cup type chrome plated, cast brass floor plates with setscrew. Pipes passing through walls and ceilings in finished areas shall use chrome plated, spring type escutcheons.

h. Insulation:

Use 1" thick fiberglass insulation on hot and cold water piping, roof drain bodies, horizontal roof leaders, and fittings in exterior walls, attic, and inside the structure. The insulation on plumbing pipes located in equipment room or in exposed areas shall be wrapped with an eight ounce pasted canvas finish or aluminum jacket. They shall be applied in strict compliance with manufacturer's instructions.

Insulation shall have a maximum flame spread rating of 25 and a maximum smoke developed rating of 50.

Fittings and valves shall be insulated with pre-molded fiberglass fitting covers with polyvinyl chloride (PVC) jacket.

Provide hard (Foamglass) inserts under hangers. Use Rubatex, Armstrong Armaflex 22, or Halstead.

All piping under handicap lavatories shall be insulated as required by the ADA code. Use TrueBro "Lav-Guard", "trap wrap" by Brocar Products, "skal guard" by TCI Products, or equal.

Label water piping "Cold Water", "Hot Water", or "Tempered Water" (for mixed hot & cold water only). Labels shall be per ANSI/ASME A13.1. Place labels for ease of reading and visibility. Labels are required on all exposed piping, piping in mechanical room, and piping in attic.

- i. Valves: Valves that are 3/4 inch and smaller shall be globe valves. Larger size valves shall be solid wedge type gate valves. Valves 2-1/2" and smaller shall be brass or bronze, and larger sizes shall be iron body. Valves shall have 400 psi minimum WOG cold non-shock type.
- j. Trap Primer: Use Wade W-2400, A. O. Smith 2699, or Zurn Z-1022. Trap primers must comply with ASSE 1018 or ASSE 1044.
- k. Pipe Hangers: Use hanger rod and adjustable split ring for soil, waste, and vent piping. Use adjustable clevis for water pipes. Use clamp hanger for vertical pipes.
- l. Inserts: Provide inserts to receive hanger rods in concrete slabs, where applicable.
- m. Anti-freeze Hydrants: Anti-freeze hydrants shall be 3/4", anti-siphon, non-freeze wall hydrant with straight inlet connection, bronze casing, satin nickel bronze face, integral vacuum breaker-backflow preventer, and operating key lock. Use JR Smith 5609, Zurn Z-1300, Wade W-8625, or Josam 7100.
- n. Hose Bibbs: See specifications on plans.
- o. Pipe Supports and Spacing:
1. All support components shall conform to Manufacturer's Standardization Society Specification (MSS) SP-58. Hangers shall adequately support the piping system. They shall be located near or at changes in piping direction and concentrated loads. They shall provide vertical adjustment to maintain pitch required for proper drainage. They shall allow for expansion and contraction of piping.

2. Horizontal steel piping shall be supported with hangers as follows:

<u>Pipe Size</u>	<u>Rod Diameter</u>	<u>Maximum Spacing</u>
Up to 1-1/4"	3/8"	8 ft.
1-1/2" and 2"	3/8"	10 ft.
2-1/2" and 3-1/2"	1/2"	10 ft.
4" and 5"	5/8"	10 ft.
6"	3/4"	10 ft.
8" and 12"	7/8"	10 ft.

3. Horizontal copper tubing shall be supported with hangers as follows:

<u>Nom. Tubing Size</u>	<u>Rod Diameter</u>	<u>Maximum Spacing</u>
Up to 1"	3/8"	6 ft.
1 1/4" and 1 1/2"	3/8"	8 ft.
2"	3/8"	9 ft.
2 1/2"	1/2"	9 ft.
3" and 4"	1/2"	10 ft.

4. Support drainage pipes every 4', at end branches, and at change of direction or elevation. Maintain vertical piping in straight alignment. Support trap arm in excess of 3 feet long as close to trap as possible.

5. Use Pipe Hanger Flange connector for support from Ceilings and Beams.

6. Intermediate Attachments - Continuous threaded rod shall be used wherever possible. No chain, wire or perforated strap shall be used.

p. Pipe & Tubing Attachments:

1" or less thick insulation: Use Grinnell Fig. 115 or Elgen #10C Ring and Turnbuckle Adjuster, or equal.

More than 1" insulation: Use Grinnell Fig. 295 or Elgen Fig. 3 Double Bolt Pipe Clamp, or equal.

Axial thermal expansion greater than 1/2": Use Grinnell Fig. 271 or Elgen #19 Pipe Roll Stand, or equal. Use a pipe saddle with a roll device on insulated pipe.

Uninsulated Tubing: Use Grinnell Fig. CT-115 or Elgen #310C Ring and Turnbuckle Adjuster, or equal.

Uninsulated Pipe: Use Grinnell Fig. 260 or Elgen #12 Clevis Hanger, or equal. Uninsulated vertical pipe shall use Grinnell Fig. 261 or Elgen #39, or equal.

Attachments shall be properly sized.

q. Dielectric Unions shall be installed at hot water heaters and at any junction of dissimilar metal pipes.

r. Heat Traps shall be provided on the supply and discharge piping of the water heater.

- s. Products used to supply drinking water for human ingestion shall conform to the requirements of National Sanitary Foundation Standard ANSI/NSF-61 for Drinking Water System Components.

t. **Natural or LP Gas Piping**

There is no gas piping included in this project's scope.

- a. **Aboveground Gas Service Piping:** Use steel pipe, butt-welding-type fittings, and welded joints. Gas piping shall comply with ANSI B36.10, ASTM A53 or ASTM A106 in accordance with section 306.1 of NCBC Vol. VI. Joint connections to threaded regulators, meters, and valves may be threaded.
- b. **Underground Containment Conduits:** Use steel pipe, butt-welding-type fittings, and welded joints.
- c. Use gas valves of sizes indicated for gas service piping, meters, mains, and where indicated.
- d. **Joint Construction:** Join pipe valves, fittings, and equipment connections as follows:

Use materials suitable for natural gas service.

Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full inside diameter.

Welded Joints: Construct joints according to AWS D10.12 "Recommended Practices and Procedures for Welding Low Carbon Steel Pipe" using qualified processes and welding operators according to "Quality Assurance" Article.

Install unions in piping 2 inches and smaller, adjacent to each valve and at final connection to each piece of equipment having a 2-inch or smaller threaded pipe connection. Union shall be external to equipment housing/cabinet.
- e. Install buried gas distribution system piping with a 36 inches minimum cover. Provide underground magnetic type warning tape. Install drips at points where condensate may collect. Locate where readily accessible to permit cleaning and emptying. Do not install where condensate would be subject to freezing.
- f. **Connect to utility company** gas main (or tank) according to utility company's procedures and requirements.
- g. **Electrical bonding and grounding:** Install aboveground portions of natural (or LP) gas piping systems that are upstream from equipment shutoff valves, electrically continuous, and bonded to grounding electrode or to building steel according to NFPA 70. Do not use gas piping as a grounding electrode.
- h. **Inspect, test, and purge gas systems** according to NFPA 54, Part 4 "Gas Piping Inspection, Testing, and Purging" and local gas utility company requirements. Repair leaks and defects with new materials and retest system until satisfactory results are obtained. Report test results promptly in writing to the Engineer and the authorities having jurisdiction. Include a copy of test report in closeout documents. See section regarding plumbing "Tests" for additional requirements.

i. Labels and Painting:

Provide pipe labels on exposed piping, piping in mechanical room, and piping in attic. Place labels for easy identification. All gas piping shall be provided with yellow labels with stenciled black letters "NATURAL (or LP, as applicable) GAS".

Prime and Paint all exposed interior gas piping yellow. All exterior piping shall be primed and painted to match exterior surrounding and to avoid corrosion. Coordinate with Architect for any special colors.

- j. All gas burning equipment shall be provided with local / adjacent regulator(s) as necessary for the equipment to operate properly with the upstream header pressure specified on the plans. Header pressure shall not be adjusted in lieu of installing pressure regulator for equipment.

2.5 WORKMANSHIP AND INSTALLATION

a. Pipe Tests:

All piping shall be tested in accordance with the North Carolina Plumbing Code or other applicable codes for leaks and/or tightness in the presence of the Engineer. A test report shall be provided to the Engineer. Test requirements include the following:

1. Waste pipe: All openings shall be plugged except the highest opening above the roof (Min. 10'-0" of Head) and the entire system, or that portion to be tested, shall be filled with water and allowed to stand for two (2) hours after stabilization without loss of water level. Pre-fill the piping system 12 hours (minimum) before test to provide for water temperature stabilization and to minimize trapped air bubbles. Provide access and visually inspect joints during test. Provide a written report at Final Inspection, and include in the closeout documents.
2. Water Supply & Circulation Pipe: All water supply pipe, including hot, cold, and tempered, shall be tested prior to placing floor slabs and/or finish walls. Tests shall be at 150 psig (minimum) for eight (4) hours (minimum) without loss of pressure. All piping shall be fully liquid filled and vented before testing. Contractor is required to provide high point vents as necessary for proper venting. Contractor shall demonstrate proper venting as required by the Engineer witnessing test. Provide a written report to Engineer at "Final Inspection" and include in closeout documents.
3. Gas Pipe Tests: Perform per "Gas Pipe Specifications Section" using guidelines provided here also (as applicable - final Engineer decision on applicability is binding). Provide a written report to Engineer at Final Inspection, and include in closeout documents.
4. A roughing-in test will be required before any piping (waste, water, gas, or other) system is concealed (under floor slabs, within walls, etc.) or fixtures set. Provide a written report to Engineer at Final Inspection, and include in the closeout documents.
5. If any test(s) reveal defective materials, defective workmanship, or leakage, then the problem shall be corrected and tests shall be repeated until satisfactory.
6. The pressure gauge used for testing shall be calibrated, and documentation of trace-ability to NIST or an equivalent standard shall be provided at request of the Engineer BEFORE testing. Pressure gauge shall have a scale with a resolution of 2.0 psi or better.
7. The supply source shall be disconnected from the system during testing or a double-block and bleed (or vent) supply configuration shall be established.

8. All joints (soldered, mechanical, welded, screwed, caulked, compression, packing, equipment connections & joints, instrument connections, etc) shall be uninsulated and exposed during the test. Contractor shall make all joints visible, accessible and exposed (including insulation removal and subsequent re-installation) as required by Engineer for joint inspection during test.
 9. All equipment connected to a system shall be OFF during the test. Equipment which may be damaged by the test pressure shall be temporarily disconnected for the test.
 10. Modifications to any system after the hydrostatic test shall require a retest of the affected portion of the system or the entire system, as applicable.
 11. Any joints or connections disassembled for test execution or to correct leaks shall have new gaskets installed at reassembly. Joints shall be inspected for leaks after reassembly.
- b. No slip joints are permitted on sewer side of a fixture trap.
 - c. Close and protect open pipe ends until final connections are made. Such closing shall be made with fittings that cannot easily be removed. Caps or plugs shall be required at all times during construction so that no pipes are left open at the end of any day's work, even though continuation is expected the next day. This includes all pipe, including uninstalled pipe.
 - d. All water piping shall be sterilized with chlorine, 100 parts per million and held for a 24-hour period, after which the system shall be flushed before placing in service. Fixture flush valves shall be thoroughly flushed-out to insure removal of sediment, pipe seals, etc., from water lines and valves. Remove working parts of the valves as required to properly flush. Flush valves shall be disassembled, cleaned, and reassembled as necessary for proper operation after flushing system. The Engineer may require disassembly for inspection following flush, and subsequent reassembly. A report documenting flushing, sterilization, and water analysis results shall be provided to Engineer at Final Inspection. The report shall be included in the closeout documents.
 - e. Rough-in Dimensions: Use manufacturer's rough-in manual for all fixtures and provide accurate rough-in for all fixtures to fit space in accordance with the intent of the drawings (including architectural). For height of all wall mounted fixtures consult drawings and/or the Engineer to provide height of fixture required for the occupants of the buildings. All fixtures shall be accurately roughed-in according to the manufacturer's installation dimension so that no offset adapters, flexible connections, or other improvisations are necessary. All incorrect work shall be torn out and corrected with walls and floors patched. Provide rough-in data sheets with fixture submittals for Engineer's approval.
 - f. Adjust flush valves, etc.: After the water system has been completed and sterilized, the Contractor shall close the stops on all flush valves and reopen them only as necessary to obtain effective flushing action. Adjust the flow rate at all lavatories, mop sinks, water coolers, and other fixtures to prevent splash, splatter, or excessive flow of water. Tamperproof fixture adjustments shall be accurately adjusted and subsequently locked in position.
 - g. All underground lines shall have a magnetic-type warning tape installed in the backfill at least 6 (six) inches below grade.
 - h. General Requirements for Tests / Reports
 1. **All reports required by this specification shall include:**
**Instruments Used (manufacturer, Model, and current Calibration Date & Certification),
Company & Test Personnel Performing Test,**

Time & Dates of Measurements and Report Preparation Date,
Actual Field Measurements (Including measurement location),
Field measurement without any adjustments (including units),
System/equipment status at time of measurement,
Ambient temperature, and

Certification (by responsible Contractor) that report and it's results are in compliance with the project Plans and Specifications and responsible Contractors approval signature and name.

2. Reports shall be provided no later than the Final Inspection. Copies of all reports shall be included in the closeout documents.

2.6 PLUMBING FIXTURES

All Fixtures are to be Eljer, Kohler, or American Standard. All Flushvalves are to be Hydrotek International, Sloan, or Zurn. Installation shall be according to the manufacturer's recommendations and/or code applicable. Fixture substitutions shall be approved by the Engineer prior to purchase and installation. Submit to the Engineer a minimum of 20 days prior to time materials are to be incorporated into the project. Include catalog cuts, rough-in data sheets, and technical information regarding fixtures and trim. Contractor shall coordinate flush valves, fixtures, and carriers for proper fit-up and connection arrangement.

- a. Handicap Water Closet (All bathrooms): Provide wall hung, 1.6 gallons per flush toilet, siphon jet, elongated bowl, and vitreous china, with 1-1/2" back spud. Use American Standard AFWall EL 1.6 ADA #2258.125, or equal by Eljer or Kohler (K-4329).

Provide with seat (white, open front, and NO cover) and self-sustaining check hinge with stainless steel hinge bolts). Use Church #9500C, Beneke #527 SS/CH, Bemis 1955SSC or Olsonite 95 seat.

Provide with concealed wall mounted sensor flush valve with manual override pushbutton, use Hydrotek (8000C-C with transformer(s)), or equal by Sloan or Zurn.

Use Wade W-350 Series, Zurn ZR-1204 Series, or Josam 14000 Series carriers. Handicap mounting height to the seat shall be 17" minimum to 19" maximum. Provide vandal resistant hardware where exposed to the public (i.e. screw for sensor covers shall be vandal resistant).

- b. Urinal: Provide wall mount, 1.0 gallon per flush, Vitreous China, washout type, with 3/4" top spud, and wall hanger. American Standard Allbrook #6541.132, Eljer Savon 161-1095, Kohler Dexter #K-5016-ET.

Provide with concealed wall mounted sensor flush valve with manual override pushbutton, use Hydrotek (8000C-D with transformer(s)), or equal by Sloan or Zurn.

Provide vandal resistant hardware where exposed to the public.

- c. Lavatories (Handicapped): Provide white, acid resisting, enameled cast iron, 20" x 18" lavatory with front overflow and wall hanger. Use American Standard Lucerne 0356.421, or equal by Kohler or Eljer. Provide with 4" center-set holes.

Provide lavatories with concealed arm carrier, valve assembly/manifold, and chrome plated sensor lavatory faucet for water supply. Provide lavatories with supplies, fixed drains, and P-traps. Use American Standard #2306.017/2412.013/4402.061, Kohler #K-7600/K-7715/K-9000, or Eljer #802-0310/ 803-0615/804-1185.

Hardware shall be vandal resistant, and exposed sensor wiring shall be encased with electrical flex metal tubing

Sensor faucets shall be as manufactured by Hydrotek HB-1000-C equal by Sloan, Zurn or Eljer. Piping under lavatories shall be insulated.

- d 2-Station Lavatory Systems (Handicapped): Provide terreon, an acrylic modified polyester resin, double module sink system with infrared faucet controls (infrared sensors shall not be affected by color or sunlight), tapered pedestal panel of acrylic laminate, ADA compliant, and wall hanger support frame. Sink assembly shall be Bradley Model MG-2 / IR-NSD-TMA, or equal by Bobrick. Color: Empire Gray.

Provide lavatories with concealed arm carrier, tempering valve assembly/manifold, and infrared sensor lavatory faucet (with spray head; include transformer(s)) for tempered water supply. Provide lavatories with supplies, fixed drains, and P-traps. Use American Standard #2306.017/2412.013/4402.061, Kohler #K-7600/K-7715/K-9000, or Eljer #802-0310/ 803-0615/804-1185.

Hardware shall be vandal resistant, and exposed sensor wiring shall be encased with electrical flex metal tubing. Piping under lavatories shall be insulated.

- e. DELETED

- f. Handicap Electric Water Cooler: Provide stainless steel dual (high and low) drinking fountain. Receptor, outer shell, bracket and backplate shall be type 304 Stainless Steel, #4 Satin finish with remote chiller (see below). Use Haws #1011.8 or approved equal by Elkay (EDFPBM-117C) or Oasis (M8CR).

Remote Electric Water Chiller: Provide electric refrigerated chiller, with a minimum capacity of 8.0 gph of 50 degrees F drinking water, and manufactured of heavy-gauge stainless steel. Electrical requirements shall be 115 volts, 60 Hz., 4.7 Amps, and single phase. Unit shall be UL listed and certified by ARI to meet standard 1010-78.

Provide shelving for mounting the unit in adjacent mechanical room and coordinate with the electrical contractor for the provision of power and disconnect switch.

Water Cooler System shall conform to NSF/ANSI Standard 61, Section , for Drinking Water System Components.

The Water Hater shall meet or exceed the minimum performance requirements of the North Carolina State Building Code's "Energy Conservation Code" for Electric Water Heaters. The Manufacturer/Contractor shall provide documentation of this.

Use Haws (See Water Cooler Spec/Model) Chiller or approved equal by Elkay (ERC-8) or Oasis.

- g. Water Heater: Provide heater with a 50-gallon storage capacity, 4.5 kW elements, 240V, and single phase electrical configuration.

Tank shall be glass lined tank and equipped with boiler drain and replaceable magnesium anode rods to prevent premature failure against electrolytic corrosion. Water heater shall have AGA seal of certification, a working pressure rating of 150 psig, and ASME rated temperature and pressure (T&P) relief valve. Complete unit shall be insulated, have a baked enamel jacket, and have 4" high legs (or house keeping pad).

Water heater tank shall be covered by an **eight year limited warranty** which includes warranty against failure due to corrosion, due to metal failure, and due to overheating caused by buildup of sediments.

Water heater shall be as manufactured by State Water Heaters M/N PX-52-20RT-2 or equal by A.O. Smith or Ruud.

- h. Anti-freeze Hydrants (hosebibbs): Provide ¾" anti-freeze wall hydrants with straight inlet connection, brass casing, and nickel brass face, and vacuum breaker. Use Zurn Z-1315-5 or approved equal by Wade or Josam.
- i. Backflow Preventer: Provide double check valve type with quarter turn shut-off valves. Use Watts Regulator or equal by Smith, Wilkins (#350) or Wade.
- j. Water Meter: Provide in the new Rest Area building for measurement of water usage. See Plumbing Drawing for specifications.
- k. Thermostatic Mixing Valve (TMV): Provide temperature regulating valve with outlet temperature indicator, NPT connections, integral strainer check stops, adjustable set-point, automatic flow isolation when thermostat fails or cold water supply is lost, bronze or brass body, stainless steel internals, and ratings of 125 psi and 200 F. See Plumbing Plan also (including Water Heater detail). Valve shall comply with requirements of ASSE 1017.
- l. Circulating Pump: Provide pump. See Plumbing drawing for specifications.

2.7 WARRANTY AND SERVICE

- a. Entire plumbing system shall have one-year warranty in accordance with Division 1 General Conditions.
- b. Upon completion of all work, the Contractor shall check-out and test the systems, verify all bearings/equipment are lubricated properly, and start-up tasks as necessary. He shall be responsible for original service and start-up of the system(s).
- c. The Contractor shall guarantee the complete plumbing system(s) against defects due to faulty materials, workmanship, or failure due to negligence of the Contractor. This guarantee shall extend for a period of not less than 12 months from the date of final acceptance. The guarantee shall include a twelve month warranty by the manufacturers on all materials and equipment provided, except where longer periods are specifically required. He shall be responsible for any maintenance required on the system and service call(s) during the guarantee period.

2.8 INSPECTION

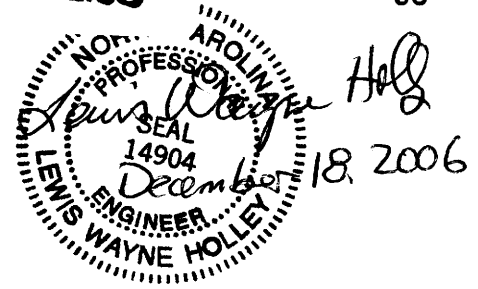
The project will be checked periodically as construction progresses. No work will be covered up until approved by the Engineer. All testing performed under this contract shall be witnessed by the Engineer or his designee. The Contractor shall be responsible for notifying the Engineer at least 48 hours in advance when any work or testing is ready for inspection.

SECTION 1540 - COMPENSATION FOR PLUMBING

The work of providing materials and constructing the North & South Bound Rest Area Service Building in accordance with the plans and specifications, completed and accepted, will be paid for at the contract lump price for " Plumbing Installation for the NBL & SBL Rest Area Building & Vending Building". Such price and payment will be full compensation for all work of constructing the North & South Bound Lane Rest Area service building and Vending Building, including but not limited to providing all transportation, materials, labor, tools, equipment, fees and incidentals necessary to complete the work. Payment will be made under:

" Plumbing Installation for the NBL & SBL Rest Area Building". Lump Sum

" Plumbing Construction for the NBL & SBL Vending Building". Lump Sum

SECTION 15B - MECHANICAL**PART 1 - GENERAL****1.1 Scope of Work**

- a. Requirements of the General and Special Conditions apply to all work in this Section. Contractor shall provide all labor, materials, equipment, any services indicated on the drawings, or specified herein reasonably necessary for, or incidental to, a complete job. Contractor shall provide disconnects (fused), wiring, and conduit for all his equipment as required by the North Carolina Electric Code.
- b. These specifications and the accompanying drawings shall include the providing of all labor, tools, materials, fixtures, transportation, appurtenances, and service necessary and incidental to installation of a complete and operative system as indicated and intended on the drawings and as herein specified.
- c. Contractor shall coordinate the work and equipment of this section with all work and equipment specified elsewhere in order to assure a complete and satisfactory installation. Work such as excavation, backfill, concrete, flashing, etc., that is required by the work of this Section shall be provided by the Contractor responsible for this Section unless otherwise indicated. Contractor shall provide specification sheets for all his equipment requiring electrical power to the electrical contractor within seven (7) days after the award of contract. See Electrical Specification Section entitled "Mechanical Equipment Electrical Coordination and Responsibilities" for additional details of responsibilities.
- d. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work the same as if herein specified or shown. The Drawings and Specifications are considered complementary one to the other; and work implied by one and not by the other shall be supplied and installed as though specifically called for by both.

Since the plans are diagrammatic only and are not intended to show all details, the Contractor shall make any necessary changes to avoid beams, columns, footings, vents, ducts, and other obstruction(s), without additional cost to the Department of Transportation (DOT/Owner).

1.2 CODES, RULES, PERMITS AND FEES

- a. All work shall be done in accordance with the North Carolina State Mechanical Building Code and the Energy Conservation Code, latest Editions, including the Energy Conservation Code, and other applicable codes.
- b. The Contractor shall give all necessary notices, and pay all government sales taxes, fees and other costs including utility connections or extension, in connection with his work; file all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required certificates of inspection for his work and deliver same to the Architect before request for acceptance and final payment for the work. Copies shall be included in the closeout documents.
- c. The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, and drawings required to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on Drawings and/or specified.
- d. All materials provided and all work installed shall comply with the National Fire Codes of the National Fire Protection Association, and and with the requirements of all governmental departments having jurisdiction.
- e. All material and equipment for the electrical portion of the mechanical systems shall bear the UL approval label, or shall be listed by Third Party Agencies Accredited by the NCBCC to label Electrical and Mechanical Equipment as of July 1, 1995, in every case where they have established a standard for

the particular type of material to be installed.

1.3 DEFINITION

The word "Contractor" as used in this Section of the Specifications refers to the Mechanical/HVAC Contractor unless specifically noted otherwise. The word "provide" means furnish, fabricate, complete, install, erect, including labor and incidental materials necessary to complete in place and ready for operation or use the items referred to or described herein and/or as shown or referred to on the Contract Drawings.

1.4 CONTRACTOR'S QUALIFICATIONS

It is assumed that the Contractor has sufficient general knowledge and experience to anticipate the needs for construction of this nature. The Contractor shall provide all items required to complete the construction in accordance with reasonable interpretation of the intent of the Drawings and Specifications. Any minor items required by code, law, or regulations shall be provided whether or not specified or specifically shown where it is a part of a major item of equipment, or of the control system specified or shown on the plans, or required for proper functioning of the equipment or system.

1.5 SURVEYS AND MEASUREMENTS

- a. The Contractor shall base all measurements, both horizontal and vertical, from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at the site and check correctness of same as related to the work.
- b. Should the Contractor discover any discrepancy between actual measurements and those indicated that prevents following good practice or the intent of the Drawings and Specifications, then he shall notify the Engineer, and he shall not proceed with his work until he has received instructions from the Engineer.

1.6 PLANS

- a. Mechanical plans are diagrammatic except where dimensions are shown. See Architectural drawings for building dimensions and ceiling plans. Include access panels as required by Mechanical Plans & Specifications, even if not shown on Architectural plans.
- b. See Demolition Plan Drawing VA-4 for demolition requirements for the Vending Building.

1.7 SHOP DRAWINGS

- a. Refer to the General Conditions and "Maintenance and Operating Instructions" section for additional requirements.
- b. All items submitted to Engineer for review shall bear stamp or notation indicating Contractor's prior review and approval including Contractor's signature(s) and date reviewed. This includes the specific Contractor/Trade responsible for purchasing and installing the items. The Contractor approvals indicate the submittal is in full compliance with the plans and specifications UNLESS specifically noted otherwise for specific exceptions or specific substitutions proposed.
- c. Where manufacturer's standard publications or other specifications are submitted, they shall bear sufficient notations to define specific material proposed including ratings, performance (electrical, mechanical, and hydraulic, as applicable), outline dimensions, colors, operating description (including all controls), layout, model numbers, listings, standards applicable, and accessories.

Marketing information or other general literature is NOT sufficient to obtain Engineer approval. Incomplete submittals will be rejected without review. The contractor (NOT the equipment vendor) is responsible for submittal preparation, review, and completeness prior to submittal

- d. Submit manufacturer's certified performance data for all equipment.
- e. Coordinate installation drawings with other parts of the work whether specified in this Section or other Sections. All approved Shop Drawings and Submittals shall be included in the closeout documents.

1.8 ELECTRICAL

- a. All motors not supplied from motor control centers shall have trip-protected starter provided with equipment. All disconnects shall be fused.
- b. All items of mechanical equipment electrically operated shall be provided in accordance with Section entitled, "DIVISION 16 – ELECTRICAL". Mechanical equipment, other than individual mounted motors, shall be factory pre-wired so that it will only be necessary to bring connections to a single set of terminals.
- c. Mechanical equipment electrical components shall be bonded together and connected to the electrical system ground.

1.9 MAINTENANCE AND OPERATING INSTRUCTIONS

- a. Submit to the Engineer for approval three (3) bound sets of maintenance data on all equipment. Each set shall contain an equipment list including equipment location by floor and room designation. After approval, turn over to the Owner's representative in the closeout documents.
- b. Instruct the Owner's representative in operation and maintenance of systems and equipment to include as a minimum all equipment and systems, i.e. air handlers, furnaces, condensers, fans, controls and actuators, relief valves/devices, zone dampers, pressure regulators, pumps & related systems, protective devices/systems, emergency shutdown/isolation, tanks/vessels, instruments, filters, and sensors.

1.10 QUALITY ASSURANCE

- a. Brand Names: Where materials, equipment, apparatus, or other products are specified by manufacturer, brand name, type or catalog number, such designation is to establish standards of desired quality and style, and shall be the basis of the bid. Materials so specified shall be provided under the Contract unless changed by written approval. Where two or more designations are listed, choice shall be optional with Contractor.
- b. Supervision: Contractor shall have in charge of the work at all times during the Construction a thoroughly competent foreman with broad experience in the work to be performed under this Contract. Anyone deemed not capable by the Architect or Engineer shall be replaced immediately upon request. After a satisfactory foreman has been assigned, then he shall not be withdrawn without written permission from the Architect and Engineer.
- c. Quality of Work: The installation of this entire system shall be in an organized and workmanlike manner. Careless and inferior work will not be tolerated. Changes and replacements required because of careless and inferior work shall be at the expense of the Contractor.
- d. Patents: Contractor shall be responsible for the cost of any damage suits that may arise in connection with infringement on patent rights or injunctions affecting any material or equipment installed by him under this work.
- e. Measurements: All equipment, etc., are located and shown on the plans as nearly as possible in their exact locations. This Contractor shall verify the locations and measurements before installation to insure the most workmanlike installation possible and avoid conflict with work of other trades. Any uncertainties and conflicts shall be submitted to the Engineer for final decision.

PART 2 - PRODUCTS

- 2.1** Provide equipment complete with all components and accessories necessary to its satisfactory operation, to meet listing requirements, to meet Code requirements, to meet Plans and Specifications, and to meet or exceed all intended functions and performance requirements.
- 2.2** Listing of a manufacturer's name in this Section or on Drawings does not infer conformity to all requirements of the Contract Documents nor waive requirements thereof.

2.3 Heating/Cooling Units

a. Abbreviations

CAP:	Total Net Capacity (1000 BTU/HR = 1 MBH)
SEN:	Sensible Cooling Load
E.E.R:	Energy Efficiency Ratio
SEER:	Seasonal Energy Efficiency Ratio
COP:	Coefficient of Performance (Heating or Cooling)
HSPF:	Heating Seasonal Performance Factor
IPLV:	Integrated Part-Load Value
AHU:	Air Handling Unit
CU:	Condensing Unit (Outdoor Unit)
HE:	Energy Recovery Heat Exchanger
NAIMA:	North American Insulation Manufacturer's Association
SMACNA:	Sheet Metal and Air Conditioning Contractor's National Association
TE:	Temperature Sensing Element
T:	Thermostat
db:	Dry Bulb Temperature
Wb:	Wet Bulb Temperature
AFUE:	Actual Fuel Utilization Efficiency

b. Heating & Cooling Standard Rating Conditions (ARI)

Cooling Standard:

Indoor:	80 degrees F. db, 67 degrees F. wb
Outdoor:	95 degrees F. db air entering outdoor unit.

Heating Standard (Heat Pump)

High Temp. Heating Standard:

Indoor:	70 degrees F. db entering air temperature
Outdoor:	47 degrees F. db, 43 degrees F. wb air entering unit.

Lo-Temp. Heating Standard:

Indoor:	70 degrees F. db entering air temperature,
Outdoor:	17 degrees F. db air entering unit.

c. **NEW REST ROOM BUILDING UNIT DESCRIPTION:**

Split System Heating / Cooling - Provide and install air to air electric cooling and heating heat pump systems including auxiliary electric heating in combination with direct expansion fan coil in locations and manner shown on the plans. The units shall be designed and tested for use with refrigerant 22 and be equipped with refrigerant line fittings that permit mechanical or sweat connections. Nominal system electrical characteristics shall be per plans with a 60 Hz system frequency. The heating and cooling systems shall meet or exceed the following specifications:

System Ratings: See Plans/Drawings for performance requirements and equipment specifications. System/Equipment efficiencies shall meet or exceed the minimum requirements of the Energy Conservation Code of the North Carolina State Building Code.

<u>Rating</u>	
Flow (CFM)	Per Plans
Cooling	Per Plans S.E.E.R. 13.0 Minimum (10.0 Code Minimum)
Heating	COP Per Plans (6.8 Code Minimum) HSPF Per Plans (6.8 Code Minimum)

d. **RENOVATED VENDING BUILDING (PREVIOUS REST ROOM BUILDING) UNIT DESCRIPTION:**

Same as for "New Rest Room Building System"

e. **General Equipment & System Requirements**

1. Use model specified (except for changes required to meet Efficiency Requirements) or equal by Carrier, Trane, Lennox, York, or Engineer approved Equal. Alternates from approved vendors shall be specified by the Contractor at the time of the bid including ALL submittals necessary to approve the alternate.
2. Condensing Unit (Outdoor): Controls and protective devices shall include a crankcase heater, liquid line low and high pressure relief device, and sound shield. Compressor/motor shall have both thermal and current sensitive overload devices and internal high-pressure protection. Outdoor unit wiring shall incorporate a time guard positive acting timer to prevent compressor from restarting for a 5 minute period. An automatic defrost control shall be included to accomplish defrosting (required for heat pumps) every 90 minutes for a period of not more than 10 minutes. A 24-V transformer shall be factory installed and wired on outdoor units for the external control circuit. The compressor unit shall be warranted for a minimum of five (5) years from the Final Acceptance of building.
3. Air Handling Unit w/ Electric Heating: (Indoor Units) - Provide and install fan sections equipped with direct expansion (R-22) cooling coil and auxiliary electric heating elements that meets or exceeds the plan and specification requirements. The fan motors shall be factory lubricated, have internal overload protection, and be resiliently mounted. Filter racks shall be equipped with factory installed permanent type filters that slide out for maintenance. Provide minimum 30% efficient pleated filter as tested per ASHRAE standard. Size shall be a minimum of 24" x 24" x 1" thick or equal as approved by Engineer.

The indoor units shall be equipped with enclosed evaporator (direct expansion coils) compatible with the entire HVAC system. The coils shall be "A" coil type and shall operate properly in the diagonal position. They shall be constructed of aluminum plate fins mechanically bonded to nonferrous tubing with all joints brazed. Coils shall have factory installed refrigerant by-pass accurater metering device. Coil shall have factory installed TXV refrigerant line fittings that permit mechanical connections and shall have a condensate pan with primary and auxiliary drain

connections. Condensate pipe shall be insulated and shall slope to floor drain, and the pipe section at floor level shall be hard copper to minimize potential for damage.

4. Equipment cabinets - Fan, coil, and heater enclosures shall be insulated and constructed of galvanized steel, bonderized, and finished with baked enamel.

5. Controls:

Provide and install programmable indoor wall mounted thermostats (with night setback) and temperature elements located as shown on plans. Provide remote Temperature Sensors as shown on the plans. The control unit shall be capable of simultaneous programs for both the heating and cooling systems for year-round comfort and economy. The unit shall be capable of containing up to four (4) comfort and economy program periods for each day of the week and two (2) each on Saturday and Sunday. The unit shall be equipped with a large easy-to-read digital information display that will display accurate time and temperature and show all functions during programming. The unit shall be compatible with a 24-volt control circuits, and shall be usable with spark ignition systems without an isolation relay. The unit shall have a built-in key lock to prevent tampering.

Provide Zone Control(s) and Damper(s) with Actuator(s) as shown on the plans. All Zone Control Dampers shall include a minimum flow stop, and shall include continuous analog-signal based modulation in opening and closing directions.

2.4 Belt Drives

- a. V-belt drives shall be rated at a minimum of 200% of nominal motor horsepower.
- b. Motor sheaves shall be fixed pitch type.
- c. Fan static pressures are estimated. Provide one extra drive/sheave to allow adjustment to deliver schedule air quantities against actual system resistance.
- d. Provide guards for all exposed belt drives (ie; those outside of equipment housings). Provide openings in guard at driving and driven sheaves for use of tachometer (revolution counter).

2.5 Motors And Starters

- a. Provide and install motors for all equipment specified under this Section in accordance with Mechanical and Electrical Divisions.
- b. Provide overload protection, starters, and disconnects (fusible -including fuses) for all motors specified under this Section unless such protection is specified under another Section.
- c. All conduit, control wiring, and wiring from starters, controls, interlocks, and connections to equipment are included under this division. Power connections to the line side of all disconnects are included under Electrical Division.

2.6 Maintenance And Operating Instructions

- a. Submit to the Engineer for approval three (3) bound sets of maintenance data on all equipment. Each set shall contain an equipment list including Owner Equipment Number/ID AND location by floor, and location by room number / name of each piece of equipment. After approval, turn over to the Owner's representative in the closeout documents.
- b. Instruct the Owner's representative in operation and maintenance of all equipment and systems;

including controls, equipment, machinery, protective functions/devices, preventative maintenance, and emergency shutdown/isolation.

2.7 Ducts, Plenum, Etc.

- a. As indicated on drawings, provide a system of ducts for supplying, returning, exhausting, routing, and distributing air from various spaces.
- b. Duct shall be rated for +2" to -2" inches of water (W.G.) static pressure or better. Ductwork and supports shall conform to the SMACNA "HVAC Duct Construction Standards (DCS), Metal, and Flexible, Second Edition, 1995" (including Addendum 1 dated November 1997). Latest SMACNA edition/issue shall be used if specified version is superceded.

Where fittings or configurations not shown in the HVAC DCS are shown on the contract drawings, they shall be constructed as though they were therein. All sheet metal, duct, casings, plenums, etc. shall be constructed from prime galvanized sheet metal. Requirements applicable include (but are not limited to) gauges of materials, workmanship, method of fabrication, and method of erection.

- c. Support ducts from building structure with 1-inch by 1/8-inch galvanized steel bands or as specified in SMACNA (whichever is more stringent).
- d. Provide all square turn duct elbows with turning vanes. Flow diverters (locking) shall be added to branches during balancing where necessary to achieve design flow.
- e. Flexible ducts shall be in accordance with "NAIMA or SMACNA Fibrous Duct Construction Standards", and listed per UL-181. Flexible duct shall have full interior liner with steel Helix. The outside jacket shall be a seamless copolymer sleeve. Insulation shall be 1" thick, 1 lb./cu. Foot) density fiberglass.

Length of flexible duct shall not exceed 6 feet.

Flexible ducts shall be by Clevaflex, or approved equal by Genflex or Metalflex, and shall be approved for use in a return air space. All turns greater than 45 degrees shall be made with rigid sheet metal elbows (with turning vanes).

- f. Make airtight joints and transformations in accordance methods in "SMACNA HVAC Duct Construction Standard – Metal and Flexible" (Seal Class A) and the NC Energy Code (Section 803.2.8). No dust marks from air leaks shall show at connections, grilles, etc., during the warranty period. Make all laps and slips in direction of airflow. All edges and slips shall be hammered down to provide a smooth finish inside ducts. All button or bolt connections in standing seams shall be spaced at fixed centers (not greater than 4 inch spacing), unless otherwise shown, and shall be at same center lines throughout entire duct length. All joints shall be sealed/taped and have mastic applied to make airtight. Tapes and mastics used to seal duct shall be listed with UL-181A/B. Unlisted duct tape is not acceptable.
- g. Ducts passing through masonry walls shall be provided with angle collars on each side of the wall, and shall be fastened to the wall and duct. Collars shall extend around the entire perimeter of the duct. The 1/2" annular space between the duct and the wall shall be packed with mineral fiber, felt, or sponge rubber.

All penetrations that penetrate a fire barrier shall be per an approved UL listed penetration, and those requirements take precedence.

- h. All ductwork shall operate without chatter and vibration, and shall be free from pulsation.
- i. Slip joints may be used on ducts up to and including 24 inches; larger ducts shall be constructed using 1-1/2 inch standing seams (maximum spacing of 38 inches), and shall include proper fastening of all ducts to the grounds at openings, grille louvers, dampers, etc. Provide sheet metal flanges where ducts

130

penetrate walls.

- j. The minimum duct gauge shall be the greater of the SMACNA requirements or the following:

Rectangular Ducts Greater Width	Minimum Thickness Galv. Iron U.S. Gauge Thickness (or greater if required by pressure class)
------------------------------------	----------------------------------------------------------------------------------------------------

Up to 12"	26
13" to 30"	24
31" to 54"	22
55" to 84"	20

- k. **Ductwork and sheet metal work also requires (but is not limited to) all of the following:**

1. Supply ducts, risers, branches, collars, adapters, boots, splitters, duct turns, ceiling grilles, duct hangers, quadrant dampers, etc: Construction shall meet the SMACNA "Duct Construction Standards – Metal and Flexible" Manual.
2. Canvas Connections - Provide flexible connections to ducts connecting plenum chamber as shown to isolate the noise from units. The connector shall be 6 inches long, and 20 oz. duct, and UL approved. Provide iron bands over ends of canvas, and bolt bands through to angle iron.
3. Access Doors or Panels: Provide gasketed access doors of approved construction at all apparatus or equipment requiring service and inspection as required by the North Carolina Building Code. Doors shall suit/match finish in which installed.
4. Apparatus/Equipment Connections: Use Flexible connections. For low velocity ductwork (less than 2,400 FPM), provide flexible connections at inlet and outlet of each fan and AHU connected to ductwork and elsewhere as indicated. Flexible connectors shall be 6 inches wide, waterproof, fireproof, and UL approved. Use "24 gauge Metaledge Ventfab" or approved equal.
5. Supports - All structural supports and hanger rods shall be provided and painted flat black (2 coats) by this contractor.
6. Provide access to all dampers as shown on the plans and as necessary for balancing and adjustments via either Attic Access Doors and Ceiling/Wall Access Panels. All ceiling and wall access panels (24" x 24" minimum) shall be steel, painted, include a manufacturer supplied latch, and shall require only a screwdriver to open from occupied space.

Provide sufficient panels and doors and in all required locations such that it is not necessary to climb on any equipment, mechanical devices/duct, electrical devices/conduit, plumbing devices/pipe, or other non-structural components to access any damper. Locate access panels and attic doors such that their use is not restricted by structural, plumbing, mechanical, or electrical devices, components (including duct, conduit, or pipe) or hardware.

7. Insulation:

(a). Rectangular Ductwork - All supply and return rectangular metal ducts shall be insulated with 1" min. thick, 1-1/2 lb. density, FRK-25, foil faced fiberglass that is applied to the exterior of ductwork. Use Johns- Manville, Micro Bar, Gustin Bacon Ultralite #300, Owen-Corning Fiberglass, or equal. Dimensions shown on plans are clear duct inside flow passage dimensions.

(b). Round Ductwork - All supply round metal ducts shall be insulated with 1" thick, foil faced, FRK-25, 3/4-lb. density fiberglass duct insulation that is applied to the exterior of the

ductwork. Wrap tight and overlap 2". Staple in place with 9/16" flare type staples on 6" centers, and seal with 4" strips of foil-faced fire retardant adhesive. Use Owens-Corning, Johns-Manville, Gustin Bacon (Ultralite #300), or approved equal.

- (c). All duct dimensions shown on plans are clear inside duct flow passage dimensions.
- (d). Insulation including jacketing and adhesives (when used) shall have a flamespread rating not to exceed 25, and shall have a smoke developed rating of not more than 50 when insulation assembly is tested as a composite product.
- (e). Duct insulation shall comply with the requirements of the Energy Conservation Code of the NC Building Code.

2.8 HVAC Refrigerant Systems

- a. Refrigerant Piping - Refrigerant piping shall be cleaned & deoxidized, type "L", hard drawn copper tubing. Copper joints shall be made with wrought copper using Chase, Revere, or Anaconda solder fittings. All joints shall be made with 1200 degrees F. minimum solder completely filling the joints. Use Silfos, Airco, or Kester solder or equal. Refrigerant piping shall be installed in strict accordance with HVAC Equipment Manufacturer's Installation Instructions and Listing Requirements.
- b. Refrigerant Accessories – Provide accessories equal to Sporlan, Alco, or Henry. This includes:
 - a. Sight glass and moisture indicator
 - b. Solenoid Valves
 - c. Expansion valve
 - d. Strainer-dryer with replaceable core
 - e. Back pressure valve
- c. Refrigerant Pipe Insulation
 - 1. Entire length of refrigerant suction line shall be insulated with 1" low temperature piping insulation by Armstrong, Rubatex, Celotex or approved equal. Fitting cover shall be mitered sections of the same material. Joints shall be carefully sealed with adhesive as recommended by the manufacturer. Installation shall be in strict accordance with manufacturer's instructions. All insulation joints shall be sealed, airtight, and prevent moisture/humidity intrusion into insulation system.
 - 2. Insulation exposed to outdoors shall be covered with a two-ply waterproof sealing tape and painted with two coats of asphaltic waterproofing cement.
 - 3. Insulation including jacketing and adhesives (when used) shall have a flamespread rating not to exceed 25, and shall have a smoke developed rating of not more than 50 when insulation assembly is tested as a composite product.
 - 4. Pipe insulation located in equipment room(s) or in exposed areas shall be wrapped with an eight ounce pasted canvas finish or aluminum jacket in strict compliance with manufacturer's instructions.
- d. Refrigerant (R22) and Lubricating Oil - Contractor shall provide and install all necessary refrigerant and oil for the proper operation of these systems. After the systems have been tested and when accepted by the Engineer, Contractor shall provide and install, without charge, any refrigerant and oil necessary to bring the system up to a full charge.

2.9 Grilles, Registers, Diffusers, and Louvers

All diffusers and return air grilles are to be mounted flush with ceiling and walls except where specified to be mounted on duct or specified otherwise. See drawings for manufacturer and model number.

2.10 Apparatus Connections

- a. Flexible connections: For low velocity ductwork (less than 2,400 FPM), provide flexible connections at inlet and outlet of each fan connected to ductwork and elsewhere as indicated. Flexible connections shall be 6 inches wide, waterproof, fireproof, UL approved, and shall be "24 gauge metaledge Ventfab".
- b. Ducts passing through masonry walls shall be protected from wall contact by a 1/2-inch thick filler of felt or sponge rubber. Fire penetration requirements take precedence over this requirement.

2.11 Air Distribution Equipment

All air distribution equipment shall be as indicated on drawings with frames to suit the mounting/supporting surface. All grilles shall have baked off-white finish unless otherwise noted.

2.12 Cleaning Duct System

After complete installation of ducts, Contractor shall clean entire system of rubbish, plaster, dirt, etc., before installing any outlets. After installation of outlets and fan connections are made, Contractor shall blow-out entire system with all control devices wide open. Filters shall be installed during "blow-down", and they shall be replaced with new ones after "blow-down".

2.13 Electrical Equipment

- a. All electrical equipment shall be in accordance with Section entitled, "DIVISION 16 - ELECTRICAL". Mechanical Contractor shall provide them unless otherwise noted.
- b. Mechanical equipment, other than individual mounted motors, shall be factory pre-wired so that it is only necessary to bring connections to a single set of terminals.
- c. Mechanical equipment electrical components shall be bonded together and connected to electrical system ground.
- d. All motors not supplied from motor control centers shall have trip-protected starters provided with equipment.
- e. All disconnects shall be fused.

2.14 Condensate Drains

Condensate drains shall be 3/4" PVC type pipe sch 40, except that Copper type "L" hard drawn drains shall be used where horizontal, on floor, subject to abuse, or subject to being "stepped-on". Appropriate fittings shall be used for all turns and joints.

2.15 Heat Exchanger:

- a. Provide a fixed plate energy reclaim device, air-to-air type, arranged for counter-flow airflow pattern, and designed, fabricated, and installed to meet Plan and Specification requirements for construction, features, controls, performance, ratings, loads, and operating conditions. The contractor shall verify

allowable space for mounting and shall coordinate with the general contractor for staging.

- b. Do not locate exhaust air outlet louver within 10' of any makeup (outside) air intake to the building. Do not locate outside air intake within 4 feet of or in-line with any Condenser Unit Fan Discharge flow path/stream.
- c. Provide 1" minimum copper condensate drain to floor drain, and install as required for Air Handler Units.
- d. In-Line Fans & Submittals: In-line fans are to be integral of the heat exchanger. The contractor shall submit detailed drawings, specifications, and equipment information for any other configuration proposed. Submitted information shall include an engineering summary covering performance of all system components (heat exchanger, fans, filters, controls, electrical, air flow, outline dimensions, and interconnecting duct) when installed as a completed system.
- e. Access Doors or Panels: Provide gasketed access doors of approved construction at any apparatus requiring service and inspection as required by the North Carolina Building Code. Doors shall suit/match housing finish.
- f. Apparatus/Flexible Connections:

For low velocity ductwork (less than 2,400 FPM), provide flexible connections at inlet and outlet of each fan connected to ductwork and elsewhere as indicated. Flexible connections shall be 6 inches wide, waterproof, fireproof, UL approved, and shall be "24 gauge metaledge Ventfab".
- g. Ducts passing through masonry walls shall be protected from wall contact by a 1/2-inch thick filler of felt or sponge rubber. Fire penetration requirements take precedence over this requirement.
- h. In-Line Air Filters: Each air handler shall be equipped with factory installed air filter(s) to protect the heat exchange coils and/or media from ALL inlet (Make-up/outdoor and Return/Exhaust) flows. They shall have a minimum 30% efficiency (or better as specified on plans).

2.16 Duct Smoke Detectors:

- a. Mechanical contractor shall provide and install Duct Smoke Detectors for smoke detection as required by plans and specifications.
- b. Each AHU shall be provided with factory installed relay to shut down the air handler and energy recovery unit upon a signal from the duct smoke detector.
- c. Electrical Contractor shall provide Audible and Visible Alarms (including Smoke and Trouble) per plans that are activated by the Duct Smoke Detector and located in an approved location (Reference: Mechanical Code Section 606.4). All wiring shall be by the Electrical Contractor. The alarm device shall be key operated.
- d. Coordinate details with Electrical Contractor.
- e. Provide hinged access opening for detector inspection. Door minimum size is 10"x10".

2.17 Exhaust Fans

- a. Exhaust fans shall be provided as shown on the plans.
- b. Fan motors shall be wired to a dedicated and independent wall switch (unless otherwise indicated).
- c. Support wall and roof fans from building structure, and locate unit(s) for easy access.
- d. Do not locate exhaust air outlet/louver within 10 feet of any makeup (outside) air intake to the building.

- e. Route bathroom and kitchen/break room exhaust ducts to soffit and provide exhaust outlet grill with screen (½" x ½" mesh).
- f. Include accessible, adjustable, and lockable damper in exhaust duct.

PART 3 - EXECUTION

3.1 WORKMANSHIP AND INSTALLATION

- a. Workmanship shall be first class, performed by experienced and skilled craftsmen.
- b. All heating and air conditioning work shall be coordinated with the general contract in order to finish together.
- c. General / Schematic Plans: The plans show general/schematic locations and arrangements of HVAC equipment and related duct inside the mechanical room(s). Contractor is responsible for final layout of equipment & duct subject to Engineer approval in the mechanical rooms.
- d. Instructions to Operating Personnel - The Contractor shall fully instruct the operating personnel in the operation and maintenance of the equipment, and shall turn over to the owner all instruction manuals, parts, lists, etc.
- e. Objectionable Noise and Vibration - Mechanical and electrical equipment shall operate without objectionable noise or vibration, as determined by the Engineer. If such objectionable noise or vibration is produced and transmitted to occupied portions of the building, then the Contractor shall make the necessary changes to correct the noise or vibration at no charge to the Owner and subject to Engineer approval.
- f. Cleaning Up and Painting - In addition to the cleaning required in the General Conditions of the Contract, the Contractor shall at the completion of the work clean, polish, and/or wash all exposed items of materials, equipment, and fixtures in his contract to leave such items bright and clean.
- g. Testing of Controls - Operate the system and test the automatic controls by simulating summer and winter conditions to verify that the controls operate in accordance with plans and specifications and their intent.
- h. Temperature Controls - The Contractor shall provide a report to the Engineer stating that the control systems for the building (by area) are installed in accordance with the recommendations of the manufacturer, the plans and specifications, and that the Contractor has adjusted, calibrated, checked, and tested them, and that they are operating in accordance with the plans and specifications and their intent.
- i. Smoke Detector Shutdown & Alarms: The Contractor shall test this system in the presence of the Engineer and demonstrate that the automatic shutdown controls and alarms work satisfactorily. The presence of smoke (smoke bomb or smoke machine) shall be simulated at the Smoke Detector, and the operating HVAC System shall shutdown in response to the simulated alarm condition. The Contractor shall provide a test report to the Engineer.
- j. Tests of Refrigerant Equipment & Piping:
 - 1. All refrigerant equipment not tested at the factory and all piping shall be vacuum leak tested. They shall not leak (or show evidence of leakage) when evacuated to an absolute pressure of 0.20 inch (or less) of mercury for a minimum of four (4) hours. They shall be isolated from the rest of the system during this test. Piping and System leak/vacuum testing shall be performed in accordance with manufacturer's instructions and EPA requirements. Piping systems shall be tested after installation and before any insulation is applied. The system shall be retested if modified, repaired, or disassembled

after initial test. All controls and other apparatus that may be damaged by the test pressure shall be removed before the tests are made. A test report shall be provided to the Engineer.

2. Refrigerant lines shall be tested at a minimum of 150 psi on the low pressure side and a minimum of 300 psi on the high pressure side. System shall be tested with an inert gas of dry carbon dioxide with a small amount of refrigerant as a tracer. Pressure limiting or pressure reducing valves and gauges on the outlet side of the tanks shall be used to reduce the tank pressure of the inert gas to the pressure specified above. Pressure shall be maintained for a minimum of 2 hours without pressure loss. If pressure loss occurs during this period, then system shall be checked with halide torch and any leaks repaired. Test shall then be re-run for another 2-hour period. Testing and repair shall continue until there is no pressure loss.
3. After a satisfactory pressure test, high vacuum pumps (DO NOT USE COMPRESSOR) shall be connected to the system and system evacuated to a pressure of 0.20 inches of mercury with the system and ambient temperature not less than 36 degrees F. After this pressure has been attained, then the vacuum pump shall be operated for a minimum of 12 hours while connected to system. The vacuum shall be broken by charging system with refrigerant vapor as soon as possible thereafter.

k. General Requirements for Tests / Reports

1. **All tests and reports required by this specification shall include a written report which includes the following:**

**Instruments Used (manufacturer, Model, and current Calibration Date & Certification),
Company & Test Personnel Performing Test,
Time & Dates of Measurements and Report Preparation Date,
Actual Field Measurements (Including measurement location),
Field measurement without any adjustments (including units),
System/equipment status at time of measurement),
Ambient temperature, and**

Certification (by responsible Contractor) that report and it's results are in compliance with the project Plans and Specifications, and responsible Contractor's approval signature and name.

2. **Reports shall be provided no later than the Final Inspection. Copies of all test reports shall be included in the closeout documents.**

3.2 AIR BALANCING

- a. Engineer shall be notified a minimum of 48 hours in advance before Air Balancing. Balancing shall be witnessed by the Engineer.
- b. The Testing and Balancing shall be performed by personnel certified by the National Environmental Balancing Bureau (NEBB), the Associated Air Balance Council (AABC), or Equal approved by the Engineer. Testing and Balancing shall be performed in accordance with approved standards, requirements, and procedures for the Contractor and the certification agencies.
- c. Balance reports shall include, but not be limited to,

Installed equipment Tag Numbers,
Component Descriptions & Locations,
Equipment nameplate ratings and information (motors, fans, etc., including model, S/N, manufacturer, performance ratings, etc.),
Design and Actual equipment performance data (including flows and static pressures, temperatures,

equipment speed (including sheave information), etc.),
 Design and actual flows (all supplies, returns, makeup, outside air, inlets, outlets, etc.),
 System total flows (rated and actual),
 Test instrument identification & calibration certification,
 Personnel certifications, and
 Other parameters as necessary to document satisfactory system operation and balancing (in judgment of Engineer).

- d. Operate various HVAC, fan, and blower systems in all normal and emergency modes of operation, and adjust / balance for each operating mode as required to obtain delivery of air quantities shown on plans at each louver, grille, register, etc., with a recently calibrated "velometer" and/or Flow Hood. Set Zone Control Dampers minimum flows. Air handling equipment shall perform with least possible noise and vibration consistent to its respective duty. After making all adjustments, then Contractor shall make a final test and tabulate air volume on data sheets. Provide four certified copies thereof, along with air balancing work sheet as shown hereinafter, to the Engineer. Balancing variation must not deviate more than 10 percent from design.
- f. **Testing and Balancing (TAB) shall be completed and the report submitted to the Engineer for review BEFORE the Final Inspection. The Contractor approved TAB report shall be available and provided at the Final Inspection to the Engineer and State Construction Office for review.**
- g. **Contractor shall be present and he shall be capable of checking airflow quantities, temperatures, pressures, equipment operation, and other specified performance parameters as directed by Engineer during Final Inspection. Contractor shall provide all instruments and equipment (including lifts, operator(s), fixtures, and safety apparatus/gear) necessary for accessing equipment/duct and performing inspection and measurements.**
- h. **The Engineer may reject the report / balance based on unsatisfactory balance execution, documentation, instrument calibration, or other technical/performance/contract bases. The Contractor shall rebalance and resubmit the report as necessary for compliance with the plans and specifications.**
- h. Any adjustments made to the HVAC system following final balance require a formal update to the TAB report and re-submittal.

3.3 AIR BALANCING WORK SHEET

Date _____ Job Name _____

Contractor _____ Instrument Mfg. No. and Date Calibrated _____

Air balanced by _____ BALANCE Certified by _____

Fan System No. _____ CFM _____ RMP _____

Voltage _____ S.P. _____ MOTOR AMPS _____

Room No. or Name	Outlet Model & Size	Design Net Air Flow	Average Core Area	Measured Velocity Reading	Design Var. Air Flow CFM

***** Include above in "Table Format" *****

3.4 PAINTING

- a. All equipment (except where otherwise specifically noted) shall be provided with a prime coat.
- b. All un-insulated ferrous piping shall be painted with one coat of primer. All miscellaneous iron items such as hangers and rods, machinery supports, etc., that are not shop coated shall be painted with one coat of primer.
- c. All surfaces to be prime coated shall be cleaned of all rust and dirt, and shall be degreased before priming. All prime coated equipment shall be touched-up where prime coat is chipped or damaged. All prime coated surfaces including shop coated machinery, equipment, etc., shall be thoroughly cleaned and left ready for finish painting by the General Contractor.

3.5 SPARE FILTERS

Provide a complete set of replacement air filters at the Final Inspection and at the Acceptance Day.

3.6 WARRANTY AND SERVICE

- a. Entire system shall have one-year warranty in accordance with Division 1 General Conditions. In addition, the condensing unit compressor shall have a 5 year warranty.
- b. Upon completion of all work, the Contractor shall check-out and test the systems, verify all equipment bearings are lubricated properly, and balance the air distribution system(s). He shall be responsible for original service and start-up of the system(s). He shall provide and install one set of replacement filters, including washable type where used, at Final Acceptance of building.
- c. The Contractor shall guarantee the complete heating, cooling, and ventilation system against defects due to faulty materials, workmanship, or failure due to negligence of the Contractor. This guarantee shall extend for a period of not less than 12 months from the date of final acceptance. The guarantee shall include a twelve month warranty by the manufacturers on all materials and equipment provided, except where longer periods are specifically required (i.e. 5 years min. on outdoor compressor). He shall be responsible for any maintenance required on the system and service call(s) during the guarantee period.

3.7 INSPECTION

The project will be checked periodically as construction progresses. The Contractor shall be responsible for notifying the Engineer at least 48 hours in advance when any work is ready for inspection or test.

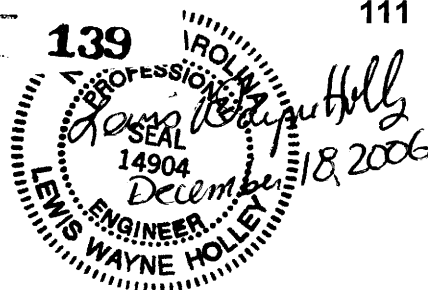
No work will be covered up until approved by the Engineer or his designee

**SECTION 1590 - COMPENSATION FOR HEATING AND AIR
CONDITIONING**

1590.01 - The work of providing and installing Heating and Air Conditioning in the North & South Bound Rest Area Service Building in accordance with the plans and specifications, completed and accepted, will be paid for at the contract lump price for " Heating and Air Conditioning Installation For the NBL & SBL Rest Area Building & Vending Building". Such price and payment will be full compensation for all work of constructing the North & South Bound Lane Rest Area service building and Vending Building, including but not limited to providing all transportation, materials, labor, tools, equipment, fees and incidentals necessary to complete the work. Payment will be made under:

"Heating and Air Conditioning Installation for NBL & SBL Rest Area Service Building". . . Lump Sum

"Heating and Air Conditioning Construction for the NBL & SBL Vending Building". Lump Sum

DIVISION 16 - ELECTRICAL**PART 1 - GENERAL****1.1 Scope Of Work**

- a. Requirements of the General and Special Conditions apply to all work in this Section. Contractor shall provide all labor, materials, equipment, any services indicated on the drawings, or specified herein reasonably necessary for, or incidental to, a complete job.
- b. These specifications and the accompanying drawings shall include the providing of all labor, tools, materials, fixtures, transportation, appurtenances, and service necessary and incidental to installation of a complete, functional, and operable system as indicated and intended on the drawings and as herein specified.
- c. Contractor shall coordinate the work and equipment of this section with all work and equipment specified elsewhere in order to assure a complete and satisfactory installation. Work such as excavation, backfill, concrete, flashing, etc., that is required by the work of this Section shall be provided by the Contractor responsible for this Section unless otherwise indicated. See Electrical Specification Section entitled "Mechanical Equipment Electrical Coordination and Responsibilities" for additional responsibility delineation.
- d. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work the same as if herein specified or shown. The Drawings and Specifications are considered complementary one to the other; and work implied by one and not by the other shall be supplied and installed as though specifically called for by both.

Since the plans are diagrammatic only and are not intended to show all details, the Contractor shall make any necessary changes to avoid beams, columns, footings, vents, ducts, and other obstruction(s), without additional cost to the Department of Transportation (DOT/Owner).

- e. The work covered by this section of the specifications consists of providing labor, equipment, materials, and performing all operations including trenching, backfilling, cutting, channeling and chasing necessary for the installation of complete electrical/wiring system in strict accordance with this section of the specifications, other applicable sections, and the applicable drawings. Work is subject to the terms and conditions of the Contract.
- f. The installation shall comply with the applicable rules of the National Electrical Code (NEC; latest Edition), the Specifications, and the Drawings. In no case shall the materials and workmanship fail to meet the minimum requirements of the NEC and regulations of local utility companies. Certificates of approval shall be issued by those departments having jurisdiction before work will be approved for final payment.

Contractor to provide disconnects (fused), wiring, and conduit for all his equipment as required by the North Carolina Electric Code.

- g. The Department of Insurance and the Office of Facilities Design are required to inspect and approve electrical work prior to introduction of power to the project.
 1. All labor and materials required to perform all work in conjunction therewith, whether or not indicated or specified, shall be provided and installed as part of this work.
 2. The contractor shall do all cutting necessary for the proper installation of his work and shall repair any damage done by himself or his workmen.
 3. All materials used in this work shall be new and approved by the Third Party Agencies Accredited by the NCBCC to label Electrical and Mechanical Equipment as of July 1, 1995, in

every case where they have established a standard for the particular type of material to be installed.

4. The applicable provisions of the following specifications and standards shall form a part of these Specifications.
 - (a). Third Party Agencies Accredited by the NCBCC to label Electrical and
 - (b) Mechanical Equipment as of July 1, 1995.
 - (c) National Fire Protection Association
 - (d) National Electrical Manufacturers Association
 - (e) National Electrical Code (NEC), dated 2005.
 - (f) National Bureau of Standards - H - 30 National Electrical Safety Code
- h. The drawings are generally diagrammatic. The work will be performed so as not to interfere with the existing work of various other trades. The installation and location of mechanical duct shall take precedence over electrical raceways (including conduit). It shall be understood that any outlet may be moved without extra charge. Raceways concealed in walls shall run vertically. Where raceways run exposed, the run must be parallel and/or vertical to walls.
- i. Control wiring of equipment is not provided under this section unless specifically called for on the electrical drawings.
- j. Pitch pockets shall be fabricated from steel plate as directed by the General Contractor and shall be installed by him.
- k. An authorized inspector from the North Carolina Department of Insurance (NCDI) shall inspect the project during construction and upon completion of the construction phase. It is the responsibility of the Electrical Contractor (EC) to notify the Office of the State Electrical Inspector (NCDI) to schedule the inspections. The NCDI Inspector can be reached at (919) 661-5880.

1.2 CODES, RULES, PERMITS AND FEES

- a. All work shall be done in accordance with the North Carolina State Building Code (Volume III), the NC State Building Code Energy Conservation Code (2002), and all other applicable codes and standards (latest Editions, Unless Otherwise Noted).
- b. The Contractor shall give all necessary notices, and he shall pay all government sales taxes, fees and other costs including utility connections or extension, in connection with his work; he shall file all necessary plans, he shall prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; he shall obtain all required certificates of inspection for his work and he shall deliver same to the Architect and Engineer before request for acceptance and final payment for the work. Include in closeout documents also.
- c. The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, and drawings required to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on Drawings and/or specified.
- d. All materials provided and all work installed shall comply with the National Fire Codes of the National Fire Protection Association, and with the requirements of all governmental departments having jurisdiction.
- e. All material and equipment for the electrical portion of the mechanical systems shall bear the UL approval label, or shall be listed by Third Party Agencies Accredited by the NCBCC to label Electrical and Mechanical Equipment as of July 1, 1995, in every case where they have established a standard for the particular type of material to be installed.
- f. Lighting System Controls as required to comply with the Energy Conservation Code (2002) are required.

1.3 DEFINITION

The word "Contractor" as used in this Section of the Specifications refers to the Electrical Contractor (EC) unless specifically noted otherwise. The word "provide" means furnish, fabricate, complete, install, erect, including labor and incidental materials necessary to complete in place and ready for operation or use the items referred to or described herein and/or as shown or referred to on the Contract Drawings.

1.4 CONTRACTOR'S QUALIFICATIONS

It is assumed that the Contractor has sufficient general knowledge and experience to anticipate the needs for construction of this nature. The Contractor shall provide all items required to complete the construction in accordance with reasonable interpretation of the intent of the Drawings and Specifications. Any minor items required by code, law, or regulations shall be provided whether or not specified or specifically shown where it is a part of a major item of equipment, a part of the control system specified, shown on the plans, or required for proper functioning of the equipment or system.

1.5 SURVEYS AND MEASUREMENTS

- a. The Contractor shall base all measurements, both horizontal and vertical, from established benchmarks. All work shall agree with these established lines and levels. Verify all measurements at the site and check correctness of same as related to the work.
- b. Should the Contractor discover any discrepancy between actual measurements and those indicated that prevents following good practice or the intent of the Drawings and Specifications, then he shall notify the Engineer, and he shall not proceed with his work until he has received instructions from the Engineer.

1.6 PLANS

- a. Electrical plans are diagrammatic except where dimensions are shown. See Architectural drawings for building dimensions and ceiling plans.
- b. See Demolition Plan Drawing VA-4 for demolition requirements for the Vending Building.

1.7 SHOP DRAWINGS

- a. Refer to the General Conditions and "Maintenance and Operating Instructions" section for additional requirements
- b. All items submitted to Engineer for review shall bear stamp or notation indicating Contractor's prior review and approval including Contractor's signature and date reviewed. This includes the specific Contractor/Trade responsible for purchasing and installing the items. The Contractor approvals indicate the submittal is in full compliance with the plans and specifications UNLESS specifically noted otherwise for specific exceptions or specific substitutions proposed.
- c. Where manufacturer's standard publications or other specifications are submitted, they shall bear sufficient notations to define specific material proposed including ratings, performance (electrical, mechanical, and hydraulic, as applicable), outline dimensions, layout, colors, operating description (including all controls), model numbers, listings, standards applicable, and accessories.

Marketing information or other general literature is NOT sufficient for Engineer approval. Incomplete submittals will be rejected without review. The contractor (NOT the equipment vendor) is responsible for submittal preparation, review, and completeness prior to submittal.

- d. Submit manufacturer's certified performance data for all equipment.

- e. Coordinate installation drawings with other parts of the work whether specified in this Section or other Sections.
- f. All approved Shop Drawings and Submittals shall be included in the closeout documents.

1.8 MAINTENANCE AND OPERATING INSTRUCTIONS

- a. Submit to the Engineer for approval three (3) bound sets of maintenance data on all equipment. Each set shall contain an equipment list including equipment location by floor and room designation. After approval, turn over to the Owner's representative in the closeout documents.
- b. Instruct the Owner's representative in operation and maintenance of systems and equipment to include a minimum all equipment and systems, i.e. transfer switches, generator(s), power transfer to/from Generator and Utility Service, Service Disconnects, Equipment Disconnects and Fuses, Fire Alarm System(s), Smoke Detectors and Alarms, Electrical Panels, Protective devices/systems, emergency shutdown/isolation, controls, any automatic or motor driven doors, emergency lighting (egress and exit), fuse requirements, and other electrical systems/devices/equipment.

1.9 QUALITY ASSURANCE

- a. Brand Names: Where materials, equipment, apparatus, or other products are specified by manufacturer, brand name, type or catalog number, such designation is to establish standards of desired quality and style, and shall be the basis of the bid. Materials so specified shall be provided under the Contract unless changed by written approval. Where two or more designations are listed, choice shall be optional with Contractor.
- b. Supervision: Contractor shall have in charge of the work at all times during the Construction a thoroughly competent foreman with broad experience in the work to be performed under this Contract. Anyone deemed not capable by the Architect or Engineer shall be replaced immediately upon request. After a satisfactory foreman has been assigned, then he shall not be withdrawn without written permission from the Architect and Engineer.
- c. Quality of Work: The installation of this entire system shall be in an organized and workmanlike manner. Careless and inferior work will not be tolerated. Changes and replacements required because of careless and inferior work shall be at the expense of the Contractor.
- d. Patents: Contractor shall be responsible for the cost of any damage suits that may arise in connection with infringement on patent rights or injunctions affecting any material or equipment installed by him under this work.
- e. Measurements: All outlets, fixtures, panels, etc., are located and shown on the plans as nearly as possible in their exact locations. This Contractor shall verify the locations and measurements before installation to insure the most workmanlike installation possible and avoid conflict with work of other trades. Any uncertainties and conflicts shall be submitted to the Engineer for final decision.

1.10 Tests

- a. **The feeders, sub-feeders, and service conductor cables shall be tested for electrical continuity and short circuits PRIOR to energization.** Test reports shall be provided to the Engineer, and shall be available prior to energization. Report must be provided no later than the Final Inspection. Copies shall be included in the closeout documents.
- b. Contractor shall test all wiring and connections for continuity and grounds prior to fixture connections

and shall demonstrate by a "500 volt megger" test the insulation resistance of any circuit or group of circuits. Minimum value shall be one million (1,000,000) or more Ohms for #6 AWG wire and smaller and 250,000 Ohms for #4 AWG wire or larger. This is required (1) between conductors and (2) between all conductors and the ground conductors.

Where the insulation test indicates the possibility of faulty insulation, Contractor shall locate the point of fault, remove the faulty conductor at the point of fault, replace with a new conductor, and demonstrate by further test the elimination of such fault, all at his own expense.

A written report with all test results shall be submitted to Engineer. Report must be provided no later than the Final Inspection. A copy shall be included in the closeout documents.

- c. At Final Inspection the Contractor shall provide a megger and show the Engineer that the panels comply with the above Megger Test requirements. He shall also provide a hook-on type ammeter and voltmeter (with current calibration certificate) to take current and voltage readings as directed by the representatives.
- d. Contractor shall test grounding per requirements of "Grounding" section of this specification. A written report with test results shall be submitted to the Engineer. Include copy in closeout documents. Report must be provided no later than the Final Inspection.
- e. Perform a Ground Resistance Test per separate section and provide a written report no later than the Final Inspection. Include a copy in the closeout documents.
- f. Perform Emergency Exit and Egress light fixture tests per separate section and provide a written report. Report must be provided no later than the Final Inspection. Include copy in the closeout documents.
- g. A full-scale electrical system test with all lights, equipment, and appliances in operation shall be conducted by Contractor at his expense to prove the satisfactory operation of the system. Any defects shall be promptly remedied. Provide written report no later than the Final Inspection, and include a copy in the closeout documents.
- h. Ground Fault Protection System

The ground fault protection on the new circuit breakers (if provided) shall be performance tested in the field and properly calibrated and set in accordance with coordination requirements. Written certification of satisfactory completion shall be provided to the Engineer no later than the Final Inspection. Include a copy in the closeout documents.

i. General Requirements for Tests / Reports

- 1. **All tests and reports required by this specification shall include a written report which includes the following:**

**Instruments Used (manufacturer, Model, and current Calibration Date & Certification),
Company & Test Personnel Performing Test,
Time & Dates of Measurements and Report Preparation Date,
Actual Field Measurements (Including measurement location),
Field measurement without any adjustments (including units),
System/equipment status at time of measurement),
Ambient temperature, and**

Certification (by responsible Contractor) that report and it's results are in compliance with the project Plans and Specifications, and responsible Contractor approval signature and name.

2. **Reports shall be provided no later than the Final Inspection. Copies of all test reports shall be included in the closeout documents.**

PART 2 – PRODUCT

2.1 Submittals

NOTE: See section entitled “Shop Drawings” for additional requirements.

- a. **Required Data:** Within 30 days after the date of award of Contract and before commencement of installation of any materials or equipment, a complete schedule in quadruplicate of materials and equipment proposed for installation, and of names of specialty subcontractors, shall be submitted for approval of the Engineer. The schedule shall be supplemented by catalog cuts, diagrams, lighting fixture brochure, shop drawings, field working drawings and such descriptive data as may be required by the Engineer or Architect.
 1. In the event any of the material or equipment submitted in the schedule fails to comply with the requirements of these Specifications, such items will be rejected.
 2. When the Shop Drawings indicate substitutions, and the submittal is made after the 30-day limit, each such substitution shall be construed as an item which will, if accepted, result in a credit to the Owner, and the amount of this credit shall be stated in the submittal.
- b. **Record Drawings:** Upon completion of this installation, Contractor shall submit to the Engineer marked reproducible drawings showing any changes made in circuits, equipment & panelboard locations, equipment ratings and specifications (where shown on drawings), panelboard circuits, or any other revisions in Drawings for the Owner's use in maintenance work and for future additions and expansion. Inaccurate or incomplete mark-ups of as-built conditions will be rejected and corrected by Contractor.
- c. **Maintenance And Operating Instructions:** See Section entitled “Maintenance and Operating Instructions”.
- d. Contractor shall provide equipment complete with components and accessories necessary to it's satisfactory operation, meeting listing requirements, meeting Code requirements, meeting Plans and Specifications, and that meets or exceeds all intended functions and performance requirements.

PART 3 - EXECUTION

3.1 Grounding

- a. The conduits, wire-ways, and neutral conductors of the wiring system shall be grounded.
- b. The ground connections for system neutral, grounding electrode, and conduit system shall be made at the Service Entrance and in accordance with Plans and NEC.
- c. Ground conductors shall be properly sized, and they shall meet or exceed the drawing, specification, and and NEC requirements (including NEC Table 250-122).
- d. Extend a bare copper grounding conductor from point of Service Entrance equipment to the cold water line (See NEC Article 250-50 & note requirement for connection within first 5 feet as it enters the building), to the building steel, and to a grounding rod (electrode). The grounding conductor shall be sized in accordance with the National Electrical Code but shall in no case be (1) less than No. 6 AWG or (2) be less than the size specified on the plans.

Conductors between ground rods (electrodes) and equipment shall NOT be installed in metallic conduit/raceway unless it is done in strict accordance with the NEC (including bonding connectors/straps at both ends of metallic raceway).

- e. The ground rod (electrode) shall be 10 feet long and ¼ inch diameter (minimum), and it shall be of copper clad steel construction.
- f. All ground connections shall be accessible for inspection with no cutting or excavation required. All connections shall be made with approved solderless connectors (braces or bolted) to the equipment or structure to be grounded. All contact surfaces shall be thoroughly cleaned before connections are made to insure good metal to metal contact.
- g. Unless otherwise specified, all grounding conductors shall be installed in rigid conduit and all grounding conductors shall be installed as to permit shortest and most direct path from equipment to grounding conductor.
- h. Ground resistance from any location in the electrical system shall NOT exceed 25 ohms. Contractor shall verify this by measurement, make any required repairs/corrections, retest to confirm criteria is met (additional ground rods shall be driven as required to correct problem), and provide a written report to Engineer. Report shall be provided no later than the Final Inspection, and a copy shall be included in the closeout documents.
- i. Green ground conductors shall be run with all phase conductors.

3.2 Wiring

- a. Branch circuit conductors shall be minimum No. 12 AWG unless otherwise indicated on the Drawings or Specifications. Equipment shall be provided with wire sizes specified by the manufacturer, but in no case smaller than (1) the size required by the electrical code or (2) smaller than that specified on the drawings. Conductors for signal and pilot control circuits may be No. 14 AWG. Junction boxes may be utilized where required. Connectors shall have Underwriters' Laboratories (UL) approval for use at 600 volts. All taps and connections shall be properly insulated with thermoplastic taps that are UL approved for use as sole insulation.
- b. Solid conductors: Power and lighting circuits #10 AWG and smaller shall have solid copper conductors. Fire alarm, smoke detectors, and controls wiring shall be stranded conductors. Splice #10 AWG, and smaller, copper wire by twisting securely. The contractor shall use Ideal "wire-nuts" for recessed lighting fixture lead splices to branch circuit conductors.

The contractor may use Ideal "wing-nuts", 3M "Scotchlok", or T. & B. "Piggy" connectors for branch circuit splices (#10 and #12) in junction boxes, outlets, and light fixtures, except recessed fixtures. "Sta-Kon" or other permanent type crimp connectors shall not be used for branch circuit conductors.

- c. Stranded conductors (Class B), #8 AWG and larger, shall be spliced by approved mechanical connectors plus gum rubber tape, friction, or plastic tape. Solderless mechanical connectors, for splices and taps provided with UL approved insulating covers, may be used instead of mechanical connectors plus tape.
- d. All conductors shall be as manufactured by Southwire, Triangle, Rome, or approved equal and types as indicated on the plans.

Conductors shall be continuous from outlet to outlet and no splicing shall be made except within outlet boxes, junction boxes, troughs, and gutters.

- e. All conductors shall be copper with 98% conductivity and insulated for 600-volt operation, unless otherwise shown on the Drawings.

- f. **Do NOT use common neutrals for different circuits. An independent neutral conductor is required from all fixtures/devices to the power panel for each circuit.** In addition, an independent neutral wire shall be provided for each circuit feeding electronic equipment and all circuits with Ground Fault monitoring.
- g. No. 8 AWG and larger wire shall have class B stranded conductors. Wire sizes shown on the Drawings are minimum requirements.
- h. The complete system of conductors shall be installed in a raceway system. Only powdered soapstone or other non-deleterious lubricant approved by the Engineer may be used in pulling in conductors.

Conductors that are No. 8 AWG and smaller, unless otherwise noted, shall be thermoplastic insulated type with Dual rated THHN/THWN or XHHW. However, all branch circuit conductors that run through fluorescent fixtures shall be insulated types THHN or RHH.

Conductors that are No. 6 AWG and larger, unless otherwise noted, shall be heat and moisture resistant grade thermoplastic insulated type "Dual rated THHN/THWN or XHHW".

Homeruns may be combined in one conduit provided (1) all connections are in accordance with National Electrical Code (NEC) requirements, and (2) the conductors are not required to be derated by the NEC. Independent neutrals are required for each circuit.

- i. Labeling Conductors: All conductors # 6 and smaller, including feeders or branch circuits, for 120, 208, and 240 Volt circuits shall be factory color coded and plainly marked as follows (as applicable): Phase A - Black; Phase B - Red; Phase C - Blue; Grounded Neutral - White; Ground - Green. For other systems, refer to electrical code for color requirements.
- j. Scotch tape of the proper color may be used to identify the phase conductors of feeders larger than #6. All feeders, subfeeds to panels, motors, etc., shall be completely phased-out as to sequence and motor direction of rotation. Phase sequence shall be A-B-C from rear to front, top to bottom, or left to right when facing equipment. However, the actual connections to unbalanced loads shall be made so as to obtain a load balance in the feeders.
- k. For minor electrical demolition for remodeling, abandoned conduit/boxes shall have all electrical wiring removed completely and not just made "safe". Conduit/boxes shall be removed where practical without creating additional demolition/restitution work for other trades. Demolition requirements on drawings shall be fully complied with also.

3.3 Conduit and Tubing Systems

- a. All wiring shall be in rigid conduit, ½" minimum size, unless otherwise noted. However, galvanized electrical metallic tubing (EMT) in sizes of ½" through 4" may be used in concealed or exposed work in lieu of rigid conduit except where (1) exposed to mechanical injury, (2) supporting light fixtures, (3) buried in earth, (4) buried in concrete, or (5) exposed to ground.
- b. Flexible metal and watertight ("sealtight") conduit in size ½ inch and larger are acceptable for motor, appliance, and fixture connections provided green wire is installed and NEC is followed.
- c. Service Entrance Conduits/Raceways (including phone, electrical power, and telecommunications) run external to building foundation walls shall be encased (i.e., enclosed in concrete) with a minimum of three (3) inches of concrete on all sides.

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

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

- d. Branch circuit raceways run underground external to building foundation walls shall be run in raceways installed in accordance the NEC, and shall be of a type approved by the NEC as "suitable for direct burial". Minimum exterior raceway size shall be $\frac{3}{4}$ ".
- e. Exposed conduit shall be neatly installed "parallel to" or "at right angles to" beams, walls, and floors of the building. Exposed conduits shall be in mechanical areas only. All bends shall be made with standard conduit elbows or conduit bent to not less than the same radius as a standard conduit elbow. Conduit and E.M.T. shall be concealed unless otherwise indicated on the drawings and shall be kept at least 6" from parallel runs of flues, steam, or hot water pipes. Conduit, flexible conduit, and tubing shall be protected from the weather during storage and installation. Conduit shall be by LTV, Triangle, or Wheatans. Conduit fittings shall be by Raco, Steel City, or Appleton.
- f. Rigid steel conduit shall be standard weight, mild steel pipe, hot-dipped galvanized, sherardized, or zinc-coated conforming to the requirements of ANSI C 80.1 latest edition. Rigid steel conduit shall be installed where routed in poured concrete, in exterior masonry walls, in wet locations, or where subject to severe physical damage.
- g. Electrical metallic tubing (EMT) shall be cold-rolled steel tubing with a zinc coating on the outside and protected on the inside by a zinc, enamel, or equivalent corrosion-resistant coating and conforming to the requirements of ANSI C 80 latest edition. EMT may be installed in dry construction in furred spaces, in partitions other than concrete and solid plaster, or for exposed work except on mechanical structures or supports, or in refrigerated areas. EMT shall not be installed where:
1. It will be subject to severe physical damage.
 2. It will be subject to severe corrosive influence.
 3. Tubing, elbows, couplings, and fittings would be in concrete or in direct contact with the earth.
 4. Service entrance use.
 5. Exposed to the element in outdoor location.
- h. Electrical metallic tubing (EMT) fittings shall be fully plated steel, hexagonal, threaded, compression gland type. No pot metal set screw or indenter shall be used. All fittings shall be Third Party Agencies Accredited by the NCBCC to label Electrical and Mechanical Equipment, as of July 1, 1995 approved for concrete tight construction.
- i. Conduit or tubing shall be installed in such a manner as to prevent collection of trapped condensation. The Contractor shall install drain boxes in conduit run where necessary.

Contractor shall exercise the necessary precautions to prevent lodgment of dirt, plaster, or trash in conduit, fittings, and boxes during the construction period by the use of T&B type push pennie closures. Conduit that becomes clogged shall be entirely cleaned out or replaced.

Conduit fastenings to junction boxes and pull boxes shall be made by galvanized locknuts and bushings. Insulated bushings of molded Bakelite (O.A. Manufacturing Company Type "A" or approved equal) shall be used in all conduit entrances one inch size or larger, in junction boxes, and in pull boxes.

- j. Conduits shall be supported in accordance with the latest issue of the NEC. Conduit installed on the interior of exterior walls shall be spaced off the wall surface a minimum of $\frac{1}{4}$ " using "clamp-backs" or strut.

Conduit supports shall be galvanized pipe straps, TEE clamps, hangers, or wall brackets and shall be secured to structure with toggle bolts in hollow masonry wall; expansion shields and machine screws or standard pre-set inserts in concrete, brick or solid masonry; screws in wood; and bolts in steel/metal surfaces.

Support shall be applied at every 4' for EMT raceway, 6' for rigid raceway, and within 3' of any bend, cabinet, outlet or junction box. Outlet and junction boxes shall be secured to structure.

Wire is not acceptable for supporting conduit.

Conduit shall not be supported or placed on top of ceiling components or systems.

k. PVC conduit and Underground Raceways:

PVC schedule 40 shall NOT be used on exposed surfaces/areas or in concealed in gypsum walls. PVC schedule 40 conduit may be used in concrete masonry unit (CMU) walls.

Conduit installed under the floor slab and within the building foundation perimeter shall be Schedule 40 PVC, rigid galvanized steel, or PVC coated rigid steel (15 mil minimum PVC thickness) material. PVC schedule 40 or PVC coated rigid steel (15 mil minimum PVC thickness) materials shall be used in elevated floor slabs and in foundation slabs.

Rigid steel conduit elbows are required for PVC conduit installed under floor slabs where the conduit turns-up to cabinets, equipment, etc.

Minimum concrete cover for PVC shall be $\frac{3}{4}$ " at finished or formed surface, and minimum cover shall be 3 inches for concrete surface that is cast against earth or for slabs placed on-grade. Greater amounts of concrete cover shall be used in areas subject to damage.

The placement of conduit in floor slabs shall be thoroughly coordinated with the structural design and fabrication.

A green copper ground wire shall be installed in all raceways.

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

- m. The raceway system shall NOT be relied on for grounding continuity.

- n. Seal raceways passing through a "below grade" wall from a conditioned interior building space using fittings similar and equal to OZ/GEDNEY type "FSK" thru-wall fitting with "FSKA" membrane clamp adapter if required.

- o. The use of "LB's" shall be limited where possible. Mogul units shall be installed where necessary to use "LB's" sized above 2 inches.

p. TERMINATIONS

1. IMC and GRC shall terminate with either a double locknut/bushing set or in a threaded hub.
2. A grounding type insulating bushing shall be provided where concentric, eccentric, or over-sized knockouts are encountered.
3. EMT terminations shall be made using steel-plated hexagonal compression connectors. **No** pot metal, setscrew, or Indented type fittings shall be utilized.
4. EMT terminations shall be "concrete tight" where buried in masonry or concrete. EMT fittings installed in damp locations shall be "raintight" type.

q. Conduit Couplings

1. Conduits passing over a building expansion joint require a standard "expansion joint fitting" that is compatible with the raceway type shall be provided.

2. Conduit couplings for IMC, GRC, and PVC shall be in accordance with the NEC.
3. EMT couplings shall be of the plated-steel hexagonal compression type. **No** pot metal, set screw or Indented type couplings shall be utilized.
4. EMT terminations shall be "concrete tight" where buried in masonry or concrete. EMT fittings installed in damp locations shall be "raintight" type.

3.4 Lamps

- a. The Contractor shall provide electronic ballasts, "T8" lamps, and LED exit lights unless otherwise noted on drawings and specifications. All incandescent lamps shall be 130 volt type. Fluorescent tubes shall be General Electric, Phillips or Westinghouse. Incandescent lamps shall be rated at 3500 hours minimum life.
- b. Fluorescent lamps shall comply with the EPA guidelines regarding the Toxicity Characteristic Leaching Procedure TCLP.

3.5 Lighting Fixtures & Installation

- a. Lighting fixture installation shall meet the requirements of section 410 of the National Electrical Code. All fluorescent fixtures shall be equipped with T-8 lamps and electronic ballast. Fixture manufacturer and model shall be per plans or equal by Lithonia, USI Lighting, or Prudential Lighting. All other (non-fluorescent) fixtures shall be as manufactured by Lithonia, G.E., Halo, Metalux, dual/lite, or progress.

Electronic ballasts shall meet the following criteria:

- a. Ballast to be "U/L Listed, Class P "
 - b. Ballast to be "Sound Rated A "
 - c. No "PCB" ballast will be accepted
 - d. Ballast shall have high power factor (minimum of 90%).
 - e. Minimum of five (5) years warranty is required with each electronic ballast.
 - f. Met or exceed ANSI C82.11 requirements.
 - g. Lamp current crest factor shall be equal to, or less than, 1.7.
 - h. Input current third harmonics shall not exceed ANSI recommendations (32% total harmonic distortion, 27.5% of third triplets.
 - i. Flicker shall be 15% or less with any lamp suitable for ballast.
 - j. Ballast design shall withstand line transients per IEEE587, Category A, and shall meet FCC Rules and Regulations, part 18.
 - k. Ballast case temperature shall not exceed 25 degrees C rise over 40 degrees C ambient.
 - l. Manufacturers shall have at least 5 years of experience in manufacturing electronic ballasts.
- b. Ceiling Tile Light Fixture Installation: Recessed fluorescent, high intensity, or down-light fixtures that replace a section or part of a ceiling tile shall be supported at two (2) opposite ends. Supports shall be provided with the wire type used to support the lay-in ceiling track. Attach wire to a corner of the luminaire and attach to the building's structural system. The lay-in luminaire shall be screwed to the main runners of the lay-in ceiling track at four (4) corners using sheet metal screws. Luminaires in fire rated suspended ceilings shall be supported to the Building Structure as per the Ceiling Design Criteria, and the luminaire shall be screwed to the main runners of the suspended ceiling track at four (4) corners using sheet metal screws.

3.6 Emergency Exit Fixture

Emergency exit fixtures shall be LED type (5 watt maximum per side), completely self-contained, and provided with maintenance-free battery, automatic charger, and other specified features. Fixture shall be third-party listed

as emergency lighting equipment, and shall meet or exceed the following standards: NEC, N.C. Building Code, Energy Conservation Code, NFPA-101, and NEMA Standards

- a. **Battery:** It shall be a sealed, maintenance-free type with minimum of 90 minutes operating endurance/capacity. The battery capacity shall include the capacity for the additional load(s) of adjacent and/or remote emergency egress fixture(s) for a minimum of 90 minutes where shown or specified on the plans. Battery shall have a normal life expectancy of 10 years. Batteries shall be a high temperature type with an operating range of 0 degree C to 60 degrees C. Batteries shall include a resealable pressure vent and sintered (+) positive and (-) negative terminals.
- b. **Charger:** It shall be fully automatic solid state type, full wave rectifying, and include 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 supply voltage drops below 80 percent. A low voltage disconnect switch shall be included if LEAD Battery is used, and it shall disconnect the battery from the load to prevent damage from a deep discharge during extended power outage
- c. **Additional Features:** Provide each unit with pilot light to indicate the unit is connected to AC power. The battery shall have high rate charge pilot light unless it is a self-diagnostic type. A test switch shall be provided to simulate the operation of the unit upon loss of AC power by energizing the lamps from the battery. The simulation shall exercise the transfer relay.
- d. **Warranty:** The unit shall be warranted for three years. The battery shall have an additional two or more years pro-rated warranty. Warranty shall start from the date of project Final Acceptance. Warranty shall be included in the contract document.
- e. **Unit Test:** 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 a minimum of 10 days prior to Final Inspection by the State Construction Office or Engineer. Any unit that fails the test shall be repaired or replaced, and re-tested. A test Report shall be provided no later than the Final Inspection, and a copy shall be included in the closeout documents.

3.7 Emergency Egress Fixture

Emergency Egress Fixtures shall be completely self-contained, provided with maintenance-free 12 volt battery, automatic charger, two lamps, and other features. Fixture shall be third-party listed as emergency lighting equipment, and meet or exceed the following standards: NEC, N.C. Building Code, Energy Conservation Code, NFPA-101, and NEMA Standards.

- a. **Battery:** It shall be sealed, maintenance free type with minimum of 90 minutes operating endurance. The battery capacity shall include the capacity for the additional load(s) of adjacent and/or remote emergency fixtures for a minimum of 90 minutes where shown or specified on the plans. Battery shall have a normal life expectancy of 10 years. Batteries shall be high temperature type with an operating range of 0 degree C to 60 degrees C. Batteries shall include a resealable pressure vent and sintered "+" positive and "-" negative terminals.
- b. **Charger:** It shall be fully automatic solid state type, full wave rectifying, and include 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, and it shall disconnect the battery from the load to prevent damage from a deep discharge during extended power outage.
- c. **Additional Features:** Provide each unit with pilot light to indicate the unit is connected to AC power. The battery shall have high rate charge pilot light unless it is a self-diagnostic type. A test switch shall be provided to simulate the operation of the unit upon loss of AC power by energizing the lamps from the battery. This simulation shall exercise the transfer relay.
- d. **Warranty:** The entire unit shall be warranted for three years. The battery shall have an additional two or more year's pro-rated warranty. Warranty shall start from the date of project Final Acceptance. Warranty shall be included in the contract document.

- e. Unit Test: 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 a minimum of 90 minutes. The battery test shall be done a minimum of 10 days prior to Final Inspection by the State Construction Office or Engineer. Any unit that fails the test shall be repaired or replaced, and re-tested. A test Report shall be provided no later than the Final Inspection, and a copy shall be included in the closeout documents.

3.8 Wiring Devices, Outlets & Fuses

a. General Requirements

1. Outlets shall be installed in the location shown on the drawings; however, the Owner shall have the right to make slight changes in the position of the outlets provided the Contractor is notified before roughing-in is done. The Contractor shall study the general building plans in relation to the spaces surrounding each outlet in order that his work may fit the other work required by these specifications. The Contractor shall relocate outlets when necessary so that when fixtures or other fittings are installed, they will be symmetrically located according to room layout and they will not interfere with other work or equipment.
2. Do NOT install outlets back-to-back on opposite sides of a wall.
3. Galvanized sheet-steel boxes, of a class to satisfy the conditions for each outlet, shall be used in concealed work only. Boxes shall be installed in rigid and satisfactory manner: either by wood screws on wood, expansion shields on masonry, or machine screws on steelwork. Fixture outlet boxes in concrete ceilings shall be of the four-inch octagonal concrete type and set flush with the finished surface.
4. Outlet, junction, or pull boxes not larger than five inches square in exposed work shall be of cast steel or alloy with threaded hubs fitted with appropriate covers unless otherwise noted on the plans. Outlet boxes in exposed masonry wall shall be Steel City type GW. Wiring devices shall be rated for 20-amp minimum and of the grounding type with hex-head green grounding screw to be connected to the green grounded conductor. Self-grounding or automatic type are NOT acceptable.

- b. Device Plates: Plates shall be installed vertically or horizontally and with an alignment tolerance of 1/16 inch. Device plates shall be Stainless Steel Type 302. Provide 2% spare at Final Inspection.

Exposed switch and receptacle cover plates on exposed work shall be galvanized cast ferrous metal or Feraloy, standard size, and shall be single or ganged as indicated on the drawings.

Exterior mounted switch and receptacle plates, and those specified as weatherproof elsewhere, shall be weatherproof PVC cover plates, standard size, single or ganged as indicated on the drawings, and shall be "approved" third party listed as "raintight while in use".

- c. Wall Switches shall be rated for 20 amp and 120/277-volt minimum with Hex-Head green grounding terminal screw. Use Bryant Series 4901 through 4904 or equal series by Sierra or Hubbell. Switches shall be specification grade, 1-inch deep body, and white color. Keyed switches shall be Bryant 4901-L through 4904-L series, white, or equal by Hubbell or Sierra. Cover plates shall be Stainless Steel Type 302.
- d. Receptacles shall be rated at 20 amperes (minimum), 125 VAC, 60 HZ, UL and CSA listed, with Hex-Head green grounding terminal screw. Use white color, G.E., Hubbell, Bryant, Sierra or approved equal. Cover plates shall be Stainless Steel Type 302.

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 and the face configuration shall conform to the NEMA Standard No. WD-1, NEMA WD-6, DSCC W-C-596G & ULJ-498, 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 industrial specification grade or heavy-duty grade and mounted vertically. Receptacles mounted over counters, backslashes, etc. shall be mounted horizontally.

- e. Ground Fault Interrupter (GFI) Receptacles shall be rated at 20 amperes (minimum), NEMA 5-20R Configuration, 120 VAC, 60 HZ, 5 ma ground fault trip level, UL and CSA listed, with Hex-Head green grounding terminal screw. Use white color, G. E., Hubbell, Bryant, Sierra or approved equal. They are required to serve countertops and within 6 feet of sinks or other water reservoirs or sources.
- f. Painting: No plates, canopies, panelboards or fixtures without canopies shall be placed on walls or ceilings until after all painting or cleaning of the walls or ceiling is completed. Items that are to be painted to match the ceiling or wall colors shall be delivered to the General Contractor for painting.
- g. Switches, receptacles, outlets, and jacks shall be located as indicated on the Drawings.
- h. Fuses (600 V or less)
 - 1. Fuses shall be so selected as to provide a fully selective system.
 - 2. Fuse types not specified on the drawings shall be included in the submittals for approval by the Engineer. Fusible safety switches with short-circuit withstand ratings of 100K Amp or 200K Amp require Class R or Class J rejection fuse Block feature.
 - 3. Fuses shall be Bussmann, Chase-Shawnut, or Westinghouse.

3.9 Lighting, Power, and Distribution Panelboard (including Main Disconnect Panels – MDP)

- a. Provide distribution and lighting panelboard as specified herein and per plans. Maximum height of highest circuit breaker shall be 6.5 feet above floor.
- b. Panelboard breakers shall be of the thermal-magnetic circuit breaker type and shall consist of an assembly of single, double, or three-pole breakers. Each circuit breaker shall be bolted-in, removable without disturbing the adjacent units, and shall have trip ratings as indicated. All multipole breakers shall be common trip. All panelboards shall be supplied with busses (100% copper), neutral bar, and grounding bar with sufficient lugs for number of circuits. Aluminum (Al) bus is **NOT** acceptable.
- c. Panelboards rated for Service Entrance use shall be so labeled. Each Panelboard shall be installed in an appropriate cabinet of sufficient size, and the cabinet shall conform to the requirements of UL standards. Standard cabinets with surface or flush type trim and door shall be used as required (UON). Cabinets shall be made of spot welded galvanized sheet steel with thickness that meets or exceeds NEC gauge, and including hinged door and trim of the same materials. The closed door shall fit properly in the cabinet opening and present a flush finish with the trim. The door shall include a key operated lock. Provide two keys with each lock. All door locks shall be keyed alike. Cabinets shall be provided without factory knockouts. Cabinets shall be finished with manufacturer's standard paint finish.
- d. **Panelboard circuit layouts SHALL match the layouts shown on the Drawings.** All layout deviations require pre-approval by the Engineer and must be explicitly identified as exceptions in the submittals.
- e. Panelboards and Main Disconnect Panels for 600A or less shall be Square D type NQOD, Westinghouse type B10B, I.T.E. CDP 7, or Engineer approved equal.
- f. Panelboards for 600A or greater shall be Square D Type I-Line or approved equal up to the maximum allowable ratings of the I-Line Panelboards. Single phase, 120/240V I-Line Panelboards rated for 800A (or less) shall have HCW interior, 65K Minimum interrupt rating (or greater as required by Plans),

Breaker Types Q2 / Q4 / LA (as applicable), and 400 A maximum branch rating. Frame size shall be 42" W x 9.5" deep. Doors are not required on I-Line panelboards unless specified on Plans.

- g. A typewritten directory (index) identifying each circuit location shall be provided on the inside of each cabinet door, and it shall be mounted in a protective enclosure. The directory shall be installed on the exterior of the panel at 5" above floor elevation when NO door is provided.
- h. **Contractor shall provide written certification to the Engineer for the new Rest Room Building that all equipment ratings for electrical feed and distribution equipment shown on the plans exceeds the available fault current from the local utility. This certification shall be provided with the submittals.**

3.10 Safety Disconnect Switches

- a. Safety Disconnect Switches shall be horsepower rated, heavy duty, fused, and installed where indicated and/or required by the National Electrical Code.
- b. All buses, terminals, and wires provided under this section shall be copper. Switches shall be provided under this section except where shown as being provided by other sections.
- c. Switches shall be fused with dual element, current-limiting fuses, unless otherwise noted, and sized per nameplate amperage of equipment served. Switches shall be non-teasible, positive, quick-make & quick break mechanisms, NEMA type "HD"(heavy duty and labeled as such) as manufactured by Westinghouse, General Electric, Square D, or Cutler-Hammer. General Duty switches (in lieu of "Heavy Duty" switches) are NOT acceptable.
- d. Switches indicated to be installed outdoors shall be NEMA type 3R, with raintight conduit hubs. Use NEMA 1 enclosures for indoor applications (UON or required by the Code).
- e. Switches shall have handles whose positions are easily recognizable in the "ON" or "OFF" position. Provide padlocks for all switches located in public areas. Switches shall be capable of being locked in the "ON" or "OFF" position. Mechanical and Electrical Rooms are NOT considered public areas. Exterior areas are considered public areas.

3.11 LOW-VOLTAGE MANUAL TRANSFER SWITCHES

- a. The Contractor shall provide and install the low-voltage (600 volts and below) manual transfer switches having the ratings, features/accessories, enclosures, as specified herein and as shown on the contract drawings.
 - 1. The manual transfer switches and all components shall be designed, manufactured, and tested in accordance with the latest applicable standards of UL and NEMA as follows:

UL 50	Cabinets and Boxes
UL 489	Molded Case Circuit Breakers
UL 508	Industrial Control Systems
UL 1008	Transfer Switches
UL 1087	Molded Case Switches
NEMA ICS	Industrial Controls and Systems
 - 2. Transfer switch shall bear the UL label.
- b. Manual transfer switch shall be Cutler-Hammer Model MTVX, NEMA 1, and include fully enclosed silver alloy contacts, completely separate utility and generator side power switching units, utility side overcurrent protection device, and permanently affixed manual operation handle. Accepted equals are ASCO and Thomson.

- c. The transfer switch shall have withstand, closing, and interrupting ratings sufficient for the voltage and the available short circuit current at the point of application as shown on the drawings.
 - 1. The transfer switch shall be rated for application with upstream power circuit breakers and insulated case circuit breakers having short time delay settings of up to 30 cycles. Contacts shall not weld when used with upstream overcurrent protective devices that do not include instantaneous trip units.
 - 2. The voltage rating of the transfer switch shall meet or exceed the system voltage rating. The continuous current rating of the transfer switch shall meet or exceed the maximum continuous current requirements of the system.
 - 3. The transfer switch shall be 100% equipment rated for continuous duty as shown on the drawings and shall conform to the applicable requirements of UL 1008 for emergency system total load.
 - 4. The transfer switches shall be fully rated for all types of loads, inductive and resistive, without derating, either open or enclosed.
- d. The transfer switches shall consist of completely enclosed (molded) contact assemblies. The contact assemblies shall be equipped with a single operating handle in an arrangement to provide inherently double-throw switching action.
 - 1. Transfer switches shall be capable of being operated manually under full load conditions without damage. The manual operator shall provide true quick-make, quick break operation to prevent possible flashover from switching the contacts slowly.
 - 2. Each transfer switch shall be positively interlocked via means of the operating mechanism, and shall also be equipped with a walking beam interlock to prevent simultaneous closing of both sources during manual operation. Each transfer switch shall be capable of achieving a neutral position (and being locked in this position) for system maintenance purposes. A transfer switch position indicator shall be included on the face of the transfer mechanism to display the switch position.
 - 3. Main contacts shall be designed to withstand multiple fault currents and shall meet UL 489 and/or UL 1087 requirements.
- e. Transfer switch shall have a NEMA 1 general purpose enclosure unless otherwise noted. Provide enclosures suitable for locations as indicated on the drawings and as described below. Color finish shall be light gray ANSI 61.

3.12 Mechanical Equipment Electrical Coordination and Provisions

- a. Specific work to be done under Division 16 is hereinafter listed or described. All other work necessary for the operation of Division 15 equipment shall be performed under Division 15.
 - 1. All individual motor starters for mechanical equipment (fans, pumps, etc.) shall be provided and installed under Division 15.
 - 2. Power wiring shall be provided up to a termination point consisting of a junction box, trough, starter, or disconnect switch, and line side terminations shall be done under Division 16. Wiring from the termination point to the mechanical equipment, including final connections, shall be provided under Division 15.
 - 3. Duct Smoke Detectors: Mechanical Contractor shall provide duct detectors for smoke detection as required by plans and specifications. The AHU's shall be provided with factory installed relay to shut down the air handler and energy recovery unit upon a signal from the smoke detector.

Duct Smoke Detector Alarms shall be provided and wired by Division 16.

4. All relays, timers, temperature, pressure, vacuum, flow switches, freezestats, line and low voltage thermostats, and other appurtenances associated with equipment under Division 15 shall be provided, installed, and wired under Division 15.
 5. All wiring required for controls and instrumentation not indicated on the drawings shall be provided and installed by Division 15 (UON). Where electrical wiring is required by trades other than covered by Division 16, then the requirements of Division 16 specifications shall apply to that section / trade. **** NO EXCEPTIONS ARE PERMITTED ****
- b. Each motor 1/8 HP (or larger) or automatically started shall be provided with an approved disconnecting device (fused) when required by the National Electrical Code, even though not indicated on Drawings.
 - c. Electric wire gutters, disconnect switches, and electrical equipment for mechanical equipment shall be mounted on angle iron rack, and shall not be mounted on mechanical or plumbing housing or enclosures.
 - d. The connection to equipment terminals shall be done with flexible conduit indoors and liquid tight flexible conduit outdoors. Use bare copper grounding jumper.
 - e. Electrical Contractor shall check electrical ratings for all equipment (including equipment provided by Mechanical, Plumbing, and other trades) before beginning roughing-in for equipment, and he shall verify that the electrical wiring, conduit, switches, and other electrical devices are adequate for the actual equipment provided and installed.
 - f. Roof exhaust fans with built-in disconnects shall be provided under Division 15, and shall be wired under Division 16 to the line side of the disconnect switch. A disconnect switch (fused) shall be provided under Division 16 if the fan is not provided with a built-in disconnect switch. In this case the wiring from the switch to the fan shall be under Division 15.
 - g. Division 16 Contractor shall install wiring from power source to a termination point adjacent to kitchen equipment. Contractor providing kitchen equipment shall wire from the equipment to the termination point.

3.13 Cleaning and Painting

Contractor shall clean all panel interiors and exteriors upon completion of work. Paint all conduit, wire mold, etc., that has been added to areas which have already been painted.

3.14 Equipment and System Identification

a. New Rest Room Building

1. Main Distribution Panel (MDP) shall be labeled with 4" x 6" x 1/16" engraved plate w/ 1/4" high letters indicating the following:

800 Amp MDP, 1 phase
Power Company:
Service: 120/240V 1 phase, 3 wire

2. Distribution panelboards (A & B) shall be labeled with 4" x 6" x 1/16" engraved plate w/ 1/4" high letters indicating the following:

225 Amp, 1 phase
Power Company:
Feeder: 120/240V 1 phase, 3 wire

b. Vending /Storage Building1. Distribution Panel C

225 A, 1 phase
Power Company:
Feeder: 120/240V, 1 phase, 3 wire

c. Disconnect Switches shall be labeled with 3/4" x 2-3/4" x 1/16" engraved plate w/ 1/4" high letters indicating equipment served, equipment number, and power source (Utility Name or Generator).

d. Transfer Switch (MTP) shall be labeled with 3/4" x 2-3/4" x 1/16" engraved plate w/ 1/4" high letters indicating

Manual Transfer Switch (MTP) ... Use ATP for automatic as applicable
800A, 1 phase
Feeder: 120/240V, 1 phase, 3 wire

Clearly indicate position functions and purpose (including each switch position) with laminated tags for the power switches, control switch(es), status/alarm lights, push-buttons, switches, indicators, displays, alarms, and other operator interface devices or indicators. Use Equipment Numbers specific to this project for labeling these.

3.15 Phone/Computer Equipment

- a. Electrical contractor is responsible for providing phone jacks, boxes, RJ plugs, wiring (2 sets of UTP level 5 wires from each box) installed in EMT conduit to the main telephone panel in the New Rest Room Building. EC is also responsible for same type of installation in the Vending / Storage Building as necessary to connect to existing phone service.
- b. Label all cables by their originating room numbers.
- c. Provide a minimum of six feet extra length to each cable end for future splicing by others.
- d. See telephone riser detail on electrical plan sheet for additional information.

3.16 FIRE DETECTION AND ALARM SYSTEM:

No fire detection equipment or work is specified for this project except for the mechanical contractor provided smoke duct detectors.

3.17 WARRANTY AND SERVICE

- a. Electrical system shall have one-year warranty in accordance with Division 1 General Conditions.
- b. Upon completion of all work, the Contractor shall check-out and test the systems, verify all equipment bearings are lubricated properly, and other start-up tasks as necessary. He shall be responsible for original service and start-up of the system(s).
- c. The Contractor shall guarantee the complete electrical system against defects due to faulty materials, workmanship, or failure due to negligence of the Contractor. This guarantee shall extend for a period of not less than 12 months from the date of Final Acceptance. The guarantee shall include a twelve month warranty by the manufacturers on all materials and equipment provided, except where longer periods

are specifically required. He shall be responsible for any maintenance required on the system and service call(s) during the guarantee period.

- d. He shall replace burned out light bulbs or tubes up to one year after the date of Final Acceptance. For the fire alarm system, refer to attached specification for exact requirements.

3.18 INSPECTION

The project will be checked periodically as construction progresses. The Contractor shall be responsible for notifying the Engineer at least 48 hours in advance when any work is ready for inspection or test.

No work will be covered up until approved by the Engineer or his designee.

PART 4- COMPENSATION FOR ELECTRICAL

1620.01 - The work of providing and installing electrical work in the North & South Bound Rest Area Service Building in accordance with the plans and specifications, completed and accepted, will be paid for at the contract lump price for " Electrical Installation For the NBL & SBL Rest Area Building & Vending Building". Such price and payment will be full compensation for all work of constructing the North & South Bound Lane Rest Area service building and Vending Building, including but not limited to providing all transportation, materials, labor, tools, equipment, fees and incidentals necessary to complete the work. Payment will be made under:

- "Electrical Installation For the Installation for NBL & SBL Rest Area Service Building". . . Lump Sum
- "Electrical Construction for the NBL & SBL Vending Building" Lump Sum

Rest Area Site Work
TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE
1	Tree Protection / Preservation Fence	2
2	Construction Fence (Temporary)	4
3	Site Demolition	5
4	(This number intentionally left blank)	
5	Landscape Grading	7
6	Site Stormwater Drainage	8
7	Site Water Distribution System	11
8	Site Sanitary Sewer System	14
9	Relocation of Direct Burial Post Top Light and Outdoor Phones	15
10	Relocation of Existing Vending Buildings	16
11	4" Concrete Sidewalk, 4" Concrete and Decorative Paver Plaza, Brick Banding and Brick Edging	18
12	Concrete Stairs with Brick Cheekwalls and Handrails	19
13	Seatwall	20
14	Pergola Picnic Shelter with HC Table	21
15	Picnic Shelter and HC Table	24
16	Flagpole	29
17	Flagpole Lighting	29
18	Waste Container	30
19	Seeding and Mulching for Rest Area Lawn	31
20	Seeding and Mulching for Roadway and Waste and Borrow Locations	32
21	Gravel Construction Entrance	34
22	Landscape Metal Edging	35
23	Mulched Path	36
24	Boulders	37
25	Planting: Seasonal Limitations, Mulch for Planting, Post- Emergent and Pre-Emergent Herbicides, and Soil Amendment	38

1 - TREE PRESERVATION / PROTECTION FENCE

General Requirements and Restrictions

The aesthetics and comfort of the rest area is greatly enhanced by the maturing trees on the site. The Department has dedicated much effort to preserve all the existing trees possible during this renovation project. This will require the utmost care during the construction process since the construction is located very close to many of the trees we desire to preserve. The contractor will assist the department by educating its employees, subcontractors and any utility companies conducting work in the vicinity, of the efforts and the preservation measures required herein.

Tree Preservation/Protection Fence consist of furnishing, installing, maintaining, and removing wood slat, polyethylene, or polypropylene fence as specified or as directed by the Engineer and in accordance with the special provisions included herein.

Install tree protection fence prior to any demolition. All construction unless approved by the Engineer will occur within the construction fence. *Do not trespass* with vehicles or machinery in the areas indicated for tree preservation. Do not park, refuel, repair or maintain vehicles or equipment in the tree preservation areas. Do not stockpile materials or store equipment in the tree preservation areas.

Do not release petroleum products, fuels, paints, or lubricants anywhere within this project in the vicinity of the tree preservation areas or in areas that drain into this vicinity. Do not apply or release herbicides, fertilizers or chemicals of any kind that may be toxic to plant life and do not 'clean out' concrete trucks in the vicinity of the tree preservation areas, or into areas that drain into this vicinity. Do not burn trash, debris or vegetation in the vicinity of tree preservation areas.

Demolition, ground disturbing activities and construction that occurs within the drip line of the tree(s) or within a radius three times the drip line of the tree(s) will be done with utmost care. Accomplish all grading in such a manner as to avoid standing water or saturated soils around root systems of trees that are to remain. Install erosion control devices in a timely manner to prevent sedimentation of the tree root zone in the tree preservation areas. In areas to be 'cut' by grading or where utility trenches or building footings occur, prevent shredding, tearing or exposing roots by excavating a trench not less than 6" wide and to the maximum depth of the cut up to 24" deep. Hand saw any roots 2" or greater in diameter that are encountered to make a clean smooth cut. If necessary, dig out enough soil to reach an undamaged portion of the root to make the smooth cut. To prevent drying out of roots, immediately cover any exposed root surfaces with 6" of approved mulch or soil until 'finish' construction operations dictate removal. Supplemental irrigation may be necessary during periods of drought or stress. Irrigate as directed and approved by the Engineer.

Branches that protrude into the construction area that interfere with construction operations will be tied back if possible or pruned if not. Follow proper pruning

techniques as established in American National Standards Institute ANSI Z133.1 and perform pruning by a professional arborist. Submit description of proposed work along with arborist credentials to the Engineer for approval prior to conducting work.

Violation of any of these tree preservation measures will result in suspension of all work until the violation is resolved or repaired to the satisfaction of the Engineer. Such suspension of work will not be considered justification for additional compensation in accordance with Section 104 of the Standard Specifications or extension of the contract time.

Materials

Posts will be nominal 2" x 4" or 4" x 4", lengths as required, structural light framing, grade no. 2, southern yellow pine or steel posts will be a minimum of 1 3/8" wide measured parallel to the fence, with a weight of 1.25 lbs/ft of length. Wood posts will be treated with a preservative in accordance with Section 1082-3 of the Standard Specifications.

Fence fabric will be a barricade or safety barrier type highly visible orange polyethylene or polypropylene mesh that is approved by the Engineer. Fabric will be UV stabilized, flexible and inert to most chemicals and acid.

Signs will be fabricated of a durable, weatherproof lightweight material. Signs will have a white background with red lettering. They will be a minimum of 4.5 square feet and clearly display the following message in both English and Spanish:

TREE PROTECTION ZONE

DO NOT ENTER

Submit sample for approval prior to placing.

Installation

Erect fence to conform to the general contour of the ground. Do not remove existing plant material in order to install fence unless directed by the Engineer.

Set post and maintain in a vertical position. Post may be hand set or set with a post driver. If hand set, thoroughly tamp all backfill material, if power driven, wood posts may be sharpened to a dull point. Remove and replace any post damaged by power driving prior to final acceptance. Cut the tops of all posts at a 30-degree angle. The posts may, at the option of the Contractor, be cut at this angle either before or after the posts are erected. Contractor is responsible for locating all utilities prior to installation of fence posts.

Stretch fence fabric taut and attach to post with appropriate means according to post type utilized. In sections where signs will be located, reinforce top of fabric by weaving a 12 gauge galvanized wire in the fabric and firmly attach to the post at each end of section. Place signs every 100 linear feet with a minimum of one sign for each segment facing in

a different direction. Secure sign to fence fabric at all four corners placing near the top of the fence fabric where clearly visible.

Tree Protection Fence Maintenance

At any time during the duration of the project if the tree protection fence is not in an upright secure position with no gaps and properly signed, work on the project will be suspended wholly until the fence is properly repaired and determined to be in satisfactory condition by the Engineer. Remove tree protection fence, fill post holes, weed/mow and dispose of debris off site as a last item of work on the project.

Compensation

Tree Protection / Preservation Fence will be paid for as 'Tree Protection Fence' in linear feet as measured along the surface of the installed and accepted work.

Such payment will be full compensation for the work described above including furnishing, installing, and removing; fence post, fence bracing, fence fabric, staples, tie wires; all tools, equipment and any other incidentals necessary to complete the work. Mulch and/or watering required herein will be incidental to the completion of the work.

Payment will be made under.

Tree Protection Fence LF

2 – CONSTRUCTION FENCE (TEMPORARY)

General

The work covered by this provision consist of furnishing, erecting, maintaining and removing (72") temporary chain link fence and gates at locations shown on the plans and/or as directed by the Engineer.

Unless at the direction of the Engineer, the entire rest area is closed and rest area access ramps are barricaded, install construction fence prior to beginning construction and as indicated on the Construction Limits and Staging Plan and Phase Chart.

The estimated quantity of chain link construction fence may be increased, decreased, or eliminated entirely by the Engineer based upon the contractor's approved work schedule and status of rest area - open or closed to the public at the time of construction. Such variations in quantity will not be considered an alteration in the plans or detail of construction that materially change the character of the work and the cost of performing the work. Standard Specifications Section 104-5 pertaining to overruns and underruns of contract quantities will not be applicable to the item of construction fence.

Construction fence and gate will conform to all applicable sections of the Standard Specifications and Standard Drawings Section 866.

Materials

Construction fence will be chain link 72 inch fabric. Double gates will be chain link, 72 inches high and 8 feet wide with a 16 foot opening.

Installation

Erect fence to conform to the general contour of the ground. When determined necessary by the Engineer, perform minor grading along the fence line to provide for installation and proper drainage. Set all posts in a true vertical position and thoroughly tamp to secure position.

Stretch fence fabric taut and securely attach to each post. Do not splice fabric between posts.

Maintain the construction fence in a satisfactory condition until directed by the Engineer to remove. Upon removal all fence materials will become the property of the Contractor and will be removed from the project promptly.

Compensation

Construction Fence (Temporary) will be paid for as 'Chain Link Fence, 72" Fabric' measured in linear feet satisfactorily installed and accepted and 'Double Gates, 72" High, 8' Wide, 16' Opening' for each satisfactorily installed and accepted. Double gates will be measured as one gate. No direct payment will be made for gate posts, terminal posts, post bracing and other miscellaneous materials necessary to construct the fence as these will be considered incidental to the fence installation. There will be no additional compensation for construction fence and gates relocated to another area on site during different phases of the project. Should relocation to accommodate a subsequent phase require additional length, thus additional materials, payment will be made for the additional length measured in linear feet and/or actual number each of gates at the contract prices as provided herein.

Such payment will be full compensation for the work as described above, including but not limited to clearing and grading; furnishing, installing, relocating and removing gates, fence fabric with necessary posts, bracing, staples, tie wires, fittings, tools, equipment and all incidentals necessary to complete the work.

Payment will be made under:

- Chain Link, 72" Fabric LF**
- Double Gates, 72" High, 8' Wide, 16' Opening EA**

3 – SITE DEMOLITION

General

Site demolition consists of the removal and disposal of all paving, structures, site amenities and vegetative material designated to be removed as indicated on the plans and

as directed by the Engineer. Vegetative material includes trees and shrubs with stumps, and plant beds as designated on the plans and as directed by the Engineer on site. Others will remove selected structures, site amenities and any trees or shrubs to be salvaged prior to the Contract. Terrazzo tabletops noted on plans or directed by the engineer are to be salvaged by contractor for reuse in this contract. **Demolition for the purpose of rest area building renovations is covered elsewhere in the Special Provisions.**

All methods and operations used for removal of paving, structures, site amenities and vegetative material will meet prior approval of the Engineer. Make a **saw cut** providing a clean edge at locations where concrete paving is removed.

Satisfactorily complete vegetative removal operations prior to building and landscape grading operations. Vegetation removal consists of below ground removal of root masses as well as above ground growth. Perform all work so as to cause minimum soil erosion and comply with the requirements of Section 107-13. Conduct vegetation removal operations in a manner to prevent limb, bark or root injuries to trees, shrubs, or other types of vegetation that are to remain. Should damage occur to adjacent trees or shrubs to remain take all steps necessary as directed by the Engineer to repair or minimize the effects of the damage to the tree or shrub. Remove any tree or shrub that is to remain that is damaged to the extent that its value as a desirable landscape tree is compromised in the opinion of the engineer. There will be no further compensation for removal of a tree or shrub damaged by the contractor. Furthermore, the contractor will reimburse the owner for the aesthetic value of the tree or shrub, as determined by a certified arborist using the current International Society of Arboriculture plant appraisal standards.

All materials removed that are not noted for recycling or reinstallation on the project will become the property of the Contractor and will be properly disposed of by the Contractor off site.

Prevent damage to adjacent property and structures during the removal and demolition operations. The contractor is responsible for repairing any and all damaged areas to its original condition and/or to the satisfaction of the Engineer.

Compensation

Payment for the work of removing and disposing of all paving, structures, site amenities and vegetation as described above, indicated on plans and directed by the Engineer, will be paid for at the contract unit price for 'Site Demolition'.

Such price and payment will be full compensation for all work covered by this provision; including but not limited to furnishing all labor, tools and equipment and any other incidentals necessary or required to complete the work.

Payment will be made under:

Site Demolition Acres

5 – LANDSCAPE AND SITE GRADING

General

Landscape and Site grading consists of placing topsoil material within seeding and planting beds, and cutting and backfilling around buildings, sidewalks, etc., to provide proper drainage and elevations as indicated on the grading plans, cross-sections, and as directed by the Engineer.

Material

Topsoil will be as specified herein and will be utilized for all fill/backfill operations as directed by the Engineer.

Topsoil will be a sandy loam, silt loam or clay loam that contains a reasonable amount of humus material. Topsoil will be of good texture, loose and friable and will be representative of topsoil in the general vicinity. It will be reasonably free from sod, hard lumps, subsoil, large roots, rocks and gravel, noxious weed seeds and/or toxic substances or other material, which would be harmful to plant growth. Topsoil when delivered to the job site will be approved by the Engineer prior to placement, whether or not the source of topsoil has been previously approved.

Fill material to bring building site to finished grade will be as specified in the building specifications under earthwork.

Installation

Place building fill and compact as described in the building specifications. Place topsoil fill and spread evenly to a depth of 18 inches or as directed by the Engineer, which after settlement, constitutes finish grade. Do not place topsoil when the ground is frozen, is excessively wet, or is in a condition that the soil cannot be worked easily and dressed smoothly. Compact fill material under elevated sidewalks/concrete paving to a density equal to or greater than undisturbed soil in the area.

Where fill material is needed within wooded areas, precautionary measures will be taken to prevent damage to trees and the roots of trees to be retained for landscape purposes. When placing or compacting fill material in or adjacent to wooded areas heavy machinery will not be allowed. Equipment for placing fill material will be approved by the Engineer prior to any grading work.

Compensation

'Landscape and Site Grading' will be paid for at the contract lump sum price for the work detailed in this section that has been successfully accomplished and accepted. Building fill will be included as part of the building lump sum payment. 'Topsoil' will be paid for in the actual number of cubic yards of topsoil placed and accepted. Topsoil will be measured by truck measurement. Each truck will be measured and will have a legible identification mark indicating its capacity. Load each truck to at least its measured capacity at the time it arrives at the point of delivery. The recorded capacity will be

adjusted by making a 25 percent deduction to allow for shrinkage, and the adjusted capacity will be the quantity to be paid for.

Such price and payment will be full compensation for furnishing, all labor, equipment and all incidentals necessary to complete the work satisfactorily.

Payment will be made under:

Landscape and Site Grading LS
Topsoil CY

6 – SITE STORMWATER DRAINAGE

Applicable parts of the supplementary General Conditions and the Standard Specifications govern work under this division which includes all labor, materials, equipment and services necessary for the proper completion of storm drainage and related work indicated on the drawings or in the specifications in general as follows:

- Landscape Drainage Drop Inlets
- Storm Drainage Pipe
- Storm drainage system from building downspouts to catch basin as shown on grading
- Adapters at each building downspout
- Cleanouts in drain lines

General

The work covered by this provision consists of excavation, fabrication, furnishing, installing drop inlets, junction box and drainage pipe, and making proper connections to the existing storm water drainage system as shown on the plans and as directed by the Engineer.

Masonry Drainage Structures

Materials

Masonry drainage structures will be as specified in Section 840 of the Standard Specifications. Concrete Drop Inlet will be as shown in Roadway Standard Drawing 840.14 with grate as shown in 840.16 at locations as indicated on the plans.

Installation

Exact placement of structures will be optimized in the field to align with existing drainage structures and necessary connections. Invert elevations will be determined/adjusted in the field based on existing drainage structures.

Compensation

Compensation will be as specified in Section 840 of the Standard Specifications.

Payment will be made under:

Masonry Drainage Structures, Std. 840.14 EA

Frame with Two Grates, Std. 840.16 EA

Downspout Connections

Downspout Conversion Unit

Building downspout to drain pipe adapter will consist of metal downspout conversion unit to adapt from rectangular downspout to drain pipe as shown on drawings. These conversion units will be incidental to drain pipe installation and there will be no separate compensation

Cleanouts

Cleanouts will be proper shape, length, and degree of bend, to fit conditions. Cleanouts will be set at locations shown on the plans but not more than 50 feet apart. Cleanout plugs will be minimum of 4", with finish elevation at proposed finish grades for lawn, plant bed or sidewalk. Cleanouts in sidewalks will be brass stem and cap mounted flush with sidewalk.

Compensation

Cleanouts installed, complete and accepted will be paid for at the contract unit cost each.

Payment will be made under:

4" Storm Drain Cleanout EA

Storm Drainage Pipe

Materials

Storm drainage pipe will be PVC/ABS-DWV meeting requirements of ASTM D-2661, Schedule 40 with solvent cement for fittings complying with ASTM D-2235, ASTM D-87.

Installation

- a) Excavate trench to a sufficient width to receive pipe and allow for tamping equipment and to the depth established by the Engineer. Follow precautions under 'Tree Preservation' if working in the vicinity of trees to be preserved.
- b) Join pipe sections and fittings together in accordance with manufacturer's recommendations.
- c) Where the pipe foundation material is found to be of poor supporting value or of rock the foundation will be conditioned by removing the existing foundation material. Remove existing foundation material by undercutting one foot or to a depth as directed by the Engineer, and backfill with either a suitable local material or a foundation condition material. Foundation condition material consists of crushed stone or gravel or a combination of sand and crushed stone and will be approved by the Engineer as being suitable for the purpose intended. The selection of the type of backfill to be used for foundation conditioning will be made by the Engineer.

- d) Connect to existing or proposed drainage structures as indicated on the plans and as directed by the Engineer.
- e) Backfill material will be carefully placed so that the pipe will not be disturbed after it has been laid. Firmly tamp the Engineer approved earth backfill material in 6 inch layers to a density equal to that of the surrounding undisturbed soil.
- f) Maintain all drainage installations in a continuously functioning condition from the time the pipe is installed until the project is accepted.

Compensation

Storm drainage pipe will be measured and paid for per linear foot when properly installed and accepted by the Engineer.

Payment will be made under:

- 4" PVC/ABS-DWV, SCH 40 Drain Pipe LF
- 6" PVC/ABS-DWV, SCH 40 Drain Pipe LF

7 – SITE WATER DISTRIBUTION SYSTEM

The work covered by these provisions consists of constructing waterlines within the rest area as required by the plans and provisions herein or directed by the Engineer. The Contractor will furnish all materials, labor, equipment, and incidentals necessary to complete the proposed utility work.

General Construction Requirements

Specifications

The proposed utility construction will meet the applicable requirements of the N. C. Department of Transportation's "Standard Specifications for Roads and Structures" (latest edition) July 2006 and the following provisions:

Plumbing Ordinances

All plumbing work in connection with the water distribution system installation will be done in accordance with local and State ordinances, and will be subject to inspection by the particular County Health Authorities or by authorities of the Sanitary Engineering Section, Division of Health Services, Department of Human Resources and/or authorities of the Water quality Section's, Division of Environmental Management, Department of Natural Resources and Community Development.

Trenches and Backfill for Utility Pipe Line Construction

The utility excavations will be made and the pipes will be laid in accordance with Section 300 of the Standard Specifications and as specified herein.

Clearing and Grading

The Contractor will limit his clearing to only that absolutely necessary to construct the water system (lines for distribution, etc.).

General

The Contractor will furnish and install all material for the water distribution system within the rest area as shown on the Site Development drawings and as specified herein, consisting of water lines, fittings, gate valves, stop and drain valves and valve boxes. Also included will be water line tests, sterilization and flushing of the entire water system and all other items not specifically mentioned but necessary to complete the work. Type of pipe material to use in the water line distribution system will be PVC Schedule 80. All pipe tees and bends will be ductile iron (incidental to water line installation).

Polyvinyl Chloride Water Pipe

PVC water pipe will be schedule 80 with a minimum of 200 psi pressure rating, and sized as shown on the plans. The pipe, when used for conveying drinking water, will meet the requirements of the National Sanitation Foundation Seal of approval for potable water.

Gate Valves

Gate valves in the water system where shown on the plans will be bronze, non-rising stem type, with body conforming to ASTM B62; stem will be of best silicon brass and the threads conforming to ANSI B2.1.

Valve Boxes

Valve boxes will be polyester/fiberglass, constructed with ultraviolet inhibitors. Valve box assembly will be constructed in two sections: bottom, and cap. Bottom section of valve box assembly will be adjustable for height and variances. Install valve box with cap flush with the proposed finished grade. Place three inches of crushed stone (No. 67 aggregate under valve and bottom section. Valve box size will accommodate valves and piping as shown on the plans and approved by the Engineer. Submit shop drawing for approval by Engineer.

Construction

Piping will consist of 1/2 inch thru 4 inch pipe, which will be installed as shown on the plans. Pipe fittings needed to complete the work and not individually noted herein will be considered part of the work of 1/2 inch thru 4 inch pipe.

The limits of clearing for installing water lines will be held to a maximum of 6 feet, except in critical areas where the Engineer may establish greater limits. Trees and shrubs, which are damaged, will be repaired and/or removed in accordance with applicable provisions of Section 894-4 of the Standard Specifications.

All PVC pipe must be installed according to manufacturer's recommendations. Pipe will be cut square, burrs removed from cut end, cleaned and dried. Apply cement to pipe and fitting with rapid and thorough coverage, assemble parts quickly, using 1/8 to 1/4 turning motion. Hold in place for two minutes to offset tendency to move out of fittings.

Pipe will be laid in a snaking manner to allow for expansion and contraction, and in such a way to avoid bumps, boulders, and holes that might result in stress on the pipe.

If, at any time before completion of the contract, any broken pipe or any defects are found in the lines or in any of their fittings or appurtenances, they will be replaced or corrected. All pipe, fittings and appurtenances will be carefully examined for defects before placing and any found defective will not be used.

The pipe trenches will be conditioned by removing the existing foundation material by undercutting one foot or to a depth as directed by the Engineer, and backfilling with either suitable local material or foundation condition material consisting of clean sand as approved by the Engineer as being suitable for the purpose intended. The selection of the type of backfill to be used for foundation conditioning will be made by the Engineer. **(Note: Foundation material is 6" around pipe incidental to water line installation).**

Pipe will not be laid upon a foundation into which frost has penetrated, or at any time, that in the opinion of the Engineer, there is danger of the formation of ice or frost at the bottom of the excavation. The Engineer may at his discretion allow construction of the pipeline to continue under freezing conditions provided the Contractor promptly backfills the trench as directed.

PVC pipe will have its location marked by using a detectable marking tape, installed 12 to 18 inches below finished grade. Such tape will be as approved by the Engineer. The proposed pipe will be laid in trenches not less than 24 inches in depth below the finished grade. After the installation of pipe has been tested, inspected, and approved by the Engineer, it will be promptly backfilled and compacted to a density equal to that of the surrounding undisturbed soil.

The locations for water lines and valves with valve boxes, as shown on the plans, are substantially correct; however, the Engineer will establish the exact location.

Water Line Test

Prior to backfilling the Contractor will test all waterlines in the water system for eight (8) hours under a water pressure of 150 PSIG. Leaks will be repaired by tightening the joint or by remaking the joint if the tightening fails to stop the leak.

Sterilizing and Flushing Piping System

All water piping will be sterilized with chlorine concentration. All lines will be filled with water and chlorine concentration so that an overall chlorine residual to the water of at least 100-ppm will result. During the filling all trapped air through drinking fountains, yard hydrants, valves, etc., will be released. After the lines have been filled with water and chlorine, the pipe system will be valved off and the chlorinated water allowed to remain in the system for a 24-hour period. At the end of this period, the chlorine residual count should be at least 10 ppm. The lines will then be thoroughly flushed to insure the removal of all sediment, pipe seals, etc. This process will be subject to inspection and/or supervision by the local Health Authorities.

Compensation

The work of furnishing and installing ½ inch thru 4 inch water lines with sand bedding as described above when completed, tested, and accepted will be paid for at the contract unit price per linear foot measured in place. The work of furnishing and installing Gate valves and boxes will be paid for at the contract unit price per each for ‘Gate Valve and Box’ in the sizes shown below complete in place and accepted. The work of repairing existing water pipe, any size up to 4”, complete, tested, and accepted will be paid for at the contract unit price per linear foot for ‘PVC, Water Pipe, SCH 80 Repair’.

Payment will be made under:

1/2" PVC Water Pipe, SCH 80	LF
3/4" PVC Water Pipe, SCH 80	LF
3" PVC Water Pipe, SCH 80	LF
4" PVC Water Pipe, SCH 80	LF
1/2" Gate Valve and Box	EA
3/4" Gate Valve and Box	EA
3" Gate Valve and Box	EA
4" Gate Valve and Box	EA
PVC Water Pipe, SCH 80 Repair	LF

8 – SITE SANITARY SEWER SYSTEM

Polyvinyl Chloride (PVC) Sewer Pipe and Fittings

Polyvinyl chloride (PVC) sewer pipe and fittings will conform to ASTM D-3034 - (SDR-35) specifications. The pipe will be installed in accordance with the applicable utility provisions herein, and as shown on the utility plans and as directed by the Engineer. PVC sewer pipe will be of the size and wall thickness (SDR) as noted on the utility plans, and will be installed in accordance with approved bedding methods.

PVC sewer pipe will be of sufficient wall thickness and strength to withstand the various earth and impact loads that bear on the installed pipe. The pipe will be circular in shape with no appreciable distortion. The pipe will have a gasket joint, used in conjunction with an integral bell, which will be a homogeneous part of the pipe.

The joints for PVC sewer pipe will be of the push-on-type, with flexible elastomeric seals conforming to ASTM D-1784 Specifications. Other types of seals may be used, if approved by the Engineer. The PVC pipe bells made as an integral part of the PVC pipe will conform to ASTM D-3212 Specifications. The pipe will be assembled in accordance with the recommendations of the manufacturer and in accordance with the specifications. Compression type couplings may be used to joint plain-end PVC sewer pipe sections, if approved by the Engineer. However, such joints will allow for pipe expansion.

Polyvinyl (PVC) sewer pipe installed in accordance with the plans utility provisions herein and accepted will be measured along the pipe and paid for at the contract unit price per linear foot ‘6” PVC (SDR-35) Gravity Sewer Line’. Such prices and payments will

be full compensation for furnishing all labor, equipment, material, pipe accessories, fittings, gaskets, seals, excavation, bedding material, backfill, leakage tests, and incidentals necessary to complete the work as required.

Payment will be made under:

6" PVC (SDR-35) Gravity Sewer Line LF

Sanitary Sewer Clean Out

Contractor will install sanitary sewer cleanouts where shown on the plans but not less than every 50', with screw type brass covers, encased in 4"x 12"x 12" concrete pad flush with ground. Sanitary Sewer Cleanouts will be paid for at the contract unit price for each upon satisfactory completion of the work.

Payment will be made under:

4" - Sanitary Sewer Cleanout EA

Connection to Existing Sewer Manhole/Sewer Line

The contractor will install Sanitary Sewer Line and connect to existing sanitary sewer manhole/Sewer Line as shown on the plans and as directed by the Engineer.

Connection to the sewer manhole/sewer line will be paid for at the contract unit price for each upon satisfactory completion of the work.

Payment will be made under:

Connection to Sewer Manhole/Sewer Line EA

9 – RELOCATION OF DIRECT BURIAL POST TOP LIGHT AND RELOCATION OF OUTDOOR PHONES

This provision covers relocation of existing post top lights and poles and relocation of existing exterior payphones. 2" PVC sleeves will also be placed as shown on the plans or as directed by the Engineer for future water or electrical needs. These sleeves shall be temporarily capped before backfilling over them.

General

Relocate existing post top lights with direct burial poles and existing exterior payphones as shown on the plans and as directed by the Engineer. Relocation will include, but not be limited to, dismounting the light and pole or phone and pedestal; removing the existing concrete foundation, storing items during construction, constructing a new pad for phone with conduit and anchor bolts, reinstallation of the light and direct burial pole or phone and pedestal and connecting to electrical source and/or phone service.

Install electric service (120/240 volt) or phone service (10-Pair) lines in (2" conduit) as shown on the details or as directed by the Engineer.

Service will be reconnected immediately after the area where they are to be relocated to is available and prepared.

Relocation of post top light and pole and relocation of payphone and pedestal will be paid for at the contract unit price each successfully relocated and accepted. 2" Sleeves for underground elec. / phone service (Sch 40 PVC) will be paid for in linear feet successfully installed and accepted.

Such price and payment will be full compensation for all work covered by this special provision; including but not limited to furnishing all labor, materials, equipment and any other incidentals necessary or required to complete the work and restore service.

Payment will be made under:

- Relocate Post Top Light and Pole EA**
- Relocate Payphone and Pedestal EA**
- 2" Sleeve for Underground Elec./ Phone Service (Sch 40 PVC) LF**

10 – RELOCATION OF EXISTING VENDING BUILDINGS

General

On these sites there are 2 existing vending buildings. Vending building on the North Bound Lane must be temporarily relocated as shown on drawings prior to beginning construction on the new restroom building. Connect temporary electrical service to building so that it remains in service. The building on the South Bound Lane can stay in place until renovation of the existing rest area building has been completed and vendor has moved in.

At such time as directed by the Engineer, the Contractor is to disconnect existing utilities (water, sewer, power) from both vending buildings, prepare the buildings for transport, construct concrete pad for the buildings to rest in a new location, relocate the buildings to the new location, and properly tie them in place. No power service will be reconnected at this time.

New Permanent Location for North bound lane vending building:
 North Carolina Welcome Center on I-95 at the NC/VA stateline. Building to be located with in the fenced-in utility area.

New Permanent Location for South bound lane vending building:
 Division Four Maintenance Yard located on US-64A just west of Nashville, NC 27856
 Exact location to be determined on site by the Engineer.

Materials and Construction

Site Preparation

After proposed building site is located, elevation is established and staked by the Engineer, the Contractor will perform necessary clearing and grubbing in accordance with Section 200 "Clearing and Grubbing" of the Standard Specifications.

Excavation and Grading

Remove root mat, rough grade and fill and compact embankment material to obtain building concrete slab elevation. Topsoil for backfill around the slab, is covered elsewhere in the proposal.

After rough grading, perform all necessary excavation for concrete slab. Remove all excavated material in excess of the amount required for finish grading off site. The Contractor may dispose of excess on site only if directed to do so by the Engineer. Construct finished grade around concrete slab at a depth of 3 inches below finished floor. Slope grade away from building at 2 percent for a distance of 10 feet or as shown on drawings.

Concrete and Steel

Use class "A" concrete in the reinforced concrete slab. All applicable portions of Section 825, 'Incidental Concrete Construction – General'; Section 1000, 'Portland Cement Concrete Production and Delivery'; Section 1070 'Reinforcing Steel'; and Section 1072 'Structural Steel', of the Standard Specifications will apply.

Concrete slab will be 6 inches thick. Reinforced with 6 inch by 6 inch, 10/10 welded wire mesh. (Note: Any additional *Temporary pad* necessary for NBL vending building may be constructed and paid for as 4 inch concrete sidewalk.) Subgrade will consist of undisturbed soil or a thoroughly compacted earth fill, well drained and leveled to proper grade. Place a 4-inch layer of coarse gravel or crushed stone over subgrade; screen to a true and level surface and thoroughly tamp. Place vapor barrier, consisting of 6 mil. polyethylene membrane after tamping.

Pour concrete to proper grade and level with a straight edge. After floating, bring the concrete to a smooth finish with a steel trowel.

Metals

Install as indicated on drawings and details and as required herein. Form metal work to required shape and size with clean lines and angles. Avoid screws and bolts where possible. Where screws and bolts are used, countersink heads, screw up tight and pick threads to prevent loosening. Conceal fastenings where possible. Anchors built into concrete or masonry will be galvanized.

Note

At the existing site all existing electrical connections to the buildings will be disconnected and properly terminated underground. Plug electrical conduit with waterproof mastic.

Compensation

The work of temporarily and permanently relocating the Vending Buildings, when completed and accepted, will be paid for at the contract unit price each for 'Relocation of Vending Building' and 'Temporary Relocation of Vending Building'. Such price will be full payment for this work; including, but not limited to, clearing and grubbing, filling, grading, installing concrete pad, transporting, installing building and connecting to electrical source, furnishing all labor, materials, and any other incidentals necessary or required to complete the work.

Payment will be made under:

Relocation of Vending Building EA

Temporary Relocation of Vending Building (On Site) EA

**11 – 4” CONCRETE SIDEWALK
4” CONCRETE AND DECORATIVE PAVER PLAZA
BRICK BANDING AND BRICK EDGING**

General

This provision covers 4” concrete sidewalks, 4” Concrete and Decorative Paver Plaza, Brick Banding and Brick Edging. All sidewalks and concrete plaza as indicated on plans will be 4" concrete pavement. All applicable sections of the Standard Specifications Section 825, Incidental Concrete Construction - General and Section 848, Concrete Sidewalks, Driveways and Wheelchair Ramps, will apply.

Materials

See Standard Specifications Section 848 for concrete specifications. Brick Banding will be a 3-5/8” x 7-5/8” x 2-1/4” solid brick paver conforming to ASTM C-902. Brick paver is to match Rest Area building face brick; submit sample board for approval prior to beginning installation. Bluestone paver will be 8” square and a minimum of 2” thick. Submit sample for approval prior to beginning installation.

Installation

Remove all construction and vegetative debris and compact subgrade in area to be paved. Construct expansion joints and place groove joints as shown on plans and as directed in Section 825-10 of the Standard Specifications and as detailed in Section 848.01 of the Standard Drawings. Scoring patterns will be as shown on Layout Plan unless field revisions necessitate changes. Any revisions will be at the direction of the Engineer in the field.

Form channels or ledges for the brick banding, brick edging and bluestone paver inserts as shown on the plans while forming and placing the concrete pavement.

Install brick pavers and bluestone pavers in preformed channels within the concrete pavement as detailed on the plans and details. Lay pavers on full mortar beds and fill all joints with mortar. Install pavers so that surface level of pavers and concrete paving create a smooth continuous surface with no raised edges and no changes in level other than the intended surface slope for drainage.

Compensation

Concrete sidewalk, concrete paving and concrete plaza will be paid for as '4" Concrete Pavement' in square yards, measured along the surface of the completed and accepted work. Such price includes, but is not limited to excavating and backfilling, sawing the existing sidewalk, furnishing and placing concrete, and constructing and sealing joints.

Brick banding and brick edging will be paid for as 'Brick Banding / Brick Edging' in linear feet, measured along the surface of the completed and accepted work. Such price includes, but is not limited to furnishing and placing brick pavers, mortar bed and mortar joints.

Bluestone paver insert will be measured and paid for in units of each as 'Bluestone Paver'. Such price includes, but is not limited to furnishing and placing bluestone paver, mortar bed and mortar joints.

Payment will be made under:

4" Concrete Pavement	SY
Brick Banding / Brick Edging	LF
Bluestone Paver	EA

12 – CONCRETE STAIRS WITH BRICK CHEEKWALLS AND HANDRAILS

General

This provision consists of constructing concrete stairs, brick cheekwalls and handrails as shown on the plans and details, including all materials, labor, equipment and grading to complete the work.

All applicable requirements of Incidental Concrete Construction-General, Section 825, Reinforced Brick Masonry Construction – General, Section 832 and Fabricating and Placing Reinforcement, Section 425 of the Standard Specifications will apply.

Materials

Concrete will be Class B. Brick will be the same as Rest Area building face brick. Cheekwall coping will be a bullnose rowlock in same color and finish as wall brick.

Sumit brick samples for approval. Handrails will be Schedule 40, 1 1/2" outside diameter aluminum pipe with a clear brushed anodized finish.

Construction/Installation

Construct concrete in accordance with Section 825, except as otherwise noted herein. Furnish and place reinforcement, as shown on the plans and details, in accordance with the provisions of Section 425. Give formed surfaces of the concrete a rubbed finish. Give unformed surfaces a float finish. Construct brick masonry in accordance with Section 832.

Erect handrails as shown on the details, straight and true to line and grade. They will be core mounted into pipe sleeve as recommended by manufacturer. All welds will be filed smooth to the touch.

Compact backfill to a degree comparable to the adjacent undisturbed material.

Compensation

Concrete steps will be paid for as 'Concrete Steps' in cubic yards of concrete, computed from the dimensions shown on the plans or established by the Engineer, which has completed and accepted.

Brick Cheekwalls will be paid for as 'Brick Cheekwalls' in linear feet computed from the dimensions shown on the plans or established by the Engineer, which has been completed and accepted.

Handrails will be paid for as 'Handrails' in linear feet as measured along the surface of the completed and accepted work.

Such price and payment will be full compensation for all work covered by this special provision; including but not limited to furnishing all labor, materials, equipment and any other incidentals necessary or required to complete the work.

Payment will be made under:

Concrete Steps	CY
Brick Cheekwalls	LF
Handrails	LF

13 – SEATWALL

General

This special provision consists of furnishing and constructing the seatwall as shown on the plans and details and as described herein.

All applicable requirements of Incidental Concrete Construction-General, Section 825, Reinforced Brick Masonry Construction – General, Section 832 and Fabricating and Placing Reinforcement, Section 425 of the Standard Specifications will apply.

Materials

Concrete will be Class "A". Concrete masonry unit will be manufactured for the purpose of reinforced masonry wall construction. Brick will be the same as used in the rest area building face brick. Wall coping will be a bullnose rowlock in same color and finish as wall brick. Submit brick samples for approval.

Installation

Excavate and pour reinforced concrete footing with reinforcement. Build block wall with reinforcement and lay brick veneer and bullnose rowlock cap with continuous wire reinforcement as shown on the details. Fill all cavities. Provide weep holes every 24". Allow the masonry to cure a minimum of 7 days prior to placing backfill.

Compensation

Seatwalls will be paid for as 'Brick Seatwall' in linear feet as measured along the surface of the completed and accepted work.

Such price and payment will be full compensation for all work covered by this special provision; including but not limited to furnishing all labor, materials, equipment and any other incidentals necessary or required to complete the work.

Payment will be made under:

Brick Seatwall LF

14 – PERGOLA PICNIC SHELTER WITH HC TABLE

General

The work covered by this section consists of furnishing and constructing as shown on the drawings and herein specified, a pergola picnic shelter with handicapped accessible table including all labor, materials, services and incidentals required to complete the work.

Picnic Table (Terrazzo and Steel)

General

Picnic tables will consist of cleaning and resealing salvaged terrazzo top and installing tables on concrete slab with brick banding, in accordance with the sizes, dimensions and details shown on the plans and as described herein.

A picnic table will include table site preparation, grading, concrete footing and concrete floor slab with brick banding, a welded tubular steel frame with a terrazzo table top (salvaged from site) and wood seats for benches, all hardware required for assembly and other incidentals as necessary for a complete installation in accordance with detail drawings.

The Engineer reserves the right to inspect the frames at the place of manufacture in accordance with Article 106-6 of the Standard Specifications.

The locations of all tables are tentatively shown on the site plan; however, exact locations, elevation, orientation, etc., will be determined on the site by the Engineer.

Submittal

Submit color chart (four copies) on epoxy glaze coatings for color selection by the Engineer for table bench seats and steel frames.

Materials and Construction

Table Site Preparation

After table/pergola site is located and staked by the Engineer, the Contractor will perform necessary clearing and grubbing in accordance with Section 200 "Clearing and Grubbing" of the Standard Specifications.

Grading

Picnic table concrete slab sub grade will be graded level with drainage swale cut on high side and filling on low side as shown on detail drawings. Additional embankment material, borrow excavation, if required, for raising table elevation and backfilling, topsoil, around concrete slab are covered elsewhere in proposal.

Concrete and Steel

Class "B" concrete will be used in all table footings and floor slabs. All concrete and all structural and reinforcing steel will comply with applicable portions of Section 825 and 1000 "Incidental Concrete Construction - General"; Section 1070 "Reinforcing Steel"; and Section 1072 "Structural Steel"; of the Standard Specifications.

Benches

Wood seats for picnic tables will be nominal size 2" x 10", old growth vertical grain Douglas Fir of "C" or better grade. On one side, bench will be constructed to allow wheelchair access as shown on drawings.

Terrazzo Tops:

Reseal terrazzo tabletop removed from the indicated picnic table on site and use to construct HC Picnic Table:

1. Scope - reuse existing pre-cast terrazzo top for picnic table. Include inserts and bolts as indicated on drawings.
2. Cleaning and Sealing Terrazzo:
 - A. Apply cleaning solution to terrazzo in accordance with the manufacturer's directions. After surfaces are dry, wash and rinse terrazzo and apply a coat of sealing solution. Buff terrazzo with electric machine and leave in clean finished condition.
 - B. Terrazzo sealing solution will produce a waterproof film on surface and seal moisture in terrazzo. Cleaning solution will not cause yellowing or leave a tacky finish on the surface after buffing.
 - C. Terrazzo cleaning solution will be a neutral chemical cleaner that will not change the color of the terrazzo or damage it in any way.
3. Installation of Table Tops:
 - A. Bolt tops in place, without binding.
 - B. Clean tops of grease, dirt, etc., and apply two (2) additional coats of sealing solution, buff with electric machine and leave in clean finished condition.
 - C. Leave tops in good condition. No chipped tops or edges and cracked slabs will be accepted.
4. Painting of Table, Wood Seats and Steel Frame.
 - A. Bench Seats. Use one coat of epoxy glaze coating mixed with one part of epoxy thinner, then use two coats of epoxy glaze coating, gloss finish.
 - B. Exterior Steel. Use one coat factory priming exterior rust resistant metal primer, then two coats of epoxy glaze coating, gloss finish.

NOTE: Painter will spot check a small area with a second coat to determine if primer "lifts off". If it does, obtain from the paint factory a second coat material that will not lift from the priming coat actually used by the factory.

Pergola Picnic Shelter:

Concrete and Steel

Class "B" concrete will be used in all footings and floor slabs. All concrete and all structural and reinforcing steel will comply with applicable portions of Section 825 "Incidental Concrete Construction - General"; Section 1070 "Reinforcing Steel"; and Section 1072 "Structural Steel" of the Standard Specifications.

Include all fasteners, anchors, ties, gusset plates, etc., as required. Through bolts will be 1/2 inches in diameter, length as required hot-dip galvanized steel. Install with steel galvanized washers under both bolt head and nut; galvanizing will conform to applicable requirements of Section 1076 of the Standard Specifications.

Carpentry and Millwork

See drawings and details for location and quantity of both rough and finish carpentry.

Grading of all lumber and trim will conform to the association under whose rules it is graded. Moisture content will not exceed 18 percent for framing lumber and 12 percent for millwork and trim.

All lumber and millwork will be stored in a manner that will keep it dry and well ventilated, well off the ground, and adequately covered.

Carpentry and millwork materials will be as follows:

All timbers, posts, rafters, lintels and lattice will be full size, rough-cut Western Red Cedar, Grade B or better, through-bolted where shown on drawings and securely spiked together at all other joints.

Apply a water-repellent preservative that includes a fungicide for inhibiting the growth of fungus and mildew to all members.

Coat section of treated wood columns with asphalt paint as shown on drawings before encasing in brick pier. Asphalt paint will not be visible above brick.

Hardware

Provide and install all hardware, metal fasteners, nails, bolts, etc. in sufficient sizes and quantities to rigidly secure members in place. All hardware (bolts, washers, screws, angle irons, fasteners, nails, channel, etc.) will be galvanized and conform to all applicable requirements of Section 1076 of the Standard Specifications. Touch up all breaks in galvanizing such as holes, end cuts, etc. with zinc rich paint prior to assembly.

Installation

Rafters and lintels will be cut square on bearings, closely fitted, accurately set to required lines and levels, and rigidly secured in place.

Brick Piers for Pergola

Brick will meet the requirements of Section 1040, and will be the same as that used on the Rest Area Building. Submit brick sample for approval prior to construction.

Excavate and pour reinforced concrete footing, build brick pier and place preformed cap with continuous wire reinforcement as shown on the drawings. Place reinforcing steel as described in Section 425. Allow the masonry to cure a minimum of 7 days prior to placing backfill.

Compensation

The work of furnishing and installing pergola picnic shelter with HC table, when completed and accepted, will be paid for at the contract unit price for each "Pergola Picnic Shelter, Single HC Table", such unit price to be considered full payment for each individual shelter with table, including but not limited to, all labor, materials, and any other incidentals necessary or required to complete the work.

Payment will be made under:

Pergola Picnic Shelter, Single HC Table EA

15 – PICNIC SHELTER WITH HC PICNIC TABLE

General

The work covered by this provision consists of furnishing and constructing a picnic shelter with table and concrete pad (Handicapped Accessible) as shown on the drawings and herein specified; including all labor, materials, services and incidentals required to complete the work.

Site Preparation

After picnic shelter and table location and orientation is staked and approved by the Engineer, perform any necessary clearing and grubbing in accordance with Section 200 "Clearing and Grubbing" of the Standard Specifications. Grade area for the concrete pad level with drainage swale cut on high side and fill on low side as shown on the details to achieve positive drainage around the pad.

Picnic Shelters

Concrete and Steel

Use Class "B" concrete in all footings and concrete pad. All concrete and all structural and reinforcing steel will comply with applicable portions of Section 825 'Incidental Concrete Construction – General'; Section 1070, 'Reinforcing Steel'; and Section 1072 'Structural Steel' of the Standard Specifications.

Include all fasteners, anchors, ties, gusset plates, etc., as required. Use ½ inch hot-dip galvanized steel thru bolts in diameter and length as required. Install with steel galvanized washers under both bolt head and nut, except for gusset plates; galvanizing will conform to all applicable requirements of Section 1076 of the Standard Specifications.

Carpentry and Millwork

Grading of all lumber, plywood and trim will conform to the association under whose rules it is graded. Moisture content will not exceed 18 percent for framing lumber and 12 percent for millwork and trim.

All lumber in contact with concrete or masonry, and/or soil will be treated with water borne pentachlorophenol or CCA (Chromated Copper Arsenate) in accordance with standards of the American Wood Preserver's Association. Minimum retention will be 0.25 pcf for material 2 inches and smaller and 0.40 pcf for materials greater than 2 inches.

Store all lumber and millwork in a manner that will keep it dry and well ventilated, well off the ground, and adequately covered.

All timbers, rafters and fascia will be full size, rough-cut No. 1 southern yellow pine, thru-bolted where shown on drawings and securely spiked together at all other joints. Stain all timbers, rafters, fascia and underside of roof decking. The Engineer will select color from samples furnished by the contractor.

Coat section of treated wood columns in footing with asphalt paint as shown on drawings. Asphalt paint shall not be visible above concrete footing.

Roof decking will be single tongue and groove, 2 inches by 6 inches with vee joints on face side, kiln-dried No. 1 southern yellow pine. Double spike each member at every rafter.

Framing rafters and fascia will be cut square on bearings, closely fitted, accurately set to required lines and levels, and rigidly secured in place.

Moisture Protection

Use #15 asphalt-saturated felt conforming to ASTM D-226 for roofing felt. Shingles will be the same brand, color, and type as those approved for the rest area service building. Lay one layer of #15 roofing felt to sheathing, lapping horizontally 6 inches, prior to placing shingles. Furnish and install, where shown on drawings, all items of flashing and caulking as required to properly and completely weatherproof the building. Flashing, drips, etc., will be galvanized steel, 26 Ga. Or aluminum, .019-inch sheeting, unless otherwise shown on details. Caulking will be installed in accordance with the manufacturer's specifications. Use Dap 'Flex Seal', Dow Corning '790', or Pecora GC-9 'Synthacalk' or approved equal.

Picnic Table (Terrazzo and Steel)**General**

The picnic table will include site preparation, grading, concrete footing, welded tubular steel frame with a terrazzo table top and wood benches, all hardware required for assembly and other incidentals as necessary for complete installation in accordance with the details and as described herein.

The Engineer reserves the right to inspect the frames and tops at the place of manufacture in accordance with Section 106-6 of the Standard Specifications.

Submittal

Submit color chart (four copies) on epoxy glaze coatings for color selection by the Engineer to be used on table bench seats and steel frames.

Concrete and Steel

Use class "B" concrete in all table footings and concrete pad. All concrete and all structural and reinforcing steel will comply with applicable portions of Section 825, 'Incidental Concrete Construction – General'; Section 1000, 'Portland Cement Concrete Production and Delivery'; Section 1070 'Reinforcing Steel'; and Section 1072 'Structural Steel' of the Standard Specifications.

Benches

Wood will be nominal size 2" x 10", old growth vertical grain Douglas Fir of "C" or better grade.

Terrazzo Tops

Terrazzo tabletops will conform to the following specifications:

1. Scope: provide pre-cast terrazzo tops for picnic tables. Include inserts and bolts as indicated on drawings.
2. Materials:
 - A. Portland Cement will comply with all applicable requirements of Section 1024, 'Materials for Portland Cement Concrete', of the Standard Specifications.
 - B. Sand will be clean and free from organic matter and will meet the requirements of 4S mortar sand, from Table 1005-1, 'Aggregate Gradation', of Section 1005, 'General Requirements for Aggregate' of the Standard Specifications.
 - C. Marble chips will be of the size, colors and kinds required by the color plate as specified herein; chips will have abrasive hardness not less than 13 as determined by the method described in the National Bureau of Standard BMS Report No. 98.

- D. Terrazzo sealing solution will produce a waterproof film on surface and seal moisture in terrazzo. Cleaning solution will not cause yellowing of terrazzo or leave tacky finish on the surface after buffing.
 - E. Terrazzo cleaning solution will be a neutral chemical cleaner that will not change the color of the terrazzo or damage it in any way.
3. Terrazzo Composition and Colors:
- A. Terrazzo tops will be of colors and composition as shown in Terrazzo Plant Catalog of the National Terrazzo and Mosaic Association, Inc. Mix terrazzo in accordance with formulas and specifications for Plate 129.
4. Production of Tops:
- A. Mix chips so that the finish surface has 80 percent aggregate showing.
 - B. Perform initial and final grinding with abrasive grit stone of proper size to obtain the finish specified. After curing terrazzo topping, by keeping damp for 6 days (or less if it has set enough to grind without loosening of chips), grind surfaces with electric machine. After initial grinding or rubbing, grout surfaces with neat Portland Cement paste of creamy consistency, filling all voids; use Portland Cement and coloring corresponding to existing topping for grouting. Let grout remain on surfaces until final grinding, but not less than 2 days.
 - C. Final grinding will produce surface of same color and texture as Plate 129 as specified in Item 3 above. Surfaces will be smooth and free from imperfections. In no case will terrazzo show a wave exceeding 1/16" when tested with straight edge.
5. Cleaning and Sealing Terrazzo:
- A. After final grinding, apply cleaning solution to terrazzo in accordance with the manufacturer's directions. After surfaces are dry, wash and rinse terrazzo and apply a coat of sealing solution. Buff terrazzo with electric machine and leave in clean and finished condition.
6. Installation of Table Tops:
- A. Bolt top in place without binding.
 - B. Clean tops of grease, dirt, etc., and apply two (2) additional coats of sealing solution, buff with electric machine and leave in clean and finished condition.
 - C. Leave top in good condition. Chipped tops, rough or chipped edges and cracked slabs will not be accepted.
7. Painting of Table, Wood Benches and Steel Frame:
- A. Bench – Use one coat of epoxy glaze coating mixed with one part of epoxy thinner, then use two coats of epoxy glaze coating, gloss finish.
 - B. Exterior Steel – Use one coat factory priming exterior rust resistant metal primer, then use two coats of epoxy glaze coating, gloss finish.

NOTE: Painter will spot check a small area with a second coat to determine if primer "lifts off". If it does, obtain from the paint factory a second coat that will not lift from the priming coat actually used by the factory.

Concrete Pad

Use Class "B" concrete. All concrete and structural and reinforcing steel will comply with applicable portions of Section 825 'Incidental Concrete Construction – General'; Section 1070, 'Reinforcing Steel'; and Section 1072 'Structural Steel' of the Standard Specifications.

Form and pour concrete pad to dimensions and with slope as shown in details. Give concrete pad the same finish as sidewalks. Do not place backfill until at least 3 curing days have elapsed. Compact backfill to a degree comparable to the adjacent undisturbed material.

Compensation

The work of furnishing and installing the picnic shelter with table and concrete pad, when completed and accepted, will be paid for at the contract unit price each for 'Picnic Shelter and HC Picnic Table'.

Such price will be full payment for each picnic shelter with table and concrete pad, including but not limited to, all labor, materials, and any other incidentals necessary or required to complete the work. There will be no separate payment for the concrete pad.

Payment will be made under:

Picnic Shelter and HC Picnic Table EA

16 – FLAGPOLE

General

The work covered by this section consists of furnishing and installing 30' Tapered Aluminum Flagpoles at locations as shown on the drawings.

Materials

Satin finish aluminum pole will be 6" tapering to 3.5" with a .188" wall thickness as manufactured by Peterson Flags, Inc. or equivalent. The flagpoles will be 30 foot exposed height with a minimum of 3 feet below ground. Internal halyard flagpole with all standard accessories, including revolving truck, gold anodized ball, stainless steel aircraft cable halyard, snap hooks, stainless steel direct drive winch behind locking access door and ground sleeve. Cabling will be set up to hold two flags.

Installation

Follow the manufacturer's recommendations for ground set mounting with an 80 M.P.H. design wind load.

Compensation

The work of furnishing and installing the flagpoles, when completed and accepted, will be paid for at the contract unit price each for 'Flag Pole'.

Such payment will be full compensation for all work covered by this section including, but not limited to, furnishing and installing the flagpole, flash collar, halyard, cleats, flag snaps, and all parts recommended by the manufacturer for a ground-set installation; and all labor, materials and equipment necessary to complete the work.

Payment will be made under:

Flagpole **EA**

17 – FLAGPOLE LIGHT

General

The work covered by this section consists of furnishing and installing 2 in-ground spotlights for each flagpole at locations as shown on the drawings and as directed by the Engineer.

Materials

120 Volt power supply in conduit. Direct Burial fixture with tempered glass lens, watertight seal and rock guard louver. Can be rotated 358 degrees, tilted and adjusted up and down for aiming flexibility. Accommodate up to a 150 watt bulb, with built in thermal protector safeguard against overheating. Photocell control shall be included. Contractor to submit Manufacturer and modal for approval.

Installation

Follow the manufacturer's recommendations for in-ground installation.

Compensation

The work of furnishing and installing the flagpole lighting, when completed and accepted, will be paid for at the contract unit price each for 'Flag Pole Light'.

Such payment will be full compensation for all work covered by this section including, but not limited to, furnishing and installing the flagpole light, and all parts recommended by the manufacturer for a proper ground-set installation; and all labor, materials and equipment necessary to complete the work.

Payment will be made under:

Flag Pole Light..... EA

18 – WASTE CONTAINER

General

Waste container will be furnished and installed on concrete pad in accordance with specifications of Keystone Ridge Designs round 38 gallon “Atlanta” litter receptacle (AT3-38) or equivalent and will be located as shown on the plans or as directed by the Engineer.

Waste container unit will be the product of a manufacturer regularly engaged in the design and manufacture of powder coated steel waste containers. Waste container will be furnished with elevated legs and a dome lid (Keystone Ridge model “D” or equivalent). Powder coating will involve a 2-coat process that provides protection from chipping, cracking, UVA damage and corrosion. Finish color will be "gloss black" dome lid and "gloss black" body. Liner will be black heavy duty commercial grade plastic. Submit six (6) copies of shop drawings or submittal data to Engineer for approval.

Compensation

The work of furnishing and installing the waste containers, when completed and accepted, will be paid for at the contract unit price each for ‘Waste Container’. Such price and payment will be full compensation for the work of furnishing and installing the waste container and dome lid, furnishing the anchoring hardware and all labor, materials, tools, equipment and incidentals necessary to complete the work.

Concrete pad will be paid for as ‘4” Concrete Sidewalk’, see appropriate special provision.

Payment will be made under:

Waste Container..... EA

19 – SEEDING AND MULCHING OF REST AREA LAWN

General

Prepare seedbed, furnish, place and incorporate limestone, fertilizer, and seed; rake, mulch, mow and perform other operations necessary for the permanent establishment of vegetation from seed on areas exposed due to construction operations. Adapt operations to variations in weather or soil conditions as necessary and as directed by the Engineer for the successful establishment and growth of the turf.

Fertilizer, limestone, seed and mulch will meet all applicable requirements of Section 1060 of the Standard Specifications.

Fertilizer - 10-20-20 analysis or equivalent 1-2-2 ratio if approved by Engineer at a rate of 300 pounds per Acre
 Limestone - at a rate of 2600 pounds per Acre
 Seed - Centipede Cultivar approved by Engineer at 10 pounds per Acre

Installation

Remove existing vegetation. Remove all construction debris, concrete, rocks, wood, brick, etc. that will interfere with turf establishment. Loosen soil to a depth of not less than 5 inches. Break up any clods and work top 2 to 3 inches of soil to prepare an acceptable seedbed. Shape and smooth any uneven or rough surfaces. Do not prepare soil when ground is frozen, extremely wet or in an otherwise unfavorable working condition. Fertilizer and Limestone may be applied as part of or after the seedbed preparation. If applied after seedbed has been prepared, rake to thoroughly mix into soil.

Distribute seed uniformly over the seedbed at the required rate of application and immediately rake to cover seed with a layer of soil. Apply mulch in a light but uniform layer that allows some sunlight penetration and air circulation but heavy enough to provide some shade to the soil/seed layer and conserve soil moisture. Hold mulch in place with a binding material specifically manufactured for this purpose if requested by the Engineer.

Maintain areas in a satisfactory condition until the project is completed. Repair any areas that are disturbed with subsequent construction operations to the satisfaction of the Engineer.

Compensation

The work described above will be measured over the surface of the ground and will be paid for at the contract unit price per acre for 'Seeding and Mulching' when properly installed and accepted. Repair of seeded and mulched areas will be incidental to this work and additional compensation will not be made.

Payment will be made under:

Seeding and Mulching of Rest Area Lawn ACRE

20 – SEEDING AND MULCHING OF ROADWAY AND WASTE AND BORROW LOCATIONS

Seeding and Mulching (East)

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, will be as stated below. During periods of overlapping dates, the kind of seed to be used will be determined. All rates are in pounds per acre.

All Roadway Areas

March 1 - August 31		September 1 - February 28	
50#	Tall Fescue	50#	Tall Fescue
10#	Centipede	10#	Centipede
25#	Bermudagrass (hulled)	35#	Bermudagrass (unhulled)
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Waste and Borrow Locations

March 1 - August 31		September 1 - February 28	
75#	Tall Fescue	75#	Tall Fescue
25#	Bermudagrass (hulled)	35#	Bermudagrass (unhulled)
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Note: 50# of Bahiagrass may be substituted for either Centipede or Bermudagrass only upon Engineer's request.

Approved Tall Fescue Cultivars

Adventure	Brookstone	Guardian	Red Coat
Adventure II	Bonanza	Houndog	Renegade
Airlie	Bonanza II	Inferno	Safari
Amigo	Bulldog 51	Jaguar	Shelby
Anthem	Chapel Hill	Jaguar III	Shenandoah
Anthem II	Chesapeake	Kentucky 31	Southern Choice II
Apache	Chieftain	Kitty Hawk	South Paw
Apache II	Coronado	Monarch	Tempo
Arid	Crossfire II	Montauk	Titan
Arid II	Debutante	Mustang	Tomahawk
Arid III	Duster	Olympic	Tacer
Aztec II	Falcon	Pacer	Trailblazer
Barfexas	Falcon III	Pixie	Tribute
Barfexas II	Finelawn	Pyramid	Wolfpack
Barrera	Finelawn I	Quest	Wrangler
Barrington	Finelawn Petite	Rebel	
Bingo	Genesis	Rebel Jr	
Bravo	Grande	Rebel II	

On cut and fill slopes 2:1 or steeper Centipede will be applied at the rate of 5 pounds per acre and add 20# of Sericea Lespedeza from January 1 - December 31.

Fertilizer will be 10-20-20 analysis. Upon written approval of the Engineer, a different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis.

Temporary Seeding

Fertilizer will be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. Sweet Sudan Grass, German Millet or Browntop Millet will be used in summer months and Rye Grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

Fertilizer Topdressing

Fertilizer used for topdressing on all roadway areas except slopes 2:1 and steeper will be 10-20-20 written approval of the Engineer, a different analysis of fertilizer may be used provided grade and will be applied at the rate of 500 pounds per acre. Upon the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 10-20-20 analysis.

Fertilizer used for topdressing on slopes 2:1 and steeper and waste and borrow areas will be 16-8-8 grade and will be applied at the rate of 500 pounds per acre. Upon written approval of the Engineer, a different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis.

Supplemental Seeding

The kinds of seed and proportions will be the same as specified for *Seeding and Mulching*, with the exception that no centipede seed will be used in the seed mix for supplemental seeding. The rate of application for supplemental seeding may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder will be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

Mowing

The minimum mowing height on this project will be 4 inches.

Minimize Removal of Vegetation

The Contractor will minimize removal of vegetation at stream banks and disturbed areas within the project limits as directed.

Stockpile Areas

The Contractor will install and maintain erosion control devices sufficient to contain sediment around any erodible material stockpile areas as directed.

21 – GRAVEL CONSTRUCTION ENTRANCE

Description

This work consists of furnishing, installing, and maintaining and removing any and all material required for the construction of a *Gravel Construction Entrance*.

Materials

Refer to Division 10

Item	Section
Filter Fabric for Drainage, Type 2	1056
Stone for Erosion Control, Class A	1042

Construction Methods

The Contractor will install a Gravel Construction Entrance in accordance with Standard Drawing No. 1607.01 and at locations as directed.

Compensation

Filter Fabric for Drainage will be measured and paid for in accordance with Article 876-4 of the *Standard Specifications*.

Stone for Erosion Control, Class __ will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications*.

Such price and payment will be considered full compensation for all work covered by this section including all materials, construction, maintenance, and removal of Gravel Construction Entrance.

22 - LANDSCAPE METAL EDGING

General

The work covered by this item will consist of furnishing and installing the metal landscape edging in accordance with the dimensions and finishes as shown on the plans, the details, and as described herein.

Landscape Metal edging construction will conform to Col-Met Commercial Grade Metal Edging or equivalent. Metal Edging will be 3/16" (4.8mm) hot rolled low carbon steel

(ASTM-A-36, ASTM-A-283, ASTM-A-569) with a 6” width. Edging will include a minimum of 4 stakes per 10’ length. Stakes will be 16" long. Color will be a black electrostatic powder coated finish resistant to cracking, chipping, corrosion and UVA damage.

Compensation

The work of installing landscape metal edging as shown on the plans or as approved by the Engineer, when completed and accepted, will be paid for at the unit price per linear foot for “Landscape Metal Edging”. Such price and payment will be full compensation for all work covered by this special provision; including but not limited to furnishing all labor, materials, and equipment and any other incidentals necessary or required to complete the work.

Payment will be made under:

Landscape Metal Edging LF

23 - MULCHED PATH

General

The work covered by this item consists of furnishing and installing the mulched path in accordance with the dimensions and finishes as shown on the plans, the details, and as described herein.

Materials

Mulch will be Double Shredded Hardwood Bark. Aggregate will be #57 Stone. Submit sample of both for approval prior to placement.

Installation

Stake perimeter of path for approval by the Engineer. Remove all existing vegetation and treat area with Post-Emergent Herbicidal Treatment. Compact sub-grade and install metal edging as described in special provision 'Landscape Metal Edging' and as shown on the details. Lay and compact stone to a finished depth of 4"; install double shredded hardwood bark to a finished depth of 4". Rake and compact to create a continuous smooth finished grade.

Compensation

The work of furnishing and installing the stone for the path, when completed and accepted, will be paid for at the contract unit price per ton for ‘#57 Stone’. Measurement will be made by truck weight on certified scales or other certified weighing devices as approved by the Engineer.

The work of furnishing and installing mulch for path when completed and accepted, will be paid for at the contract unit price per cubic yard for ‘Mulch for Planting’.

If furnished in bags, measurement will be as indicated on package label and multiplied by the number of sealed full bags that are utilized on the path. If mulch is furnished in trucks, each truck will be measured by the Engineer and will bear a legible identification mark indicating its capacity. Each truck will be loaded to its measured capacity at the time it arrives at the site. Such price and payment will be full compensation for all work covered by this special provision; including but not limited to furnishing all labor, materials, and equipment and any other incidentals necessary or required to complete the work.

Payment will be made under:

#57 Stone **TON**
Mulch for Planting **CY**

24 - BOULDERS

General

This special provision consists of furnishing and installing the boulders as shown on the plans and details and as described herein.

Materials

Boulders will be of natural stone. Size, color and shape will be the selection of the Engineer at a source to be approved by the Engineer. A variety of sizes will be utilized and will vary from approximately 350 pounds to 2500 pounds. Backfill will be as specified for landscape grading.

Installation

Placement of boulders will be at the direction of the Engineer and will require the cooperative effort of the contractor to maneuver into the desired position. Excavate and place boulder so that it sits embedded in the plant bed and not on top. Backfill around boulder with plant bed media.

Compensation

'Boulders' will be paid for in tons, measured by weighing in truck or on palette on certified platform scales or other certified weighing devices that have been delivered to site, installed and accepted.

The work of furnishing and installing boulders, when completed and accepted, will be paid for at the contract unit price per ton for 'Boulders'.

Such price and payment will be full compensation for all work covered by this special provision; including but not limited to furnishing all labor, materials, equipment and any other incidentals necessary or required to complete the work.

Payment will be made under:

Boulders **Ton**

25 - PLANT BED**General**

Plant bed will be prepared in accordance with all applicable parts of Standard Specifications Section 1060 - Landscape Development Materials and Section 1670 - Planting.

Where plant beds include existing trees, ground disturbing activities and tilling that occurs within the drip line of the existing tree(s) will be done with utmost care.

Mulch for Planting

Mulch for planting will be double shredded hardwood bark.

Herbicides

Post-emergence herbicidal treatment and Pre-emergent herbicidal treatment will consist of the following products and rates unless otherwise approved by the Engineer.

(See chart on next page)

Herbicide Chart

Herbicide Brand Name	Common Name	Formulation	Oral LD/50 (MG/KG)	Amount of Formulation per Acre	Lbs. of Active Ingredient per Acre	Adjuvants	Remarks
Stump Control							
<i>Garlon</i>	Triclopyr	3 S	2,574	1 gal./1 gal. of water	3 #	1 - 2 qts. Surfactant/ acre	Paint or spray, add bullseye dye.
Pre-emergent							
<i>Pennant + Endurance + Gallery</i>	Metolachlor + Prodiamine + Isoxaben	Liquid (5G) + 65 WDG + 75 DF	3750 + >5,000 + 5,000	2 - 3 pts. (40#) + 2# + 1#	1.95 - 2.93# (2#) + 20 lbs. + 1#	NA	Spring application; use tank agitation when mixing.
Post-emergent							
<i>Roundup</i>	Glyphosate	4 S	>5,000	2 - 4 qts.	2 - 4 #	2 - 4 qts. Surfactant/ 100 gals.	NA