



SM No. CBWO505251003

PROPOSAL AND CONTRACT DOCUMENTS

FOR THE CONSTRUCTION OF
(EXEMPT)

7

Work necessary for alterations and additions to District Five Materials Lab / Auditorium, known as State Project No. BWO-5052-51(003) / 501501301, in the County of Newton, State of Mississippi
Project Completion: April 30, 2008

NOTICE

**BIDDERS MUST PURCHASE A BOUND PROPOSAL
FROM MDOT CONTRACT ADMINISTRATION DIVISION
TO BID ON THIS PROJECT.**

Electronic addendum updates will be posted on www.goMDOT.com

**SECTION 900
OF THE CURRENT
(2004) STANDARD SPECIFICATIONS
FOR ROAD AND BRIDGE CONSTRUCTION
MISSISSIPPI DEPARTMENT OF TRANSPORTATION
JACKSON, MISSISSIPPI**

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

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PROJECT: **ALTERATIONS & ADDITIONS TO DISTRICT FIVE
MATERIALS LAB / AUDITORIUM IN NEWTON
NEWTON COUNTY, MISSISSIPPI**

PROJECT NUMBER: **BWO-5052-51(003) 501501**

DATE: **JANUARY 8, 2007**

DESCRIPTION: This Work shall consist of minor site work and all construction work necessary for Alterations and Additions to Materials Lab / Auditorium for District Five in Newton, Newton County, Mississippi, in accordance with these Specifications and conforming to the Drawings.

It is the intention of these Specifications to provide the necessary items and instruction for a complete building including all code compliance. Omission of items or instruction necessary or considered standard good practice for the proper installation and construction of the building shall not relieve the Contractor of furnishing and installing such items and conforming to the building codes having jurisdiction.

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MISSISSIPPI DEPARTMENT OF TRANSPORTATION

ADVERTISEMENT FOR BIDS

DOCUMENT 00100

Sealed bids will be received by the Mississippi Transportation Commission in the Office of the Contract Administration Engineer, Mississippi Department of Transportation Office Building, Jackson, Mississippi, until 9:30 o'clock A.M., Tuesday, February 27, 2007. Thereafter bids will be received in the First Floor Auditorium of the Mississippi Department of Transportation Office Building, Jackson, Mississippi, until 10:00 o'clock A.M., Tuesday, February 27, 2007, and shortly thereafter publicly opened for

Construction necessary to build Alterations and Additions to District Five Materials Lab / Auditorium in Newton, Newton County, Mississippi, known as Project No. BWO-5052-51(003) 501501

The attention of bidders is directed to the Contract Provisions governing selection and employment of labor. Minimum wage rates have been predetermined by the Secretary of Labor and are subject to Public Law 87-581, Work Hours Act of 1962, as set forth in the Contract Provisions.

The Mississippi Department of Transportation hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex, religion or national origin in consideration for an award.

Drawings and Specifications are on file in the offices of the Mississippi Department of Transportation at Newton and Jackson.

Bid or specimen proposals must be acquired from the Contract Administration Engineer Division, First Floor of Mississippi Department of Transportation Office Building, Telephone (601) 359-7744. These proposals are available at a cost of Ten Dollars (\$10.00) per proposal.

Plans may be acquired on a cost per sheet basis from MDOT Plans Print Shop, Room 1100, Administration Building, 401 North West Street, Jackson, Mississippi 39201, Telephone (601) 359-7460, FAX (601) 359-7461, E-mail plans@mdot.state.ms.us.

Bid Bond, signed or countersigned by a Mississippi Resident Agent, with Power of Attorney attached or on file with the Contract Administration Engineer of the Department, a Cashier's check or Certified Check for five (5%) percent of bid, payable to STATE OF MISSISSIPPI, must accompany each proposal.

The attention of bidders is directed to the provisions of Document 00200 - Instructions to Bidders pertaining to irregular proposals and rejection of bids.

(SPWP)

LARRY L. "BUTCH" BROWN
EXECUTIVE DIRECTOR

END OF DOCUMENT
00100-1

MDOT – 5th District – Newton

Advertisement for Bids

INSTRUCTIONS TO BIDDERS

DOCUMENT 00200

Part 1 GENERAL

- 1.01 **QUESTIONS:** General questions should be directed to the Project Engineer. Should a Bidder find Discrepancies in or omissions from the Drawings or Project Manual, or be in doubt as to their meaning, the Bidder should immediately notify the Project Engineer. The Contract Administration Engineer will send the Project Engineer's written instruction(s) or interpretation(s) to all known holders of the Documents. Neither the Owner, nor the Project Engineer, will be responsible for any oral instruction or interpretation.
- 1.02 **BIDDER'S QUALIFICATIONS:**
- A. **Certificate of Responsibility:** The Mississippi State Board of Contractors is responsible for Issuing Certificates of Responsibility to Contractors. To be awarded a Contract for public work, Sections 31-3-15 and 31-3-21 of the Mississippi Code 1972, Annotated requires a Contractor to have a current Certificate of Responsibility at bid time and during the entire length of the job. The Certificate of Responsibility number issued becomes a significant item in all public bidding.
 - B. **Bid Under \$50,000:** If a Bidder submits a bid not exceeding \$50,000, no Certificate of Responsibility number is required; however, a notation stating the bid does not exceed \$50,000 must appear on the face of the envelope, or a Certificate of Responsibility number.
 - C. **Bid Over \$50,000:** Each Bidder submitting a bid in excess of \$50,000 must show its Certificate of Responsibility number on the bid and on the face of the envelope containing the bid.
 - D. **Joint Venture Bid:** When multiple Contractors submit a joint venture bid in excess of \$50,000, a joint venture Certificate of Responsibility number must be shown on the bid and on the face of the envelope containing the bid. If the Multiple-Contractor joint venture has no joint venture Certificate of Responsibility number, each of the Contractors participating in the bid must indicate their individual Certificate of Responsibility numbers on the bid and on the face of the envelope.
- 1.03 **NON-RESIDENT BIDDER:** When a non-resident Bidder (a Contractor whose principal place of Business is outside the State of Mississippi) submits a bid for a Mississippi public works project, one of the following is required and shall be submitted with the Proposal Form:
- A. **Copy of Law:** If the non-resident Bidder's state has a resident Bidder preference law, a copy of that law shall be submitted with the Proposal Form.
 - B. **Statement:** If the state has no such law then a statement indicating the State of (Name of State) has no resident Contractor preference law shall be submitted with the Proposal Form.
- 1.04 **DISQUALIFICATION OF BIDDER:** A Bidder may be disqualified for having defaulted on a previous Contract.

- 1.05 **CONDITIONS OF WORK:** Each Bidder must fully inform himself of all conditions relating to the construction of the Project and employment of labor thereon. Failure to do so will not relieve a successful Bidder of obligations to furnish all material and labor necessary to carry out the provisions of the Contract. Insofar as possible, the Bidder must employ methods, or means, which will not cause interruption of, or interference with, the work of any other Bidder or Contractor.
- 1.06 **EXAMINATION OF SITE:** All Bidders, including the general Contractor and Subcontractors shall visit the building site, compare the Drawings and Project Manual (Proposal) with any work in place and informed of all conditions. Failure to visit the site will in no way relieve the successful Bidder from furnishing any materials or performing any work required to complete Work in accordance with Drawings and Project Manual (Proposal) without additional cost to the Owner.
- 1.07 **LAWS AND REGULATIONS:** The Bidder's attention is directed to the fact that all applicable Mississippi state laws, rules and regulations of all authorities having jurisdiction over construction of the Project apply to the Contract.
- 1.08 **OBLIGATION OF BIDDER:** At the bid opening, each Bidder will be presumed to have inspected the site, read and become thoroughly familiar with the Drawings and the Project Manual (Proposal) including all addenda.
- 1.09 **BID DOCUMENT:** The amount for Bid Document (Proposal) is indicated in the advertisement for Bids. Selected plan rooms will be issued one set of documents without charge.

Part 2 PROPOSAL FORM

- 2.01 **METHOD OF BIDDING:** Lump sum, single bids received on a general contract will include general, mechanical and electrical construction and all work shown on Drawings or specified in the Project Manual (Proposal).
- 2.02 **PROPOSAL FORMS:** The Bidder shall make all proposals on forms provided and shall fill all applicable blank spaces without interlineation or alteration and must not contain recapitulation of the work to be done. No oral or telegraphic proposals will be considered.
- 2.03 **TIME OF COMPLETION:** The Bidder shall agree to commence work on, or before a date specified in a written **Notice to Proceed** and fully complete the Project within the calendar days indicated on the Proposal Form.
- 2.04 **SUBSTITUTIONS:** No substitutions, qualifications or redefining of the Specification requirements are allowed to be marked on the Proposal Form, unless specifically required by the Bid Documents. Refer to Section 01630 entitled *Product Options and Substitution Procedures* which covers procedures after the award of Contract.
- 2.05 **ADDENDA:** Any addenda to the Drawings or Project Manual issued before or during the time of bidding shall be included in the proposal and become a part of the Contract. The Proposal Form will have ample space to indicate the receipt of addenda.

2.06 BIDDER IDENTIFICATION

- A. **Signature:** The Proposal Form shall be signed, by any individual authorized to enter into a binding agreement for the Business making the bid proposal.
- B. **Name of Business:** The name appearing on the Proposal Form should be the same as the name appearing in the current Mississippi State Board of Contractors Roster.
- C. **Legal Address:** The address appearing on the Proposal Form should be the same address appearing in the current Mississippi State Board of Contractors Roster.
- D. **Certificate of Responsibility Number(s):** The Certificate of Responsibility Number(s) appearing on the Proposal Form should be the same number appearing in the current Mississippi State Board of Contractors Roster.

2.07 BID SECURITY: The Bid Security shall be in the form of a Bid Bond, or a Certified Check:

- A. **Bid Bond:** The Bidder may submit a Bid Bond by a Surety licensed in Mississippi in the amount of five percent (5%) of the base bid. The Bidder, the Surety and a Mississippi resident agent shall duly execute the Bid Bond. (No standard form is required for the Bid Bond.)
- B. **Certified Check:** The Bidder may submit a certified check made out to the STATE OF MISSISSIPPI in the amount of five percent (5%) of the base bid. All checks received from Bidders will be returned upon request, unless a Bidder is one (1) of the three (3) apparent low Bidders. The three (3) apparent low Bidder's checks will be held for forty-five (45) days, unless a Contract is awarded and executed in less time.

2.08 POWER OF ATTORNEY: Each bid security must be accompanied by an appropriate Power of attorney.

Part 3 SUBMITTING THE PROPOSAL FORM

3.01 SUBMITTAL: This Proposal, which includes the Bid Forms and Specifications, must have all applicable parts completely filled out and delivered in its entirety to the address indicated on the Advertisement for Bids prior to the time and date stated.

- A. **DO NOT** remove any part of the Contract Documents (Exception – An addendum requires substitution of second sheet of Document 00400).
- B. Failure to complete all of the applicable requirements may be cause for the Proposal to be considered irregular.
- C. **A stripped Proposal that is not re-assembled in its correct order is considered as an irregular bid and will be rejected.**
- D. The Proposal shall be submitted and sealed in the opaque envelope provided and mailed or hand-delivered.

If the Bid is mailed, the bid envelope shall be placed inside a second envelope to prevent inadvertent premature opening of the Proposal. The second mailing envelope shall have the notations "**SEALED BID ENCLOSED**" on the face thereof.

- 3.02 **MODIFICATION TO BID:** A Bidder may not modify the bid prior to the scheduled closing time indicated in the Advertisement for Bids in the following manner:
- A. **Notification on Envelope:** A modification may not be written on the outside of the sealed envelope containing the bid.
 - B. **Facsimile:** A facsimile (fax) will not be acceptable.
- 3.03 **WITHDRAWAL OF BID:** Any bid may be withdrawn prior to the scheduled time for opening of bids. However, bids may not be withdrawn until sixty (60) days after bid opening.

Part 4 BID OPENING AND AWARD OF CONTRACT

- 4.01 **OPENING OF BIDS:** Bids will be publicly opened shortly after the time stated in the advertisement for Bids. Bidder representatives are invited; however, attendance is not mandatory.
- 4.02 **IRREGULARITIES:** The omission of any information requested on the Proposal Form may be considered as an informality, or irregularity, by the awarding public body when in their opinion the omitted information does not alter the amounts contained in the submitted bid proposal, or place other Bidders at a disadvantage.
- 4.03 **PROTEST:** Any protest must be delivered in writing to the Owner within twenty-four (24) hours after the bid opening.
- 4.04 **ERRORS:** Any claim of error and request for release from bid must be delivered in writing to the Owner within twenty-four (24) hours after the bid opening. The Bidder shall provide sufficient documentation with the written request clearly proving an error was made.
- 4.05 **AWARD OF CONTRACT:** The Owner reserves the right to reject any, or all bids. A Contract will be awarded on the basis of the low base bid, or low combination of base bid and those alternates selected by the Owner in any order determined to be in the best interest of the Mississippi Transportation Commission and which produces a total within available funds.
- 4.06 **FAILURE TO ENTER INTO A CONTRACT:** The Bidder shall forfeit the Bid Security to the Owner as liquidated damages for failure, or refusal, to execute and deliver the Contract, Bond and Certificate of Insurance within the required ten (10) days after notice of the acceptance of the bid.
- 4.07 **SECURITY FOR FAITHFUL PERFORMANCE:** Simultaneously, with delivery of the executed Contract, the Contractor shall furnish a Surety Bond, or Bonds, as security for faithful performance, the payment of all persons performing labor on the project and furnishing materials in connection with this Contract. The Surety on such Bond or Bonds shall be a duly authorized surety company satisfactory to the Owner and meeting all of the following requirements:
- A. Licensed at the time of award by the State of Mississippi's Commissioner of Insurance for the purpose of providing surety.
 - B. Listed at the time of award in the Department of the Treasury's Federal Register as a company holding certificates of authority as acceptable sureties on Federal Bonds, commonly referred to as the Treasury List.

- C. All Bonds shall be executed on the form provided in the Project Manual under Document 00600 entitled *Contract Bond*.
- D. A Mississippi resident agent with the name and address typed, or lettered legibly shall countersign all Bonds.
- E. All Bonds must be accompanied by an appropriate Power of Attorney.

Part 5 BIDDER'S CHECKLIST

5.01 PROPOSAL FORM

Base Bid

- ☐ Write in the amount of the base bid in numbers.

Addenda

- ☐ Acknowledge the receipt of each addendum by substituting the second sheet of Document 00400-2 with the substituted sheet listing the addendum number and date. Properly complete, sign and add the substituted sheet 00400-2 to the Proposal.

Certification Form

- ☐ Certification (regarding Non-Collusion, Debarment and Suspension, etc.) Form has been executed in duplicate.

Acceptance

- ☐ Proposal is signed by authorized person.
- ☐ Name of Business as it appears in the current Mississippi State Board of Contractors Roster.
- ☐ Legal address of the business listed above.
- ☐ Correct Certificate of Responsibility Number(s) as it appears in the current Mississippi State Board of Contractors Roster.

Certificate of Responsibility Number(s)

- ☐ Base Bid is under \$50,000 and no number is required.
- ☐ Base Bid is under \$50,000 and the statement "bid does not exceed \$50,000" is on the outside of the sealed envelope.
- ☐ Base Bid is over \$50,000 and number is required.
- ☐ Joint Venture and *joint venture* number is required.
- Or
- ☐ Joint Venture participants' numbers are required.

5.02 BID SECURITY

- ☐ Included Bid Bond.
- Or
- ☐ Included Certified Check payable to the STATE OF MISSISSIPPI.

5.03 POWER OF ATTORNEY

- ☐ Included Power of Attorney

5.04 NON-RESIDENT BIDDER

- ☐ Attached a Copy of Non-Resident Bidder's Preference Law
- Or
- ☐ Attached a Statement

Part 6 BIDDER'S CONTACT LIST

6.01 **PROPOSAL AND CONTRACT DOCUMENTS:** If the Bidder has any questions pertaining to the following specific areas of the Documents, please direct them to the following individuals:

A. Additional Proposals	Emma Taylor – Contract Administration	(601) 359-7744
B. Additional Prints	Clint Wells – MDOT Plans Print Shop	(601) 359-7460
C. Bid Forms	B.B. House – Contract Admin. Engineer	(601) 359-7730
D. Specifications	Jim Vinson -- Architectural Services	(601) 359-7292
E. Drawings	Jim Vinson -- Architectural Services	(601) 359-7292

Bidder's List & Specimen Proposals are available online at:

<http://www.gomdot.com/business/bids/adv/default.htm>

END OF DOCUMENT

**NOTICE TO BIDDERS
DOCUMENT 00300**

Part 1 GENERAL

- 1.01 **WORK IN PROXIMITY OF HIGH VOLTAGE POWER LINES:** Bidders are hereby advised of Section 45-15-1, et seq., Mississippi Code of 1972, regarding the performance of work in the proximity of high voltage overhead power lines. It is the Contractor's responsibility to comply with those statutory requirements.
- 1.02 **AGENCY, COMMISSION AND OFFICER NAME CHANGES**
- A. Whenever the term "Mississippi State Highway Department", the word "Department", or variations thereof meaning the Mississippi State Highway Department appears in the plans, proposal, contract documents, and specifications for highway construction projects, in accordance with the laws of the State of Mississippi, it shall mean the "Mississippi Department of Transportation.
 - B. Whenever the term "Mississippi State Highway Commission", the word "Commission", or variations thereof meaning the Mississippi State Highway Commission appears in the plans, proposal, contract documents, and specifications for highway construction projects, in accordance with the laws of the State of Mississippi, it shall mean the "Mississippi Transportation Commission".
 - C. Whenever the term "Director", or variations thereof meaning the Chief Administrative Officer of the State Highway Department appears in the plans, proposal, contract documents, and specifications for highway construction projects, in accordance with the laws of the State of Mississippi, it shall mean the "Executive Director of the Mississippi Department of Transportation."
- 1.03 **PLANT PEST QUARANTINES INFORMATION:** AT the request of the U. S. Department of Agriculture, Plant Pest Control Information Concerning Domestic Quarantines is cited as follows:
- A. The entire state of Mississippi has been quarantined for the Imported Fire Ants. Soil and soil-moving equipment operating in the state will be subject to plant quarantine regulations. In general, these regulations provide for cleaning soil from equipment before it is moved from the state. Complete information may be secured from the State of Mississippi Department of Agriculture and commerce, Bureau of Plant Industry, P.O. Box 5207, Mississippi State, Mississippi 39762-5207 – Telephone 325-3390.

IMPORTED FIRE AN QUARANTINES

THE FOLLOWING REGULATED ARTICLES REQUIRE A CERTIFICATE OR PERMIT FOR MOVEMENT:

- 1. Soil, separately or with other things, except soil samples shipped to approved laboratories*. Potting soil is exempt, if commercially prepared, packaged and shipped in original containers.
- 2. Plants with roots with soil attached, except houseplants maintained indoors and not for sale.
- 3. Grass sod.
- 4. Baled hay and straw that have been stored in contact with the soil.
- 5. Used soil-moving equipment.

6. Any other products, articles, or means of conveyance of any character whatsoever not covered by the above, when it is determined by an inspector that they present a hazard of spread of the imported fire ant and the person in possession thereof has been so notified.

* Information as to designated laboratories, facilities, gins, oil mills, and processing plants may be obtained from an inspector.

Consult your State or Federal plant protection Inspector or your county agent for assistance regarding exact areas under regulation and requirements for moving regulated articles. For detailed information see 7 CFR 301.81 for quarantine and regulations.

1.04 **FEDERAL BRIDGE**

- A. Bidders are hereby advised that Federal Highway Administration Publication No. FHWA-MC-94-007, **BRIDGE FORMULA WEIGHTS**, dated January 1994, is made a part of this contract when applicable.

Prior to the preconstruction conference, the Contractor shall advise the Engineer, in writing, what materials, if any, will be delivered to the jobsite via Interstate route(s).

Copies of the **BRIDGE FORMULA WEIGHTS** publication may be obtained by contacting:

Federal Highway Administration
400 7th Street, SW
Washington, DC 20590
(202) 366-2212
or

<http://ops.fhwa.dot.gov/freight/regulate/sw/>

- 1.05 **FUEL TAX APPLICABILITY TO BIDDERS AND CONTRACTORS:** Bidders are hereby advised that the Mississippi Code of 1972, section 27-55-301 et seq. requires the use of taxed diesel fuel used in performing contracts for construction, reconstruction, maintenance, or repair where such contracts are entered into with the State of Mississippi, any agency, department, institution, or political subdivision thereof. Section 27-55-313 reads as follows:

- A. A tax at the rate of Eighteen Cents (18¢) per gallon until the date specified in Section 65-39-35, and Fourteen and Three-fourths Cents (14.75¢) per gallon thereafter, is levied upon any delivering other motor fuel to a retail dealer, user or any other person for use in propelling motor vehicles on the highways of this state and/or for the privilege of engaging in the business of selling and delivering other motor fuel to any other person who purchases or uses other motor fuel in performing contracts for construction, reconstruction, maintenance or repairs, where such contracts are entered into with the State of Mississippi, any political subdivision of the State of Mississippi, or any department, agency or institution of the State of Mississippi or any political subdivision thereof.
- B. A tax at the rate described in this section is hereby levied upon any person who purchases, receives or acquires any other motor fuel upon which the tax has not been paid when such other motor fuel is used for any taxable purpose as set forth in this article. A tax at the rate described in this section is hereby levied upon any retailer who purchases, receives, or acquires any other motor fuel upon which the tax has not been paid when such other motor fuel is sold for use or used for any taxable purpose as set forth in this article.

- C. The commission may adopt rules and regulations providing for the issuance of permits to persons performing contracts as hereinabove provided, allowing or requiring said persons to purchase other motor fuel for use in performing said contracts without the payment to the distributor of the tax imposed hereunder, and providing for such persons to report and pay such tax directly to the commission in instances where the commission determines that such payment will facilitate and expedite the collection of the tax which may be due on such purchases by the permittee. The distributor is relieved of collecting and remitting the taxes specified hereunder, when furnished with a copy of said permit, and the person holding the permit shall become liable for such taxes instead of the seller, and the full enforcement provisions of this article shall apply in the collection of the tax from the permittee. The commission may require said person to execute and file with the commission a good and valid bond in a surety company authorized to do business in this state, or with sufficient sureties to be approved by the commission, conditioned that all taxes which may accrue to the State of Mississippi under the provisions of this chapter will be paid when due. Provided further, the commission may accept a bond filed under the provision of Section 27-65-21, when such bond is conditioned upon the payment of taxes hereunder.
- D. Any person who shall, while not licensed as a distributor of other motor fuel or retail dealer, sell or deliver to other persons any other motor fuel upon which the tax levied by this article has not been paid shall be liable for the tax and penalties imposed by this article if the person selling or delivering such fuel knows or has reason to know that it will be used or sold for a taxable purpose.
- E. A retail dealer may, with the approval of the commission, sell or dispense tax free other motor fuel. Said retailer shall comply with all rules and regulations pertaining to retailers selling or dispensing tax free other motor fuel. The commission may require said retailer to execute and file with the commission a good and valid bond, in a surety company authorized to do business in the state, conditioned that all taxes which may accrue to the State of Mississippi under the provisions of this chapter will be paid when due. Storage tanks or pumps located at all such retail dealers' place of business which are used or to be used in storing and dispensing kerosene for lamps, stoves, heaters and domestic purposes shall bear the label "not for highway use" of letters of not less than four (4) inches in height.
- F. When other motor fuel on which the full tax under this section has been paid has been Delivered to a retail dealer for sale or to a consumer for use as motor fuel for operating a motor vehicle upon the highways of this state, the distributor of other motor fuel who made said tax payments and deliveries may pick up and return to his bulk storage facility any portion of such other motor fuel which may be unused and claim credit for the amount of tax paid on the quantity so returned. In order to claim credit for the tax on the quantity of other motor fuel to be so returned, such distributor shall notify the commission of his desire to so return it. Such transaction shall only be made under the supervision of the commission.
- G. When dyed diesel fuel and clear diesel fuel are accidentally mixed and the mixture is converted to nonhighway use diesel fuel, the distributor or other person owning such mixture may claim credit for the highway portion of the tax paid on such mixture. Proof satisfactory to the distributor or other person owning such mixture shall notify the commission immediately after gaining knowledge that such accidental mixture has occurred.

Bidders/Contractors are required to comply with the provisions of said section, and any revisions or amendments thereto, for all work performed under this contract; and be able to substantiate compliance when requested by the Mississippi Department of Transportation or the Mississippi State Tax Commission.

1.06 PROMPT PAYMENT

- A. Bidders are hereby advised that the Prime Contractor must pay their subcontractor(s) for satisfactory performance of their contracts no later than a specific number of days from receipt of payment from the Department. Therefore, Prime Contractors are hereby advised of the following:
1. Within 15 calendar days after receiving payment from the Department for work satisfactorily performed, the Prime Contractor shall make prompt payment to all sub-contractors or material suppliers for all monies due.
 2. Within 15 calendar days after receiving payment from the Department for work satisfactorily completed, the Prime Contractor shall promptly return all retainage monies due to all sub-contractors or material suppliers.
 3. The Engineer will have the authority to suspend the Work wholly or in part and to withhold payments because of the Contractor's failure to make prompt payment within 15 calendar days as required above, or failure to submit the required OCR-484 Form, "Certification of Payments to Subcontractors", which is also designed to comply with prompt payment requirements.

1.07 ALTERATIONS IN BIDDING PROCESS

- A. Bidders are hereby advised that they may either use the traditional method of entering their Bid information by hand on Proposal Document 00400 (Section 905, dated 2/28/01, MDOT – Edited for Building Projects) or may insert printed information obtained from the available Electronic Bid System (EBS).
- B. It is the responsibility of every bidder to check for any addendum or modification to the contract document(s) for which they intend to submit a response. It shall be the bidder's responsibility to be sure they are in receipt of all addenda, pre-bid conference information, and/or questions and answers provided at, or subsequent to, the pre-bid conference, if any are issued.

The Mississippi Transportation Commission assumes no responsibility for defects, irregularities or other problems caused by the use of electronic media. Operation of this electronic media is done at the sole risk of the user.

1.08 CONTRACT TIME

- A. It is anticipated that the Notice to Award will be issued by not later than March 13, 2007, and the date for Notice to Proceed and Beginning of Contract Time will be April 12, 2007.
- B. The calendar date for completion of this Contract shall be April 30, 2008 which date or extended date as provided in Article 8 – TIME shall be the end of Contract Time.
- C. A Construction Schedule as described in Section 01320 of these Specifications will be required.

1.09 **SUBCONTRACTING**

- A. The Bidder is specifically advised that any person, firm or other party to whom it proposes to award a subcontract must be acceptable to the Owner. The total allowable subcontract amount shall not exceed **sixty percent (60%) of the Contract Sum**, excluding the value of any "Specialty Items" listed below:

Specialty Items

Termite Treatment
Plumbing Items
Heating, Ventilating and Air Conditioning Items
Electrical Items

These items are not to be confused with Division 10 – Specialties of the Specifications.

END OF DOCUMENT

**PROPOSAL
DOCUMENT 00400**

(Section 905, dated 2/28/01, MDOT – Edited for Building Projects)

Date _____

Mississippi Transportation Commission
Jackson, Mississippi

Sirs: The following proposal is made on behalf of _____
(Company Name)

of _____
(Company Street Address)

(Company City, State, & Zip Code)

For constructing the following designated project(s) within the time(s) hereinafter specified.

The Contract Documents are composed of the Project Manual (Proposal) and the Drawings on file in the offices of the Mississippi Department of Transportation, Jackson, Mississippi.

I (We) certify that I (we) possess a copy of said Contract Documents.

Evidence of my (our) authority to submit the Proposal is hereby furnished. The proposal is made without collusion on the part of any person, firm or corporation. I (We) certify that I (we) have carefully examined the Contract Documents, including the Instructions and Notice(s) to Bidders, herein, and have personally examined the site of the work. On the basis of the Contract Documents, Instructions and Notice(s) to Bidders, I (we) propose to furnish all necessary machinery, tools, apparatus and other means of construction and do all the work and furnish all the materials in the manner specified.

Attached hereto is a certified check, cashier's check or Proposal Guaranty Bond in the amount as required in the Advertisement (or, by law).

I (We) further propose to perform all "force account or extra work" that may be required of me (us) on the basis provided in the Contract Documents and to give such work my (our) personal attention in order to see that it is economically performed.

I (We) further propose to execute the attached Contract Agreement (Document 00500) as soon as the work is awarded to me (us), and to begin and complete the work within the time limit(s) provided for in the Contract Documents and Advertisement. I (We) also propose to execute the attached Contract Bond (Section 00600) in an amount not less than one hundred (100) percent of the total of my (our) part, but also to guarantee the excellence of both workmanship and materials until the work is finally accepted.

I (We) enclose a certified check, cashier's check, or bid bond for **five percent (5%) of total bid** and hereby agree that in case of my (our) failure to execute the contract and furnish bond within Ten (10) days after notice of award, the amount of this check (bid bond) will be forfeited to the State of Mississippi as liquidated damages arising out of my (our) failure to execute the contract as proposed. It is understood that in case I am (we are) not awarded the work, the check will be returned as provided in the Specifications.

Bidder acknowledges receipt of and has added to and made a part of the proposal and contract documents the following addendum (addenda):

Respectfully submitted, _____
(Contractor)

BY _____
(Signature)

TITLE _____

ADDRESS _____
(Street Address)

ADDRESS _____
(City, State & Zip Code)

Date _____, 20

(To be filled in if a corporation)

Our corporation is chartered under the Laws of the State of _____ and the names, titles and business addresses of the executives are as follows:

(President) (Address)

(Secretary) (Address)

(Treasurer) (Address)

The following is my (our) itemized proposal.

WORK NECESSARY FOR ALTERATIONS & ADDITIONS TO DISTRICT FIVE MATERIALS LAB / AUDITORIUM KNOWN AS PROJECT BWO-5052-51(003) 501501, IN THE COUNTY OF NEWTON, STATE OF MISSISSIPPI.

I (We) agree to complete the entire Project within the specified Contract Time.

*****SPECIAL NOTICE TO BIDDERS*****

BIDS WILL NOT BE CONSIDERED UNLESS ITEM TOTALS ARE ENTERED AND THE BID CERTIFICATE (DOCUMENT 00604) IS SIGNED

REF. NO.	PAY ITEM NO.	UNIT with	DESCRIPTION	UNIT PRICE		ITEM TOTAL	
		Approx. Quantity		Dollar	Cents	Dollar	Cents

(10) 1540-A001 lump sum Alterations & Additions to District Five
Materials Lab / Auditorium in Newton
Newton County, Mississippi.....\$ _____

SUB-TOTAL\$ _____

TOTAL BID.....\$ _____

*****SIGNATURE STATEMENT*****

BIDDER ACKNOWLEDGES THAT HE / SHE HAS CHECKED ALL ITEMS IN THIS PROPOSAL FOR ACCURACY AND CERTIFIED THAT THE FIGURES SHOWN THEREIN CONSTITUTE THEIR OFFICIAL BID.

BIDDER'S SIGNATURE

END OF DOCUMENT

**AGREEMENT
DOCUMENT 00500**

(Section 902, dated 2/28/01, MDOT – Edited for Building Projects)

CONTRACT FOR

Project No. BWO-5052-51(003) 501501
Alterations and Additions to
District Five Materials Lab / Auditorium in Newton

LOCATED IN THE COUNTY OF
STATE OF MISSISSIPPI,
COUNTY OF HINDS

NEWTON

This Contract entered into by and between the Mississippi Transportation Commission on one hand, and the undersigned Contractor, on the other witnesseth;

That, in consideration of the payment by the Mississippi Transportation Commission of the prices set out in the Proposal hereto attached, to the undersigned Contractor, such payment to be made in the manner and at the time of times specified in the Contract Documents, the undersigned Contractor hereby agrees to accept the prices stated in the Proposal in full compensation for the furnishing of all materials and equipment and the executing of all the Work contemplated in this Contract.

It is understood and agreed that the advertising according to law, the Contract Documents, are hereby made a part of this Contract by specific reference thereto and with like effect as if each and all of said instruments had been set out fully herein in words and figures.

It is further agreed that for the same consideration the undersigned Contractor shall be responsible for all loss or damage arising out of the nature of the Work aforesaid; or from the action of the elements and unforeseen obstructions or difficulties which may be encountered in the prosecution of the same and for all risks of every description connected with the Work, exceptions being those specifically set out in the Contract; and for faithfully completing the whole Work in good and workmanlike manner according to the approved Contract Documents and requirements of the Mississippi Department of Transportation.

It is further agreed that the Work shall be done under the direct supervision and to the complete satisfaction of the Executive Director of the Mississippi Department of Transportation, or his authorized representatives, and when Federal Funds are involved subject to inspection at all times and approval by the Federal Highway Administration, or its agents as the case may be, or the agents of any other Agency whose funds are involved in accordance with those Acts of the Legislature of the State of Mississippi approved by the Governor and such rules and regulations issued pursuant thereto by the Mississippi Transportation Commission and the authorized Federal Agencies.

It is agreed and understood that each and every provision of law and clause required by law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and this Contract shall be read and enforced as though it were included herein, and, if through mere mistake or otherwise any such provision is not inserted, then upon the application of either party hereto. The Contract shall forthwith be physically amended to make such insertion.

The Contractor agrees that he has read each and every clause of this Contract, and fully understands the meaning of same and that he will comply with all the terms, covenants and agreements therein set forth.

Witness our signatures this the _____ day of _____, _____

Contractor(s) Company Name

By _____
(Signature)

MISSISSIPPI TRANSPORTATION COMMISSION

Title _____
Signed and sealed in the presence of:
(Names and address of witnesses)

By _____
Executive Director

Secretary to the Commission

Award authorized by the Mississippi Transportation Commission in session on the ____ day of

_____, _____ Minute Book No. _____, Page No. _____

END OF DOCUMENT

CONTRACT BOND
DOCUMENT 00600

(Section 903, dated 2/28/01, MDOT – Edited for Building Projects)

CONTRACT BOND FOR: Project No. BWO-5052-51(003) 501501
Alterations and Additions to
District Five Materials Lab / Auditorium in Newton

LOCATED IN THE COUNTY OF: NEWTON

STATE OF MISSISSIPPI,
COUNTY OF HINDS

Know all men by these presents: that we, _____

_____, Principal, a _____

residing at _____ in the State of _____

and _____

residing at _____ in the State of _____

authorized to do business in the State of Mississippi, under the laws thereof, as surety, are held

and firmly bound unto the State of Mississippi in the sum of _____

(\$ _____) Dollars, lawful money of the United States of

America, to be paid to it for which payment well and truly to be made, we bind ourselves, our

heirs, administrators, successors, or assigns jointly and severally by these presents.

Signed and sealed this the _____ day of _____ A.D. _____.

The conditions of this Bond are such, that whereas the said _____

principal, has (have) entered into a Contract with the Mississippi Transportation Commission, bearing the date of _____ day of _____ A.D. _____ hereto annexed, for the construction of certain Project(s) in the State of Mississippi as mentioned in said Contract in accordance with the Contract Documents therefor, on file in the offices of the Mississippi Department of Transportation, Jackson, Mississippi.

Now therefore, if the above bounden _____
_____ in all things shall stand to and abide by and well and truly observe, do keep and perform all and singular the terms, covenants, conditions, guarantees and agreements in said Contract, contained on his (their) part to be observed, done, kept and performed and each of them, at the time and in the manner and form and furnish all of the material and equipment specified in said contract in strict accordance with the terms of said

Contract which said Drawings, Specifications and Special Provisions are included in and form a part of said Contract and shall maintain the said Work contemplated until its final completion and acceptance as specified in the approved Specifications, and save harmless said Mississippi Transportation Commission from any loss or damage arising out of or occasioned by the negligence, wrongful or criminal act, overcharge, fraud, or any other loss or damage whatsoever, on the part of said Principal(s), his (their) agents, servants, or employees in the performance of said Work or in any manner connected therewith, and shall be liable and responsible in a civil action instituted by the State at the instance of the Mississippi Transportation Commission or any officer of the State authorized in such cases, for double any amount in money or property, the State may lose or be overcharged or otherwise defrauded of, by reason of wrongful or criminal act, if any, of the Contractor(s), his (their) agents or employees, and shall promptly pay the said agents, servants and employees and all persons furnishing labor, material, equipment or supplies therefor, including premiums incurred, for Surety Bonds, Liability Insurance, and Workmen's Compensation Insurance; with the additional obligation that such Contractor shall promptly make payment of all taxes, licenses, assessments, contributions, damages, any liquidated damages which may arise prior to any termination of said Principal's Contract, any liquidated damages which may arise after termination of the said Principal's Contract due to default on the part of said Principal, penalties and interest thereon, when and as the same may be due this State, or any county, municipality, board, department, commission or political subdivision: in the course of the performance of said Work and in accordance with Sections 31-5-51 et seq. Mississippi Code of 1972, and other State statutes applicable thereto, and shall carry out to the letter and to the satisfaction of the Executive Director of the Mississippi Department of Transportation, all, each and every one of the stipulations, obligations, conditions, covenants and agreements and terms of said Contract in accordance with the terms thereof and all of the expense and cost and attorney's fee that may be incurred in the enforcement of the performance of said Contract, or in the enforcement of the conditions and obligations of this bond, then this obligation shall be null and void, otherwise to be and remain in full force and virtue.

Witness our signatures and seals this the _____ day of _____ A.D. _____

(Contractors) Principal

(Surety)

By _____
(Signature)

By _____
(Signature) Attorney in Fact

Title _____
(Contractor's Seal)

(Name and address of local (Mississippi) representative
(Surety Seal)

END OF DOCUMENT

NON-COLLUSION CERTIFICATION

DOCUMENT 00602

(Non-Collusion Certification, dated 2/28/01, MDOT – Edited for Building Projects)

(Execute in duplicate)

State of Mississippi

County of _____

I, _____,
(Name of person signing Certification)

individually, and in my capacity as _____
(Title)

_____ do hereby certify under
(Name of Company, Partnership, or Corporation)

penalty of perjury under the laws of the United States and the State of Mississippi that

_____, Bidder
(Name of Company, Partnership, or Corporation)

for Project No. BWO-5052-51(003) 501501 in Newton County, Mississippi, has not either directly or indirectly entered into any agreement, participated in any collusion; or otherwise taken any action in restraint of free competitive bidding in connection with this contract; nor have any of its corporate officers or principal owners.

Except as noted hereafter, it is further certified that said legal entity and its corporate officers, principal owners, managers, auditors and others in a position of administering federal funds are not currently under suspension, debarment, voluntary exclusion or determination of ineligibility; nor have a debarment pending; nor been suspended, debarred, voluntarily excluded or determined ineligible within the past three years by the Mississippi Transportation Commission, the State of Mississippi, any other State or a federal agency; nor been indicted, convicted or had a civil judgment rendered by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past three years.

Initial here "_____" if exceptions are attached and made a part thereof. Any exceptions shall address to whom it applies, initiating agency and dates of such action.

Note: Exceptions will not necessarily result in denial of award but will be considered in determining bidder responsibility. Providing false information may result in criminal prosecution or administrative sanctions.

All of the foregoing and attachments (when indicated) is true and correct.

Executed on _____
(Date) (Signature)

END OF DOCUMENT

NON-COLLUSION CERTIFICATION

DOCUMENT 00602

(Non-Collusion Certification, dated 2/28/01, MDOT – Edited for Building Projects)

(Execute in duplicate)

State of Mississippi

County of _____

I, _____,
(Name of person signing Certification)

individually, and in my capacity as _____
(Title)

_____ do hereby certify under
(Name of Company, Partnership, or Corporation)

penalty of perjury under the laws of the United States and the State of Mississippi that

_____, Bidder
(Name of Company, Partnership, or Corporation)

for Project No. BWO-5052-51(003) 501501 in Newton County, Mississippi, has not either directly or indirectly entered into any agreement, participated in any collusion; or otherwise taken any action in restraint of free competitive bidding in connection with this contract; nor have any of its corporate officers or principal owners.

Except as noted hereafter, it is further certified that said legal entity and its corporate officers, principal owners, managers, auditors and others in a position of administering federal funds are not currently under suspension, debarment, voluntary exclusion or determination of ineligibility; nor have a debarment pending; nor been suspended, debarred, voluntarily excluded or determined ineligible within the past three years by the Mississippi Transportation Commission, the State of Mississippi, any other State or a federal agency; nor been indicted, convicted or had a civil judgment rendered by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past three years.

Initial here "_____" if exceptions are attached and made a part thereof. Any exceptions shall address to whom it applies, initiating agency and dates of such action.

Note: Exceptions will not necessarily result in denial of award but will be considered in determining bidder responsibility. Providing false information may result in criminal prosecution or administrative sanctions.

All of the foregoing and attachments (when indicated) is true and correct.

Executed on _____
(Date) (Signature)

END OF DOCUMENT

TO: EXECUTIVE DIRECTOR, MISSISSIPPI DEPARTMENT OF TRANSPORTATION
JACKSON, MISSISSIPPI

**CERTIFICATE
DOCUMENT 00604**

(Certificate, dated 2/28/01, MDOT – Edited for Building Projects)

If awarded this Contract, I (we) contemplate that portions of the Contract will be sublet. I (we) certify that those subcontracts which are equal to or in excess of fifty thousand dollars (\$50,000.00) will be in accordance with regulations promulgated and adopted by the Mississippi State Board of Contractors on January 13, 1999.

I (We) agree that this notification of intent DOES NOT constitute APPROVAL of the subcontracts.

NOTE: Insert name and address of subcontractors. (Subcontracts equal to or in excess of fifty thousand dollars (\$50,000.00) ONLY.)

_____ (Individual or Firm)	_____ (Address)
_____ (Individual or Firm)	_____ (Address)
_____ (Individual or Firm)	_____ (Address)
_____ (Individual or Firm)	_____ (Address)

NOTE: Failure to complete the above DOES NOT preclude subsequent subcontracts. Subsequent subcontracts, if any, equal to or in excess of fifty thousand dollars (\$50,000.00) will be in accordance with regulations promulgated and adopted by the Mississippi State Board of Contractors on January 13, 1999.

Contractor _____
(Name of Company, Partnership, or Corporation)

By _____
(Signature)

Title _____

CERTIFICATE MUST BE EXECUTED

END OF DOCUMENT

**HAUL PERMIT FOR BRIDGES
WITH POSTED LOAD LIMITS**

DOCUMENT 00605

(Haul Permit for Bridges, dated 3/17/03, MDOT – Edited for Building Projects)

DATE: _____

PROJECT: BWO-5052-51(003) 501501

PROJECT NAME: ALTERATIONS AND ADDITIONS TO DISTRICT FIVE
MATERIALS LAB / AUDITORIUM IN NEWTON

ADDRESS: 7759 Highway 80W, Newton, Mississippi

COUNTY: NEWTON

A permit is issued to _____
(Company Name & Address)

for transporting loads exceeding the posted limit for any such bridge located on State designated routes within the project termini provided that such transport vehicles comply with all other governing statutory load limits.

This permit is valid on all State designated routes from the point of origin to the point of delivery for materials and equipment utilized in construction of said project and also valid for sub-contractors and vendors upon written permission of the Contractor. The permit is non-transferable and no other haul permit for posted bridges will be issued to other individuals, vendors, or companies for construction of this project.

A copy of this signed permit shall be carried in all vehicles operating under the authority of this permit and also a copy of the Contractor's written permission when the vehicle is other than Contractor owned.

In accordance with State law, the above named Contractor will be liable for damages directly attributable to vehicles operating under this permit.

LARRY L."BUTCH" BROWN
EXECUTIVE DIRECTOR

**GENERAL CONDITIONS
DOCUMENT 00700**

Part 1 GENERAL

1.01 DESCRIPTION.

- A. The American Institute of Architects **AIA DOCUMENT A201-1997**, "General Conditions of the Contract for Construction", 1997, Fifteenth Edition, Articles 1 through 14 inclusive, except as may be added to or modified herein, is hereby made a part of the Contract Documents. For brevity, **AIA DOCUMENT A201-1997** is also referred to in the Contract documents as the "General Conditions".
- B. All persons intending to provide goods or services in connection with this Work are required to read and understand the referenced document prior to proceeding.
- C. See Document 00800-*Supplementary Conditions*. In the event of a conflict between the **AIA DOCUMENT A201-1997**, "General Conditions of the Contract for Construction", 1997, Fifteenth Edition and Document 00800-*Supplementary Conditions*, Document 00800 shall control even if the conflicting provision in the **AIA DOCUMENT A201-1997** "General Conditions of the Contract for Construction" is not expressly deleted or revised by reference in Document 00800.

AIA® Document A201™ – 1997

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address):

BWO-5052-51(003) 501501
ALTERATIONS AND ADDITIONS TO
DISTRICT FIVE MATERIALS LAB / AUDITORIUM
IN NEWTON, NEWTON COUNTY, MISSISSIPPI

THE OWNER:

(Name and address):

THE ARCHITECT:

(Name and address):

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document has been approved and endorsed by The Associated General Contractors of America

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include other documents such as bidding requirements (advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or portions of Addenda relating to bidding requirements).

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Architect and Contractor, (2) between the Owner and a Subcontractor or Sub-subcontractor, (3) between the Owner and Architect or (4) between any persons or entities other than the Owner and Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

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

§ 1.1.4 THE PROJECT

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

§ 1.1.5 THE DRAWINGS

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

§ 1.1.6 THE SPECIFICATIONS

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

§ 1.1.7 THE PROJECT MANUAL

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

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

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

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

§ 1.3 CAPITALIZATION

§ 1.3.1 Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

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

§ 1.5 EXECUTION OF CONTRACT DOCUMENTS

§ 1.5.1 The Contract Documents shall be signed by the Owner and Contractor. If either the Owner or Contractor or both do not sign all the Contract Documents, the Architect shall identify such unsigned Documents upon request.

§ 1.5.2 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 1.6 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.6.1 The Drawings, Specifications and other documents, including those in electronic form, prepared by the Architect and the Architect's consultants are Instruments of Service through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect or the Architect's consultants, and unless otherwise indicated the Architect and the Architect's consultants shall be deemed the authors of them and will retain all common law, statutory and other reserved rights, in addition to the copyrights. All copies of Instruments of Service, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' copyrights or other reserved rights.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 The Owner shall, at the written request of the Contractor, prior to commencement of the Work and thereafter, furnish to the Contractor reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Furnishing of such evidence shall be a condition precedent to commencement or

continuation of the Work. After such evidence has been furnished, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees, including those required under Section 3.7.1, which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 Information or services required of the Owner by the Contract Documents shall be furnished by the Owner with reasonable promptness. Any other information or services relevant to the Contractor's performance of the Work under the Owner's control shall be furnished by the Owner after receipt from the Contractor of a written request for such information or services.

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

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

§ 2.3.1 If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or persistently fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

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

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

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

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

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

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Since the Contract Documents are complementary, before starting each portion of the Work, the Contractor shall carefully study and compare the various Drawings and other Contract Documents relative to that portion of the

Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, any errors, inconsistencies or omissions discovered by the Contractor shall be reported promptly to the Architect as a request for information in such form as the Architect may require.

§ 3.2.2 Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Architect, but it is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents. The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations, but any nonconformity discovered by or made known to the Contractor shall be reported promptly to the Architect.

§ 3.2.3 If the Contractor believes that additional cost or time is involved because of clarifications or instructions issued by the Architect in response to the Contractor's notices or requests for information pursuant to Sections 3.2.1 and 3.2.2, the Contractor shall make Claims as provided in Sections 4.3.6 and 4.3.7. If the Contractor fails to perform the obligations of Sections 3.2.1 and 3.2.2, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. The Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents or for differences between field measurements or conditions and the Contract Documents unless the Contractor recognized such error, inconsistency, omission or difference and knowingly failed to report it to the Architect.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any resulting loss or damage.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

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

§ 3.4.2 The Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order.

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

§ 3.5 WARRANTY

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

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

§ 3.7 PERMITS, FEES AND NOTICES

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

§ 3.7.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities applicable to performance of the Work.

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

§ 3.7.4 If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Architect and Owner, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.8 ALLOWANCES

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

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances;
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner in sufficient time to avoid delay in the Work.

§ 3.9 SUPERINTENDENT

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

communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

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

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

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

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the Architect without action.

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

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

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services which constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

§ 3.13 USE OF SITE

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

§ 3.14 CUTTING AND PATCHING

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

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

§ 3.15 CLEANING UP

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

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

§ 3.16 ACCESS TO WORK

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

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

§ 3.17.1 The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law and to the extent claims, damages, losses or expenses are not covered by Project Management Protective Liability insurance purchased by the Contractor in accordance with Section 11.3, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ADMINISTRATION OF THE CONTRACT

§ 4.1 ARCHITECT

§ 4.1.1 The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a new Architect against whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the former Architect.

§ 4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents, and will be an Owner's representative (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the one-year period for correction of Work described in Section 12.2. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

§ 4.2.2 The Architect, as a representative of the Owner, will visit the site at intervals appropriate to the stage of the Contractor's operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and

deficiencies in the Work, and (3) to determine in general if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect will have authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4.

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

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which interpretations required of the Architect shall be furnished in compliance with this Section 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until 15 days after written request is made for them.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and initial decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.

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

§ 4.3 CLAIMS AND DISPUTES

§ 4.3.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be initiated by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 4.3.2 Time Limits on Claims. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be initiated by written notice to the Architect and the other party.

§ 4.3.3 Continuing Contract Performance. Pending final resolution of a Claim except as otherwise agreed in writing or as provided in Section 9.7.1 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 4.3.4 Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the Architect has given notice of the decision. If the conditions encountered are materially different, the Contract Sum and Contract Time shall be equitably adjusted, but if the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Architect for initial determination, subject to further proceedings pursuant to Section 4.4.

§ 4.3.5 Claims for Additional Cost. If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.6.

§ 4.3.6 If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds, Claim shall be filed in accordance with this Section 4.3.

§ 4.3.7 Claims for Additional Time

§ 4.3.7.1 If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 4.3.7.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 4.3.8 Injury or Damage to Person or Property. If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

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

§ 4.3.10 Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes:

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 4.3.10 shall be deemed to preclude an award of liquidated direct damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 4.4 RESOLUTION OF CLAIMS AND DISPUTES

§ 4.4.1 Decision of Architect. Claims, including those alleging an error or omission by the Architect but excluding those arising under Sections 10.3 through 10.5, shall be referred initially to the Architect for decision. An initial decision by the Architect shall be required as a condition precedent to mediation, arbitration or litigation of all Claims between the Contractor and Owner arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered by the Architect. The Architect will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 4.4.2 The Architect will review Claims and within ten days of the receipt of the Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Architect is unable to resolve the Claim if the Architect lacks sufficient information to evaluate the merits of the Claim or if the Architect concludes that, in the Architect's sole discretion, it would be inappropriate for the Architect to resolve the Claim.

§ 4.4.3 In evaluating Claims, the Architect may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Architect in rendering a decision. The Architect may request the Owner to authorize retention of such persons at the Owner's expense.

§ 4.4.4 If the Architect requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either provide a response on the requested supporting data, advise the Architect when the response or supporting data will be furnished or advise the Architect that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Architect will either reject or approve the Claim in whole or in part.

§ 4.4.5 The Architect will approve or reject Claims by written decision, which shall state the reasons therefor and which shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Architect shall be final and binding on the parties but subject to mediation and arbitration.

§ 4.4.6 When a written decision of the Architect states that (1) the decision is final but subject to mediation and arbitration and (2) a demand for arbitration of a Claim covered by such decision must be made within 30 days after the date on which the party making the demand receives the final written decision, then failure to demand arbitration within said 30 days' period shall result in the Architect's decision becoming final and binding upon the Owner and Contractor. If the Architect renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence, but shall not supersede arbitration proceedings unless the decision is acceptable to all parties concerned.

§ 4.4.7 Upon receipt of a Claim against the Contractor or at any time thereafter, the Architect or the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Architect or the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 4.4.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines prior to resolution of the Claim by the Architect, by mediation or by arbitration.

§ 4.5 MEDIATION

§ 4.5.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Sections 4.3.10, 9.10.4 and 9.10.5 shall, after initial decision by the Architect or 30 days after submission of the Claim to the Architect, be subject to mediation as a condition precedent to arbitration or the institution of legal or equitable proceedings by either party.

§ 4.5.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing with the other party to the Contract and with the American Arbitration Association. The request may be made concurrently with the filing of a demand for arbitration but, in such event, mediation shall proceed in advance of arbitration or legal or equitable proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

§ 4.5.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 4.6 ARBITRATION

§ 4.6.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Sections 4.3.10, 9.10.4 and 9.10.5, shall, after decision by the Architect or 30 days after submission of the Claim to the Architect, be subject to arbitration. Prior to arbitration, the parties shall endeavor to resolve disputes by mediation in accordance with the provisions of Section 4.5.

§ 4.6.2 Claims not resolved by mediation shall be decided by arbitration which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect. The demand for arbitration shall be filed in writing with the other party to the Contract and with the American Arbitration Association, and a copy shall be filed with the Architect.

§ 4.6.3 A demand for arbitration shall be made within the time limits specified in Sections 4.4.6 and 4.6.1 as applicable, and in other cases within a reasonable time after the Claim has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations as determined pursuant to Section 13.7.

§ 4.6.4 Limitation on Consolidation or Joinder. No arbitration arising out of or relating to the Contract shall include, by consolidation or joinder or in any other manner, the Architect, the Architect's employees or consultants, except by written consent containing specific reference to the Agreement and signed by the Architect, Owner, Contractor and any other person or entity sought to be joined. No arbitration shall include, by consolidation or joinder or in any other manner, parties other than the Owner, Contractor, a separate contractor as described in Article 6 and other persons substantially involved in a common question of fact or law whose presence is required if complete relief is to be accorded in arbitration. No person or entity other than the Owner, Contractor or a separate contractor as described in Article 6 shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a Claim not described therein or with a person or entity not named or described therein. The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 4.6.5 Claims and Timely Assertion of Claims. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 4.6.6 Judgment on Final Award. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

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

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

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

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

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not change a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitute.

§ 5.3 SUBCONTRACTUAL RELATIONS

§ 5.3.1 By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner provided that:

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements which the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Section 4.3.

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

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights which apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

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

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

§ 6.2.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a separate contractor because of delays, improperly timed activities or defective construction of the Contractor. The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of delays, improperly timed activities, damage to the Work or defective construction of a separate contractor.

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

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

§ 6.3.1 If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

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

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

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

§ 7.2 CHANGE ORDERS

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

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

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

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

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

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

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

- .1 mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 as provided in Section 7.3.6.

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

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

§ 7.3.6 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Architect on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.6 shall be limited to the following:

- .1 costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.7 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.8 Pending final determination of the total cost of a Construction Change Directive to the Owner, amounts not in dispute for such changes in the Work shall be included in Applications for Payment accompanied by a Change Order indicating the parties' agreement with part or all of such costs. For any portion of such cost that remains in dispute, the Architect will make an interim determination for purposes of monthly certification for payment for those costs. That determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a claim in accordance with Article 4.

§ 7.3.9 When the Owner and Contractor agree with the determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.

§ 7.4 MINOR CHANGES IN THE WORK

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

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

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

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

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

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by the Contract Documents or a notice to proceed given by the Owner, the Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

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

§ 8.3 DELAYS AND EXTENSIONS OF TIME

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

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Section 4.3.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

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

§ 9.2 SCHEDULE OF VALUES

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

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment for operations completed in accordance with the schedule of values. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to

payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.8, such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Such applications may not include requests for payment for portions of the Work for which the Contractor does not intend to pay to a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

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

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

§ 9.4 CERTIFICATES FOR PAYMENT

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

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of:

- .1 defective Work not remedied;

- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or another contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 persistent failure to carry out the Work in accordance with the Contract Documents.

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

§ 9.6 PROGRESS PAYMENTS

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

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

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

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

§ 9.6.5 Payment to material suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

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

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

§ 9.7.1 If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by arbitration, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

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

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.4.1.5 and authorized by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

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

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

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in

the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

§ 10.2 SAFETY OF PERSONS AND PROPERTY

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

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

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

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

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

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

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

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 The Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to verify that it has been rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. The Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up, which adjustments shall be accomplished as provided in Article 7.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) and provided that such damage, loss or expense is not due to the sole negligence of a party seeking indemnity.

§ 10.4 The Owner shall not be responsible under Section 10.3 for materials and substances brought to the site by the Contractor unless such materials or substances were required by the Contract Documents.

§ 10.5 If, without negligence on the part of the Contractor, the Contractor is held liable for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.6 EMERGENCIES

§ 10.6.1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Section 4.3 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
- .2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 claims for damages insured by usual personal injury liability coverage;
- .5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 claims for bodily injury or property damage arising out of completed operations; and
- .8 claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Section 9.10.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

§ 11.2 OWNER'S LIABILITY INSURANCE

§ 11.2.1 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE

§ 11.3.1 Optionally, the Owner may require the Contractor to purchase and maintain Project Management Protective Liability insurance from the Contractor's usual sources as primary coverage for the Owner's, Contractor's and Architect's vicarious liability for construction operations under the Contract. Unless otherwise required by the Contract Documents, the Owner shall reimburse the Contractor by increasing the Contract Sum to pay the cost of purchasing and maintaining such optional insurance coverage, and the Contractor shall not be responsible for purchasing any other liability insurance on behalf of the Owner. The minimum limits of liability purchased with such coverage shall be equal to the aggregate of the limits required for Contractor's Liability Insurance under Sections 11.1.1.2 through 11.1.1.5.

§ 11.3.2 To the extent damages are covered by Project Management Protective Liability insurance, the Owner, Contractor and Architect waive all rights against each other for damages, except such rights as they may have to the proceeds of such insurance. The policy shall provide for such waivers of subrogation by endorsement or otherwise.

§ 11.3.3 The Owner shall not require the Contractor to include the Owner, Architect or other persons or entities as additional insureds on the Contractor's Liability Insurance coverage under Section 11.1.

§ 11.4 PROPERTY INSURANCE

§ 11.4.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.4 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.4.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.4.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance which will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.4.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.4.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.4.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.4.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.4.3 Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.4.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.4.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.4.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.4.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.4. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.4.7 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.4 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.4.8 A loss insured under Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.4.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.4.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or in accordance with an arbitration award in which case the procedure shall be as provided in Section 4.6. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.4.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved as provided in Sections 4.5 and 4.6. The Owner as fiduciary shall, in the case of arbitration, make settlement with insurers in accordance with directions of the arbitrators. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

§ 11.5 PERFORMANCE BOND AND PAYMENT BOND

§ 11.5.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.5.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

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

§ 12.1.2 If a portion of the Work has been covered which the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

§ 12.2.1.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

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

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

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract

Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

§ 13.1.1 The Contract shall be governed by the law of the place where the Project is located.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to an institutional lender providing construction financing for the Project. In such event, the lender shall assume the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

§ 13.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

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

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

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

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

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

§ 13.6 INTEREST

§ 13.6.1 Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 COMMENCEMENT OF STATUTORY LIMITATION PERIOD

§ 13.7.1 As between the Owner and Contractor:

- .1 Before Substantial Completion. As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;
- .2 Between Substantial Completion and Final Certificate for Payment. As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and
- .3 After Final Certificate for Payment. As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any Warranty provided under Section 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Section 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 issuance of an order of a court or other public authority having jurisdiction which requires all Work to be stopped;
- .2 an act of government, such as a declaration of national emergency which requires all Work to be stopped;
- .3 because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 the Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work

by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor:

- .1 persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

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

- .1 take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 accept assignment of subcontracts pursuant to Section 5.4; and
- .3 finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

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

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work;
and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

Additions and Deletions Report for AIA[®] Document A201[™] – 1997

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

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ALTERATIONS AND ADDITIONS TO
DISTRICT FIVE MATERIALS LAB / AUDITORIUM
IN NEWTON, NEWTON COUNTY, MISSISSIPPI

PAGE 39

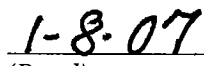
Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, James W. Vinson, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 15:34:55 on 12/13/2006 under Order No. 1000237945_1 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 1997 - General Conditions of the Contract for Construction, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.


(Signed)


(Title)


(Dated)

SUPPLEMENTARY CONDITIONS
Document 00800

SUMMARY

1.01 DESCRIPTION

- A. **Owner:** These supplements are necessary because the Owner is an agency, or political subdivision, of the State of Mississippi and occupies a different position from that of the usual Owner.
- B. **Document:** The following supplements modify, change, delete from, or add to the **AIA DOCUMENT A201-1997**, "General Conditions of the Contract for Construction", 1997, Fifteenth Edition. When any Article of the General Conditions is modified, or deleted, by these Supplementary Conditions, the unaltered provisions of that Article, Paragraph, Subparagraph, or Clause will remain in effect. The "General Conditions of the Contract for Construction" may also be supplemented or amplified elsewhere in the Contract Documents by provisions located in, but not necessarily limited to, Division 1 of the Specifications.

1.02 Verification Of Dimensions: Before ordering any materials or doing any work, the Contractor shall verify the dimensions and shall be responsible for the accuracy of such dimensions as they affect the Work. No extra compensation will be allowed on account of differences between the dimensions shown on the Drawings and actual dimensions.

1.03 Plans And Specifications: The Specifications and the Drawings are intended to be in agreement with each other, and to be mutually explanatory. They are also intended to be complementary and any Work or material called for by either shall be provided as if called for by both.

1.04 Execution Of The Work: Sections of Division 1 General Requirements govern the execution of the Work of all Sections 2-16 of the Specifications.

1.05 Workmanship: All Work as described or required shall be executed in a neat, skillful manner, in accordance with the best-recognized trade practice. Only competent workmen (including the superintendent), who work and perform their duties satisfactorily shall be employed on the Project. When requested by the Project Engineer, the Contractor shall discharge and shall not re-employ on the Project, any person who commits trespass or who is, in the opinion of the Project Engineer, dangerous, disorderly, insubordinate, incompetent, or otherwise objectionable.

1.06 Use Of Site And Facilities: Contractor shall not allow tradesman, technicians and laborers to enter other portions of existing facilities except as predetermined and approved by the Project Engineer. Existing utilities shall not be interrupted unless pre-approved by the Project Engineer. Parking for construction vehicles shall be in areas designated by the Owner at the Pre-construction Conference.

1.07 Utilities: The Owner will furnish utilities for construction (electricity and water). Contractor must use "as- is" or pay for any necessary modifications.

- 1.08 Inspection Of Work:** All materials and each part or detail of the Work are subject to inspection by the Project Engineer. Work performed or materials used by the Contractor without supervision, inspection, or written approval by an authorized Department representative may be ordered removed and replaced, at Contractor's expense, if found to be defective or noncompliant with the Contract Documents. No Work shall be performed on Legal Holidays, Sundays or after 5:00 P.M. on week days without prior written approval from the Project Engineer.

Article 1 GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

- 1.1.1 The Contract Documents:** Delete the last sentence of this Subparagraph and substitute following sentence:

The Contract Documents include the Advertisement for Bids, Instructions to Bidders, Notice to Bidders, Proposal Form, sample forms and all portions of addenda issued prior to execution of the Contract.

1.6 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATION AND OTHER INSTRUMENTS OF SERVICE

- 1.6.1** Add a new sentence at the end of this Subparagraph:

This Paragraph in no way supersedes the Owner's document rights set forth in the "Engineering Services Contract" Agreement Between the Owner and the Professional.

Article 2 OWNER

2.1 GENERAL

- 2.1.1** Change this Subparagraph to read as follows:

The Owner, as used in these Documents, refers to the Mississippi Transportation Commission, a body Corporate of the State of Mississippi, acting by and through the duly authorized Executive Director of the Mississippi Department of Transportation for the benefit of the Department for which the Work under this Contract is being performed. The Owner is the entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner's representative, who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization, is the individual who signed the Construction Contract for the Owner. The term "Owner" means the Owner or the Owner's authorized representative.

- 2.2.5** Change this Subparagraph to read as follows:

After the Contract is executed by the Executive Director, the Contractor will receive free of charge two bound copies of the Project Manual (Proposal and Contract Documents) (one executed and one blank), and five full-scale copies of the Drawings and two half-scale copies. The Contractor shall have available on the Project Site at all times one copy each of the Contract Drawings and the Project Manual (Proposal).

Article 3 CONTRACTOR

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

3.3.1 Change the last sentence to read as follows:

If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner and Professional shall be responsible for any resulting loss or damage.

3.18 INDEMNIFICATION

3.18.3 Add a new Subparagraph as follows:

The Contractor agrees to defend, hold harmless and indemnify the Owner against all claims or demands caused by the Contractor's acts or omissions.

Article 4 ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

4.1.4 Add a new Subparagraph as follows:

The term "Architect," "Engineer," "Professional", or "Consultant" as used in these Documents refers to the Professional firm who has been directed by the Owner to design and inspect construction of this Project.

4.1.5 Add a new Subparagraph as follows:

The term "Project Engineer" as used in these Documents refers to the Mississippi Department of Transportation Executive Director's authorized representative. The term "MDOT Architect" is the representative for the MDOT Architectural Services Unit and is an advisor to the Project Engineer.

4.5 MEDIATION

4.5.1 Delete this Subparagraph in its entirety.

4.5.2 Delete this Subparagraph in its entirety.

4.5.3 Delete this Subparagraph in its entirety.

4.6 ARBITRATION

4.6.1 Delete this Subparagraph in its entirety.

4.6.2 Delete this Subparagraph in its entirety.

4.6.3 Delete this Subparagraph in its entirety.

4.6.4 Delete this Subparagraph in its entirety.

4.6.5 Delete this Subparagraph in its entirety.

4.6.6 Delete this Subparagraph in its entirety

- 4.7 Add a new Paragraph as follows:

ARBITRATION PROCEDURES FOR THE MISSISSIPPI TRANSPORTATION COMMISSION

All matters of dispute arising out of any agreement with the Mississippi Transportation Commission for planning, design, engineering, construction, erection, repair, or alteration of any building, structure, fixture, road, highway, utility or any part thereof, or any agreement with the Mississippi Transportation Commission for architectural, engineering, surveying, planning, and related professional services which provides for mediation or arbitration, shall comply with the following course for resolution. No arbitration hearing shall be granted on any claim in excess of One Hundred Thousand Dollars (\$100,000.00).

- 4.7.1 Add a new Subparagraph as follows:

CONDITIONS PRECEDENT TO ARBITRATION

- .1 The aggrieved party must first notify opposing party in writing in detail of the matter(s) in dispute, the amount involved and the remedy sought. Such writing shall include copies of any documents, writings, plans, or other matter pertinent to the resolution of the dispute. The Chief Engineer of the Mississippi Department of Transportation, or his authorized representative, and a principal of the opposing party shall be the proper parties for such notice and shall be active parties in any subsequent dispute resolution.
- .2 If the dispute cannot be satisfactorily resolved, within thirty (30) days of the complaint being rejected in writing by either party, notice by certified mail shall be given to the Project Engineer. A copy of the notice shall be sent by certified mail to the opposing party. Such notice shall be in writing setting forth in detail the matter(s) in dispute, the amount involved, the remedy sought and state that informal resolution between the parties cannot be reached. Such writing shall include copies of any documents, writings, plans, or other matter pertinent to the resolution of the dispute. Opposing party shall have the opportunity to set forth in writing a rebuttal with pertinent documents attached. At the sole discretion of the Project Engineer, oral testimony may be had on the matter.

- 4.7.2 Add a new Subparagraph as follows:

REQUESTS FOR ARBITRATION: Within thirty (30) days of a claim being rejected in writing by the Project Engineer, either party may request arbitration. Notices for requests for arbitration shall be made in writing to the Chief Engineer of the Mississippi Department of Transportation, P. O. Box 1850, Jackson, Mississippi 39215-1850. Such notice shall set forth in detail the matter(s) in dispute, the amount involved, and the remedy sought. A copy of the request shall be mailed to the opposite party. The party requesting arbitration must deposit the sum of two hundred dollars (\$200.00) with its request as a deposit against costs incurred by the arbitrators. Each party will be notified in writing in any manner provided by law of certified mail not less than twenty (20) days before the hearing of the date, time and place for the hearing. Appearance at the hearing waives a party's right to notice.

- 4.7.3 Add a new Subparagraph as follows:

SELECTION OF ARBITRATORS: Upon request for arbitration, a panel of three (3) arbitrators shall be chosen. The Chief Engineer of the Mississippi Department of Transportation shall appoint one (1) member. One (1) member shall be appointed by the Executive Director of a professional or trade association that represents interests similar to that of the non-state party. The first two shall appoint the third member.

4.7.4 Add a new Subparagraph as follows:

HEARINGS: All hearings shall be open to the public. All hearings will be held in Jackson, Mississippi, unless the parties mutually agree to another location. The hearings shall be conducted as prescribed by **Mississippi Code 1972, Annotated**, Sections 11-15-113, 11-15-115, and 11-15-117. A full and complete record of all proceedings shall be taken by a certified court reporter. The scheduling and cost of retaining the court reporter shall be the responsibility of the party requesting arbitration. The costs of transcription of the record shall be the responsibility of the party requesting such transcript. No arbitration hearing shall be held without a certified court reporter. Deliberations of the arbitrators shall not be part of the record.

4.7.5 Add a new Subparagraph as follows:

AWARDS: Awards shall be made in writing and signed by the arbitrators joining in the award. A copy of the award shall be delivered to the parties by certified mail.

4.7.6 Add a new Subparagraph as follows:

FEES AND EXPENSES: Reasonable fees and expenses, excluding counsel fees, incurred in the conduct of the arbitration shall be at the discretion of the Arbitrator except each party shall bear its own attorney's fees and costs of expert witnesses.

4.7.7 Add a new Subparagraph as follows:

MODIFICATIONS, CONFIRMATIONS, AND APPEALS: All modifications, confirmations and appeals shall be as prescribed by **Mississippi Code 1972, Annotated**, Section 11-15-123 et seq. All awards shall be reduced to judgment and satisfied in the same manner other judgments against the State are satisfied.

4.7.8 Add a new Subparagraph as follows:

SECRETARY FOR THE ARBITRATORS: All notices, requests, or other correspondence intended for the arbitrators shall be sent to the Chief Engineer, Mississippi Department of Transportation, P. O. Box 1850, Jackson, Mississippi 39215-1850.

Article 5 SUBCONTRACTORS

No supplementary conditions.

Article 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

No supplementary conditions.

Article 7 CHANGES IN THE WORK

7.1 GENERAL

7.1.1 Replace the words "Change Order" with the words "Supplemental Agreement".

7.2 CHANGE ORDERS

7.2.3 Add a new Subparagraph as follows:

The maximum cost included in a Change Order (Supplemental Agreement) for profit and overhead is limited to twelve percent (12%) of the total of the actual cost for materials, labor and subcontracts. Profit and overhead include: all taxes, fees, permits, insurance, bond, job superintendent, job and home office expense. All Subcontractors shall acquiesce to the same requirements when participating in a Change Order (Supplemental Agreement).

Article 8 TIME

8.1 DEFINITIONS

8.1.1 Change this Subparagraph to read as follows:

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

8.1.3 Change this Subparagraph to read as follows:

The date of Completion is the date certified by the Project Engineer and approved by the Owner in accordance with Paragraph 9.8 entitled "Substantial Completion."

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 Change this Subparagraph to read as follows:

If the Contractor is delayed at any time in the commencement or progress of the Work by any act of neglect of the Owner or Project Engineer, or by any employee or either, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or any causes beyond the Contractor's control, or by any other causes which the Project Engineer determines may justify the delay, then the Contract time may be extended by Change Order for such reasonable time as the Engineer may determine, subject to the Owner's approval. Any claim for loss or any delay occasioned by any separate Contractor, or Subcontractor, shall be settled between the Contractor and such other separate Contractor, or Subcontractors.

Article 9 PAYMENTS AND COMPLETION

9.3 APPLICATIONS FOR PAYMENT

9.3.1 Add a new sentence to the end of this Subparagraph:

The form of Application for Payment will be AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet, or a computer generated form containing similar data.

9.3.1.3 Add a new Clause to Subparagraph 9.3.1 as follows:

The Owner will retain five percent (5%) until the Work is at least fifty percent (50%) complete, on schedule, and satisfactory in the Project Engineer's opinion, at which time fifty percent (50%) of the retainage held to date shall be returned to the Contractor for distribution to the appropriate Sub-Contractors and Suppliers. Future retainage shall be withheld at the rate of two and one half percent (2 1/2%) of the amount due the Contractor on account of progress payments.

9.3.1.4 Add a new Clause to Subparagraph 9.3.1 as follows:

The Contractor must submit each month with this Application for Payment a separate letter stating that he is requesting an extension of time or that he had no need for an extension for that period of time. No payment on a monthly application will be made until the letter is received. Complete justification such as weather reports or other pertinent correspondence must be included for each day's request for extension. A Contractor's letter, or statement, will not be considered as adequate justification. The receipt of this request and data by the Owner will not be considered as Owner approval in any way.

9.3.2.1 Add a new Clause to Subparagraph 9.3.2 as follows:

Payment on materials stored at some location other than the building site, may be approved by the Project Engineer and the Owner after the Contractor has submitted the following items:

- .1 An acceptable Lease Agreement between the General Contractor and the owner of the land, or building, where the materials are located.
- .2 Consent of Surety, or other acceptable Bond, to cover the materials stored off-site.
- .3 All Perils Insurance coverage for the full value of the materials stored off-site.
- .4 A Bill of Sale from the Manufacturer to the General Contractor for the stored materials.
- .5 A complete list and inventory of materials manufactured, stored and delivered to the storage site and of materials removed from the storage site and delivered to the job site.
- .6 A review by the Project Engineer of the materials stored off-site prior to release of payment.
- .7 Guarantee no storage costs, additional delivery fees, or subsequent costs to the Owner.
- .8 List of stored items shall be sent to the Chief Engineer for his approval prior to payment of stored materials.

9.3.2.2 Add a new Clause to Subparagraph 9.3.2 as follows:

Payment for materials stored at the building site, may be approved by the Project Engineer and the Owner after the Contractor has submitted the following items:

- .1 A Bill of Sale from the Manufacturer to the General Contractor for the stored materials.
- .2 List of stored items shall be sent to the Chief Engineer for his approval prior to payment of stored materials.
- .3 List of stored items shall be sent to the Chief Engineer for his approval prior to payment of stored materials.

9.6 PROGRESS PAYMENTS

9.6.8 Add a new Subparagraph as follows:

The amount retained by the Contractor from each payment to each Subcontractor and material supplier will not exceed the percentage retained by the Owner from the Contractor.

9.7 FAILURE OF PAYMENT**9.7.1** Change this Subparagraph to read as follows:

The Contractor and the Owner shall be subject to the remedies as prescribed in Section 31-5-25 of the **Mississippi Code 1972, Annotated**.

9.8 SUBSTANTIAL COMPLETION**9.8.4** Add a new sentence at the end of this Subparagraph:

Substantial Completion shall not be recognized under this Contract. The Project Engineer shall determine when the building is complete to the point it can be used for its intended purpose and occupied.

9.11 LIQUIDATED DAMAGES**9.11.1** Add a new Paragraph as follows:

Time being of the essence and a matter of material consideration thereof, a reasonable estimate in advance is established to cover losses incurred by the Owner if the project is not substantially complete on the date set forth in the Contract Documents. The Contractor and his Surety will be liable for and will pay the Owner liquidated damages for each calendar day of delay until the work is substantially complete as follows:

For More Than	To and Including	Per Calendar Day
\$ 0	\$ 100,000	\$ 140
100,000	500,000	200
500,000	1,000,000	300
1,000,000	2,000,000	400
2,000,000	5,000,000	650
5,000,000	10,000,000	750
10,000,000	-----	1,400

Article 10 PROTECTION OF PERSONS AND PROPERTY**10.2 SAFETY OF PERSONS AND PROPERTY****10.2.5** Change this Subparagraph to read as follows:

The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Clause 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible for Clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Project Engineer and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 3.18.

10.3 HAZARDOUS MATERIALS**10.3.2** Delete this Subparagraph in its entirety.**10.3.3** Delete this Subparagraph in its entirety.

10.4 Delete this Subparagraph in its entirety.

10.5 Delete this Subparagraph in its entirety.

Article 11 INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.4 Add a new Subparagraph as follows:

The Contractor's limits of liability shall be written for not less than the following:

.1 GENERAL LIABILITY:

Commercial General Liability
(Including XCU)

General Aggregate.....	\$ 1,000,000.00	Aggregate
Products & Completed Operations.....	\$ 1,000,000.00	Aggregate
Personal & Advertising Injury.....	\$ 500,000.00	Per Occurrence
Bodily Injury & Property Damage.....	\$ 500,000.00	Per Occurrence
Fire Damage Liability.....	\$ 50,000.00	Per Occurrence
Medical Expense.....	\$ 5,000.00	Per Person

.2 OWNERS & CONTRACTORS PROTECTIVE LIABILITY:

Bodily Injury & Property Damage.....	\$ 1,000,000.00	Aggregate
Bodily Injury & Property Damage.....	\$ 500,000.00	Per Occurrence

.3 AUTOMOBILE LIABILITY:

(Owned, Non-owned & Hired Vehicle

Contractor Insurance Option Number 1:

Bodily Injury & Property Damage.....	\$ 500,000.00	Per Occurrence

(Combined Single Limit)

Contractor Insurance Option Number 2:

Bodily Injury.....	\$ 250,000.00	Per Person
Bodily Injury.....	\$ 500,000.00	Per Accident
Property Damage.....	\$ 100,000.00	Per Occurrence

.4 EXCESS LIABILITY:

(Umbrella on projects over \$500,000)

Bodily Injury & Property Damage	\$ 1,000,000.00	Aggregate

(Combined Single Limit)

.5 WORKERS' COMPENSATION:

(As required by Statute)

EMPLOYERS' LIABILITY:

Accident	\$ 100,000.00	Per Occurrence
Disease	\$ 500,000.00	Policy Limit
Disease	\$ 100,000.00	Per Employee

.6 PROPERTY INSURANCE:

Builder's Risk.....	\$	Equal to Value of Work
Or		
Installation Floater.....	\$	Equal to Value of Work

11.1.5 Add a new Subparagraph as follows:

Furnish one (1) copy of the Standard Construction Contract Certificate of Insurance Form for each copy of the Standard Form of Agreement Between Owner and Contractor specifically setting forth evidence of all coverage required by Subparagraphs 11.1.1, 11.1.2 and 11.1.3. Furnish to the Owner copies of any endorsements that are subsequently issued amending limits of coverage.

11.1.6 Add a new Subparagraph as follows:

If the coverages are provided on a claims-made basis, the policy date or retroactive date shall predate the Contract: the termination date, or the policy, or applicable extended reporting period shall be no earlier than the termination date of coverages required to be maintained after final payment.

11.2 OWNER'S LIABILITY INSURANCE

11.2.1 Delete this Subparagraph in its entirety and substitute the following:

The Contractor shall purchase and maintain such insurance as will protect the Owner from his contingent liability to others for damages because of bodily injury, including death, and property damage, which may arise from operations under this Contract and other liability for damages which the Contractor is required to insure under any provision of this Contract. Certificate of this insurance will be filed with the Owner and will be the same limits set forth in 11.1.4.

11.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE

Delete this Paragraph in its entirety.

11.4 PROPERTY INSURANCE (BUILDER'S RISK OR INSTALLATION FLOATER)

11.4.1 Change the first line in this Subparagraph to read as follows:

The Contractor shall purchase...

11.4.1.2 Delete this Clause under Subparagraph 11.4.1 in its entirety.

11.4.1.3 Change the following Clause in Subparagraph 11.4.1.3 to read as follows:

If the property insurance requires deductibles, the Contractor shall pay costs not covered because of such deductibles.

11.4.2 Delete this Subparagraph in its entirety.

11.4.3 Delete this Subparagraph in its entirety.

11.4.4 Delete this Subparagraph in its entirety.

11.4.5 Delete this Subparagraph in its entirety.

11.4.6 Delete this Subparagraph in its entirety.

11.4.10 Change this Subparagraph to read as follows:

The Owner as fiduciary shall have power to adjust and settle a loss with Insurers unless one of the parties in interest shall object in writing within five (5) days after occurrence of loss.

Article 12 UNCOVERING AND CORRECTION OF WORK

No supplementary conditions.

Article 13 MISCELLANEOUS PROVISIONS

No supplementary conditions.

Article 14 TERMINATION OR SUSPENSION OF THE CONTRACT

No supplementary conditions.

END OF DOCUMENT

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

**ADDENDA
DOCUMENT 00910**

DATE: 01-15-07

PROJECT: ALTERATIONS & ADDITIONS TO DISTRICT FIVE
MATERIALS LAB / AUDITORIUM IN NEWTON
NEWTON COUNTY, MISSISSIPPI

PROJECT NUMBER: BWO-5052-51(003) 501501

PART 1 GENERAL

1.01 DESCRIPTION

- A. Any Addendum issued on this Project will be included in Section 00910 and become part of the Standard Form of the Agreement Between the Owner and the Contractor.
- B. Bidders shall acknowledge receipt of addendum by inserting its number and date in the designated spaces on their Proposal.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION
Not Used

END OF DOCUMENT

SECTION 01110

SUMMARY OF WORK

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work covered by the Contract Documents shall be provided by one (1) General Contractor as one (1) Contract to improve the Mississippi Department of Transportation site to construct Alterations and Additions to District Five Materials Lab / Auditorium in Newton, Newton County, Mississippi.
- B. Time of Completion: The completion of this Work is to be on or before the time indicated on the Owner and Contractor Agreement.
- C. Contractor's Duties:
 - 1. Except as specifically noted, provide and pay for:
 - a. Labor, materials, equipment.
 - b. Tools, construction equipment, and machinery.
 - c. Other facilities and services necessary for proper execution and completion of the Work.
 - 2. Pay legally required sales, consumer, use, payroll, privilege and other taxes.
 - 3. Secure and pay for, as necessary for proper execution and completion of Work, and as applicable at time of receipt of bids:
 - a. Permits
 - b. Government Fees
 - c. Licenses
 - 4. Give required notices.
 - 5. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities that bear on performance of Work.
 - 6. Promptly submit written notice to Project Engineer of observed variance of Contract Documents from legal requirements. Appropriate modifications to Contract Documents will adjust necessary changes. Assume responsibility for Work known to be contrary to such requirements, without notice.
 - 7. Enforce strict discipline and good order among employees. Do not employ on Work, unfit persons or persons not skilled in assigned task.
 - 8. Schedule of Values: Submit 8 copies to the MDOT Architectural Services Unit a Schedule of Values as described in Section 01295 of these Specifications. This submittal will be recorded as submittal number one for this Project. When this submittal is approved, a copy will be transmitted to Construction Administration to be used to review and compare to amounts submitted on the CAD-720 form.

9. Sub-Contractors List: Submit 8 copies of a list, acceptable to the MDOT, of all subcontractors to be used on the Project within seven (7) days after written notice of Contract award by the MDOT. The list shall include the Firm's name, contact person, street address, e-mail address, telephone and fax numbers.
10. Request for Permission to Subcontract: Submit original to Contract Administration Division and two copies to the Project Engineer CAD-720 form - REQUEST FOR PERMISSION TO SUBCONTRACT for each subcontractor before they are allowed to perform any Work.
11. Coordination: The Contractor is responsible for the coordination of the total Project. All subcontractors will cooperate with the Contractor so as to facilitate the general progress of the Work. Each trade shall afford all other trades every reasonable opportunity for the installation of their Work. Refer to Section 01310– Project Management & Coordination.

1.02 CONTRACTOR'S USE OF PREMISES

- A. Confine operations at the site to areas permitted by:
 1. Law
 2. Ordinances
 3. Permits
 1. Contract Documents
 5. Owner
- B. Do not unreasonably encumber site with materials or equipment.
- C. Do not load structure with weight that will endanger structure.
- D. Assume full responsibility for protection and safekeeping of products stored on premises.
- E. Move any stored products which interfere with operations of MDOT or other Contractors.
- F. Obtain and pay for use of additional storage of work areas needed for operations.
- G. Limit use of site for work and storage to the area indicated on the Drawings.

1.03 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat" numbering system.
 1. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.

- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION
Not Used

END OF SECTION

SECTION 01290

PAYMENT PROCEDURES

PART 1 GENERAL

1.01 METHOD OF MEASUREMENT: The method of measurement and payment shall conform to the applicable provisions of Article 9 of the AIA Document A201-1997 General Conditions of the Contract for Construction.

1.02 APPLICATION FOR PAYMENT

A. Format:

1. Applications for Payments will be prepared on AIA forms G702-Application and Certificate for payment and G703-Continuation Sheet; or, a computer generated form containing similar data may be used.

B. Preparation of Application:

1. Present required information in type written form.
2. Execute certification by signature of authorized officer.
3. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of Work performed and for stored products.
4. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original Item of Work.
5. Prepare Application for Final Payment as specified in Section 01770-Closeout Procedures.

C. Submittal Procedures:

1. Submit 6 copies of each Application for Payment to the Project Engineer.
2. Submit an updated construction schedule with each Application for Payment as described in Section 01320-Construction Progress Documentation.
3. Submit request for payment at intervals agreed upon by the Project Engineer, Owner, and Contractor.
4. Submit requests to the Project Engineer at agreed upon times, or as may be directed otherwise.

D. Substantiating Data:

1. Submit data justifying dollar amounts in question when such information is needed.
2. Provide one copy of the data with a cover letter for each submittal.
3. Indicate the Application number, date and line item number and description.

1.03 STATEMENTS AND PAYROLLS

- A. The submission by the Contractor of the actual weekly payrolls showing all employees, hours worked, hourly rates, overtime hours, etc., or copies thereof, is not required to be turned in. However, each Contractor and Subcontractor shall preserve weekly payroll records for a period of three years from the date of Contract completion. All Contractor personnel working at the project site will be paid unconditionally and not less often than once a week without subsequent deduction or rebate on any account, except such payroll deductions as are permitted by regulations, the full amounts of wages and bona fide fringe benefits due at time of payment.

- B. The payroll records shall contain the name, address, social security number, classification, rate of pay, daily and weekly number of hours worked, itemized deductions and actual wages paid to each employee.
- C. Upon request, the Contractor will make payroll records available at the project site for inspection by the Department Compliance Officer or authorized representative and will permit such officer or representative to interview employees on the job during working hours.
- D. The Contractor and Subcontractors shall submit Form CAD-880, "Weekly Summary of Wage Rates", each week to the Project Engineer. The forms may be obtained from the Contract Compliance Officer, Contract Administration Division, Mississippi Department of Transportation, Jackson, Mississippi. Custom forms, approved by Contract Administration Division, may be used in lieu of CAD forms.
- E. The Contractor shall make all efforts necessary to submit this information to the Project Engineer in a timely manner. The Engineer will have the authority to suspend the work wholly or in part and to withhold payments because of the Contractor's failure to submit the required information. Submission of forms and payrolls shall be current through the first week of the estimate period in order for the Project Engineer to process an estimate.

1.04 BASIS OF PAYMENT

- A. This Work will be paid for by Contract Sum for the construction necessary to build Alterations and Additions to District Five Materials Lab / Auditorium in Newton, Newton County, Mississippi. The Contract Sum shall be full compensation for all site work, for furnishing all materials, and all other Work and effort of whatever nature in the construction of the building, installation of underground and other equipment, and final clean-up of the area. It shall also be complete compensation for all equipment, tools, labor, and incidentals necessary to complete the Work.
- B. Payment will be made under:

MDOT Project No. BWO-5052-51(003) 501501

Lump Sum

TOTAL PROJECT CONTRACT SUM

LUMP SUM

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION
Not Used

END OF SECTION

SECTION 01295

SCHEDULE OF VALUES

PART 1 GENERAL

1.01 DESCRIPTION

- A. Scope: Submit 8 copies of the Schedule of Values to the MDOT Architectural Services Unit at least 10 days prior to submitting first Application for Payment. When this submittal is approved, a copy will be transmitted to Construction Administration to be used to review and compare to amounts submitted on the CAD-720 form. Other copies will be kept by Architectural Services Unit and distributed to Project Engineer, MDOT Consultants, and Contractor. Upon Project Engineer / MDOT Architect's request, support the values given with data substantiating their correctness. List quantities of materials. Payment for materials stored on site will be limited to those listed in Schedule of Unit Material Values (refer to Article 9 of the Supplementary Conditions for requirements). Use Schedule of Values only as basis for contractor's Application for Payment.
- B. Form of Submittal: Submit typewritten Schedule of Values on AIA Document G703-1992, using Table of Contents of this Specification as basis for format for listing costs of Work for Sections under Divisions 2- 16. Identify each line item with number and title as listed in Table of Contents of this Specification.
- C. Preparing Schedule of Values:
 - 1. Itemize separate line item costs for each of the following general cost items: Performance and Payment Bonds, field supervision and layout, Contingency Allowance, temporary facilities and controls, and closeout documents.
 - 2. Itemize separate line item cost for Work required by each Section of this specification. Breakdown installed cost with overhead and profit.
 - 3. For each line item, which has installed value of more than \$20,000, break down costs to list major products for operations under each item; rounding figures to nearest dollar. Make sum of total costs of all items listed in schedule equal to total Contract Sum.
- D. Preparing Schedule of Unit Material Values:
 - 1. Submit separate schedule of unit prices for materials to be stored on which progress payments will be made. Make form of submittal parallel to Schedule of Values with each line item identified same as line item in Schedule of Values. Include in unit prices only: Cost of material, delivery and unloading site, and sales tax.
 - 2. Make sure unit prices (if required) multiplied by quantities equal material cost of that item in Schedule of Values.
- E. Review and Re-submittal: After Project Engineer's review, if requested, revise and resubmit schedule in same manner

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01298

CHANGE ORDER PROCEDURES

PART 1 GENERAL

- 1.01 SCOPE: This Section describes the procedures for processing Change Orders (Supplemental Agreements) by the Project Engineer and the Contractor.
- 1.02 CHANGE ORDER PROCEDURES
 - A. Change Proposed by the Project Engineer: The Project Engineer may issue a Proposal Request to the Contractor which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications and a change in Contract Time for executing the change. The Contractor shall prepare and submit an estimate within 10 days.
 - B. Change Proposed by the Contractor: The Contractor may propose a change by submitting a request for change to the Project Engineer, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other Contractors. Document any requested substitutions in accordance with Section 01630 - Product Options and Substitution Procedures.
 - C. Contractor's Documentation:
 1. Maintain detailed records of Work completed on a time and material basis. Provide full information required for evaluation of proposed changes, and substantiate costs of changes in the Work.
 2. Document each quotation for a change in cost or time with sufficient data allowing evaluation of the quotation.
 3. On request, provide additional data to support computations:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 4. Support each claim for additional costs, and for work completed on a time and material basis, with additional information:
 - a. Origin and date of claim.
 - b. Dates and time work was performed and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 - D. Construction Change Directive: The Project Engineer may issue a document, approved by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order (Supplemental Agreement). The document will describe changes in the Work, and will designate method of determining any change in the Contract Sum or Contract Time. The change in Work will be promptly executed.
 - E. Format: The Project Engineer will prepare 5 originals of the Change Order (Supplemental Agreement) using the Mississippi Department of Transportation's Change Order (Supplemental Agreement) Form.
 - F. Types of Change Orders (Supplemental Agreements):
 1. Stipulated Sum Change Orders: Based on Proposal Request and Contractor's fixed price quotation, or Contractor's request for a Change Order (Supplemental Agreement) as approved by the Project Engineer.

2. Unit Price Change Order: For pre-determined unit prices and quantities, the Change Order (Supplemental Agreement) will be executed on a fixed unit price basis. For unit costs or quantities of units of work, which are not pre-determined, execute Work under a Construction Change Directive. Changes in Contract Sum or Contract Time will be computed as specified for Time and Material Change Order (Supplemental Agreement).
 3. Time and Material Change Order (Supplemental Agreement): Submit itemized account and supporting data after completion of change, within time limits indicated in the Standard Form of Agreement Between the Owner and the Contractor. The Project Engineer will determine the change allowable in Contract Sum and Contract Time as provided in the Contract Documents. The Contractor shall maintain detailed records of Work accomplished on Time and Material basis and shall provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- G. Execution of Change Order (Supplemental Agreement): The Project Engineer will issue Change Orders (Supplemental Agreements) for signatures of parties as provided in the Standard Form of Agreement Between the Owner and the Contractor. Final execution of all Change Orders (Supplemental Agreements) requires approval by the Owner.
- H. Correlation of Contractor Submittals: The Contractor shall promptly revise Schedule of Values and the Application for Payment forms to record each authorized Change Order (Supplemental Agreement) as a separate line item and adjust the Contract Sum. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust time for other items of Work affected by the change and resubmit. Promptly enter changes in Project Record Documents.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION
Not Used

END OF SECTION

SECTION 01310

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Scope: To set forth procedures, conditions and responsibility for coordination of the total project.
- B. Project Coordinator: The General Contractor shall designate one individual as Project Coordinator (Superintendent), as referred to in the General Conditions. Prior to beginning Work his name, qualifications and address shall be submitted, in writing, to the MDOT Executive Director with copies to the Construction Engineer, Contract Administration Engineer, District Engineer, Project Engineer and MDOT Architect. Upon approval, he will remain until the Project is completed and cannot be removed during construction without the written consent of the Project Engineer.

1.02 DUTIES OF PROJECT COORDINATOR (SUPERINTENDENT)

- A. General:
 - 1. Coordination: Coordinate the work of all subcontractors and material suppliers.
 - 2. Supervision: Supervise the activities of every phase of Work taking place on the project.
 - 3. Contractor's Daily Job Diary: Submit copy of daily job diary to the Project Engineer and the MDOT Architect each Monday for the previous week.
 - 4. Electrical: Take special care to coordinate and supervise the Work of the electrical and other subcontractors.
 - 5. Communication: Establish lines of authority and communication at the job site.
 - 6. Location: The Project Coordinator (Superintendent) must be present on the job site at all times while work is in progress. The superintendent shall advise the Project Engineer of an intended absence from the work and designate a person to be in charge of the Work during such absence.
 - 7. Permits: Assist in obtaining building and special permits required for construction.
- B. Interpretations of Contract Documents
 - 1. Consultation: Consult with Project Engineer / MDOT Architect to obtain interpretations.
 - 2. Assistance: Assist in resolution of any questions.
 - 3. Transmission: Transmit written interpretations to concerned parties.
- C. Cessation of Work: Stop all Work not in accordance with the requirements of the Contract Documents.
- D. Division One: Coordinate and assist in the preparation of all requirements of Division One and specifically as follows:
 - 1. Enforce all safety requirements.
 - 2. Schedule of Values: Assist in preparation and be knowledgeable of each entry in the Schedule of Values.
 - 3. Cutting and Patching: Supervise and control all cutting and patching of other trades work.
 - 4. Project Meetings: Schedule with Project Engineer's approval and attend all project meetings.
 - 5. Construction Schedules: Prepare and submit all construction schedules. Supervise Work to monitor compliance with schedules.

6. Shop Drawings, Product Data and Samples: Administer the processing of all submittals required by the Project Manual.
 7. Testing: Coordinate all required testing.
 8. Temporary Facilities and Controls: Allocate, maintain and monitor all temporary facilities.
 9. Substitutions and Product Options: Administer the processing of all substitutions.
 10. Cleaning: Direct and execute a continuing (daily) cleaning program throughout construction, requiring each trade to dispose of their debris.
 11. Project Closeout: Collect and present all closeout documents to the Project Engineer.
 12. Project Record Documents: Maintain up-to-date Project Record Documents.
- E. Changes: Recommend and assist in the preparation of requests to the Project Engineer for any changes in the Contract.
- F. Application for Payment: Assist in the preparation and be knowledgeable of each entry in the Application and Certificate for Payment.

1.03 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements, supports, and installation of Mechanical and Electrical Work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy, if required.
- E. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.04 SUBCONTRACTOR'S DUTIES: The Subcontractor is responsible to coordinate and supervise his employees in the Work accomplished under his part of the Contract.

- A. Schedules: Conduct Work to assure compliance with construction schedules.
- B. Suppliers: Transmit all instructions to his material suppliers.
- C. Cooperation: Cooperate with the Project Coordinator and other subcontractors.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01315

PROJECT MEETINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Provisions for and procedures related to the required Project Meetings which include, but not limited to, the following for each Project Phase:
 - 1. Pre-Construction Meeting.
 - 2. Periodic Progress Meetings.

1.02 MEETINGS

- A. Purpose of Meetings: Project Meetings shall be held for the following reasons:
 - 1. To establish an understanding of what is expected from everyone involved.
 - 2. To enable an orderly Project review during the progress of the Work.
 - 3. To provide for systematic discussion of problems and effect remedies and clarifications.
 - 4. To coordinate the Work.
 - 5. To review installation procedures and schedules.

1.03 SCHEDULING AND ADMINISTRATION

- A. The Project Engineer shall schedule and preside over all meetings throughout the progress of the Work. Duties include the following:
 - 1. Review, modify / approve minutes of the previous meeting.
 - 2. Discuss items that have been done the previous month and anticipated work to be done within the next month.
 - 3. Review Contractor's Pay Request and resolve questions or conflicts with Construction Documents.
- B. The Contractor shall attend and administer all meetings throughout the progress of the Work. Duties include the following:
 - 1. Preparation of agenda for meetings
 - 2. Distribution of agenda and written notice 7 days in advance of date for each regularly scheduled meeting.
 - 3. Make physical arrangements for meetings.
 - 4. Record the minutes which shall include list of all participants and all significant proceedings and, in particular, all decisions, agreements, clarifications, and other data related to Project cost, time, and modifications.
 - 5. Distribute copies of minutes within 7 calendar days to all parties affected by decisions made at the meeting.
 - 6. Follow-up unresolved matters discussed at meetings and promptly effect final resolution, especially for work in progress. Advise all effected parties of result and include report of activities in next scheduled meeting.
- C. Representatives of Contractor's, Subcontractor's, and Supplier's attending the meetings shall be qualified and authorized to act on behalf of the entity each represents.
- D. Consultants may attend meetings to ascertain work is expedited consistent with Contract Documents and construction schedules.

1.04 PRE-CONSTRUCTION MEETING

- A. Schedule: Schedule Pre-Construction Meeting prior to commencement of the Work.
- B. Location: A central site, convenient for all parties, designated by the Contractor and approved by the Project Engineer.
- C. Attendance: Attending shall be the Project Engineer and MDOT representatives associated with the Project, the MDOT Architect and Consultants (if requested by the District), the General Contractor, all major Subcontractors, and any representatives of governmental or other regulatory agencies as required.
- D. Minimum Agenda:
 - 1. Distribute and discuss construction schedule prepared by Contractor.
 - 2. Review critical Work sequencing.
 - 3. Designate responsibilities.
 - 4. State procedures for submittals.
 - 5. State procedures for maintaining record documents.
 - 6. State procedures for change orders.
 - 7. State procedures for application of payment.
 - 8. Coordinate use of premises, including office and storage areas.
 - 9. List Owner's requirements.
 - 10. Show clear understanding of Security.
 - 11. Show clear understanding of Housekeeping procedures.

1.05 PROGRESS MEETINGS

- A. Schedule: Progress Meetings will be scheduled monthly. The Project Engineer will cancel the meeting with at least 48 hours notice if a meeting is not necessary for any particular month.
- B. Place of Project Meetings: Project Engineer's Office, except as otherwise agreed.
- C. Attendance: Attending shall be the Project Engineer or his representative and MDOT representatives associated with the Project, the MDOT Architect or his representative and Consultants (if requested by the District), the General Contractor, and all Subcontractors as pertinent to the agenda.
- D. Minimum Agenda:
 - 1. Review, modify / approve minutes of the previous meeting.
 - 2. Review work progress since last meeting.
 - 3. Note field observations, problems and decisions.
 - 4. Identify problems that impede planned progress.
 - 5. Review off-site fabrication problems.
 - 6. Revise construction schedule as indicated.
 - 7. Plan progress during the next work period.
 - 8. Review submittal schedules; expedite and modify as required.
 - 9. Review proposed changes,
 - 10. Review Request for Payment.
 - 11. Complete other current business.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01320

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.01 DESCRIPTION

- A. Scope: Provide projected Construction Schedules for entire Work and revise monthly to show progress through the pay period. The following is a minimum requirement and other type schedules are acceptable with Owner's approval.
- B. Form of Schedules: Prepare in form of horizontal bar chart.
 - 1. Provide separate horizontal bar column for each trade or operation.
 - 2. Order: Table of Contents of Specifications.
 - 3. Identify each column by major Specification section number.
 - 4. Horizontal Time Scale: Identify first work day of each week.
 - 5. Scale and Spacing: To allow space for updating.
- C. Content of Schedules:
 - 1. Provide complete sequence of construction by activity.
 - 2. Indicate dates for beginning and completion of each stage of construction.
 - 3. Identify Work of logically grouped activities.
 - 4. Show projected percentage of completion for each item of Work as of first day of each month.
- D. Updating:
 - 1. Show all changes occurring since previous submission of updated schedule.
 - 2. Indicate progress of each activity and completion dates.
- E. Submittals:
 - 1. Submit initial schedules to the Project Engineer within 15 days after date of Notice to Proceed.
 - 2. Submit to the Project Engineer periodically updated schedules accurately depicting progress to first day of each month.
 - 3. Submit 2 copies to the Project Engineer.
- F. If the Contractor is required to produce two revised construction schedules because of lack of progress in the Work, the Owner will notify the Contractor's surety.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Scope: Submit to the MDOT Architectural Services Unit shop drawings, product data, and samples required by Specification Sections. Faxed submittals will **not** be accepted. Do **not** submit Material Safety Data Sheets for approval. Refer to Section 01630 – Product Options and Substitution Procedures, for requirements concerning products that will be acceptable on this Project.
- B. Shop Drawings: Original (**legible**) drawings prepared by Contractor, subcontractor, supplier or distributor which illustrate actual portions of the Work; showing fabrication, layout, setting or erection details. Reproductions of the Contract Drawings will **not** be acceptable. Minimum requirements for shop drawings shall include the following:
 - 1. Prepared by a qualified detailer.
 - 2. Identify details by reference to sheet and detail numbers shown on Contract Drawings.
 - 3. Minimum sheet size: 8-1/2 inches by 11 inches.
 - 4. Reproductions for submittals: 9 Prints.
 - 5. Shop drawings shall be stamped and signed by the Contractor certifying accuracy, completeness and compliance with Contract requirements prior to submitting to the MDOT Architectural Services Unit.
- C. Product Data: Provide 9 copies each. Minimum information submitted shall include the following:
 - 1. Manufacturer's standard schematic drawings: Modify drawings to delete information that is not applicable to the Project. Supplement standard information to provide additional information applicable to Project.
 - 2. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data: **Clearly mark** each copy to identify pertinent materials, products or models. Show dimensions and clearances required. Show performance characteristics and capacities, wiring diagrams and controls.
 - 3. Product Data shall be stamped and signed by the Contractor certifying accuracy, completeness and compliance with contract requirements prior to submitting to the Architectural Services Unit.
- D. Samples: Provide physical examples to illustrate materials, equipment or workmanship and to establish standards by which completed Work is judged.
 - 1. Provide one copy each of sufficient size and quantity to clearly illustrate functional characteristics of products or material with integrally related parts and attachment devices and full range of color samples.
 - 2. Samples remain the property of the Architectural Services Unit until completion of construction of the Project.
 - 3. Samples (except for color samples) will not be required when specified product is submitted.
 - 4. If a specified product color is discontinued, Contractor shall notify Project Engineer promptly to determine if it affects other color selections.

E. Field Samples and Mock-Ups: Erect on Project Site at location acceptable to Project Engineer.

1. Construct each sample or mock-up complete, including Work of all trades required in the finished Work. Field Samples are used to determine standards in materials, color, texture, workmanship, and overall appearance.
2. Work shall not be allowed using these materials until the mock-up is approved.
3. The mock-up shall not be destroyed, until after the Work it represents is finished, without permission of the Project Engineer. This mock-up shall be used as a standard to compare to the Work it represents for color, craftsmanship, overall appearance, and how the different materials make up the whole system.

F. Contractor Responsibilities:

1. Review shop drawings, product data, and samples prior to submission.
2. Verify field measurements, construction criteria, catalog numbers and other data.
3. Coordinate each submittal with requirements of Work and Contract Documents.
4. Contractor's responsibility for errors and omissions in submittals is not relieved by MDOT Architect's / Consultant's review of submittals.
5. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by review of submittals unless written acceptance of specific deviations is given.
6. Notify the Project Engineer in writing at the time of submission, of deviations in submittals from requirements of Contract Documents.
7. Order no materials or begin no Work requiring submittals until the return of submittals bearing MDOT Architect / Consultant's stamp and initials indicating review.
8. After MDOT Architect / Consultant's review, distribute copies.

G. Submission Requirements:

1. Schedule submission with ample time given to review submittals prior to being needed.
2. Submit 9 copies of shop drawings and product data with additional number of copies, if required, by Contractor for distribution.
3. Submit number of samples specified in each Specification Section.
4. Accompany submittals with transmittal letter, in duplicate, containing data, project title and number; Contractor's name and address; the number of each Shop Drawings, product data and samples submitted; notification of deviations from Contract Documents; and other pertinent data.
5. Each copy of submittals shall include the following:
 - a. Date and revision dates.
 - b. Project title and number.
 - c. The names of Project Engineer, Contractor, Supplier, Manufacturer, and separate detailer, when pertinent.
 - d. Identification of product or material.
 - e. Relation to adjacent structure or materials.
 - f. Field dimensions, clearly identified as such.
 - g. **Specification Section Number.**
 - h. Applicable standards such as ASTM Number or Federal Specification.
 - i. A blank space, 2 inches by 3 inches for the Reviewer's stamp.
 - j. Identification to deviations from Contract Documents.
 - k. Contractor's stamp, initialed or signed, certifying the review of submittal, verification of field measurements, and compliance with Contract Documents.

H. Resubmission Requirements:

1. Shop Drawings: Revise initial Drawings as required and resubmit as specified for initial submittal. Indicate on Drawings, any changes that have been made other than those required by the Reviewer.
2. Product Data and Samples: Submit new data and samples as required for initial submittal.

I. Distribution of Submittals after Review:

1. Distribute copies of Shop Drawings and product data which carry MDOT Architect's / Consultant's stamp to: Project Engineer's File, Architectural Services Unit File, Architect's File(as required) / Electrical / Mechanical / Structural Engineer's File (as required), Materials' File (if concrete), Contractor's File, Job Site File, and Subcontractor, Supplier and/or Fabricator as necessary.
2. Distribute samples as directed. The Project Engineer, MDOT Architect and Consultant (as required) shall retain one of each.

J. MDOT Architect / Consultants' Duties:

1. Review submittals with reasonable promptness.
2. Review for design concept of Project and information given in Contract Documents.
3. Review of separate item does not constitute review of an assembly in which item functions.
4. Affix stamp and initial, or signature, certifying the review of submittal.
5. Return submittals to the Architectural Services Unit, which will forward one copy to the Project Engineer, one copy to the Materials Engineer (if concrete), and the remainder to the Contractor.
6. Retain one copy of reviewed submittals.

K. Delays attributable to untimely submittals, submittals not approved, or time taken to resubmit will not serve as a basis for a Contract Time extension.

L. Acceptance of submittal items will not preclude rejection of these items upon discovery of defects in them prior to final acceptance of completed Work.

M. After an item has been accepted, no change in brand, make, manufacturer's catalog number, or characteristics will be considered unless:

1. Satisfactory written evidence is presented to and approved by the Project Engineer, that manufacturer cannot make scheduled delivery of accepted item, or;
2. Item delivered has been rejected and substitution of a suitable item is an urgent necessity, or;
3. Other conditions became apparent which indicates acceptance of such substitute item to be in the best interest of the Owner.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01355

RENOVATION PROJECT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDE

- A. Project coordination and assignment of the work of all Parties and the scheduling of all elements of alterations and renovation work by procedures and methods to expedite completion of the Work for each Part.
- B. The Work to be assigned, coordinated and scheduled includes, but is not limited to, the following:
 - 1. The work of each Division and Section of the Specifications as shown on the Drawings and in the Specifications.
 - 2. The procedures and activities required under the provisions of this Section.

1.02 PROJECT COORDINATION

- A. Definition: Project Coordination is the process utilized to guide all participants in the Project's construction and includes assigning, scheduling, expediting, reviewing, and modifying, as appropriate, the activities required to produce the total Work to the designated quality and within the assigned time.
- B. Responsibility: Except otherwise provided by the Contract Documents, all Project Coordination shall be the entire responsibility of the Contractor. The Contractor shall set forth procedures and conditions for coordination of the Work and shall personally be responsible for the implementation of the required coordination which shall include the following:
 - 1. Communications: Establish lines of authority and communication at the Job Site.
 - 2. General Coordination: Closely coordinate all work of Project participants to effect quality construction and steady progress in all phases and aspects of the Work with a minimum of delays and interference.
 - 3. Special Coordination: Give additional careful attention to the work of the following:
 - a. Mechanical / Electrical Subcontractors and be responsible for the following:
 - 1) Establishment of locations, clearances and precedence for all piping, conduit and ductwork (underground and above ceilings).
 - 2) Submittal of Schematic Drawings giving location and clearance information for Architect / Engineer review.
 - 4. Supervision: Supervise the activities of every phase of the Work of the Project. Make frequent inspections of the Work to determine progress and quality; proceed immediately to remedy problems and to effect changes needed in the construction process and personnel.
 - 5. Interpretations of Contract Documents:
 - a. Consultation: Consult with Project Engineer to obtain interpretations.
 - b. Assistance: Assist in resolution of any questions.
 - c. Stop all work not in accordance with the requirements of the Contract Documents.

6. Division One: Coordinate requirements of Division One and specifically as follows:
 - a. Testing: Coordinate all required testing. Refer to Section 01455.
 - b. Temporary Facilities and Controls: Allocate, maintain and monitor all temporary facilities. Refer to Section 01500.
 - c. Cutting and Patching: Supervise and control all cutting and patching. Refer to Section 01735.
 - d. Cleaning: Direct and execute a continuing cleaning program throughout the construction, requiring each trade to dispose of their own debris, except as otherwise provided in the Contract Documents. Refer to Section 01740.
 - e. Project Record Documents: Maintain up-to-date project record documents. Refer to Section 01785.
7. Enforce all safety requirements.
8. Maintain quality control of all work.

1.03 QUALITY CONTROL

- A. Assign all elements of the work to trades qualified to perform each type of work.
- B. Patch, repair and refinish existing work using skilled mechanics who are capable of matching existing quality of workmanship. Quality of patched or extended work shall be not less than that specified for new work.

1.04 PROJECT MEETINGS

- A. When required by Project Engineer or by individual Specification Sections, convene meetings to coordinate the Work and / or to review conditions at the Site and to outline procedures by which the Work will be performed. Refer to Sections 01310 and 01315.
- B. Require attendance by all affected Parties.

1.05 CONSTRUCTION ACCESS: Access to construction area for construction materials and exit way for demolition debris shall be as directed by the Project Engineer.

1.06 PROTECTION OF WORK

- A. Protect from damage, existing finishes, equipment, adjacent work scheduled to remain, and all new work.
 1. Protect existing and new work from temperature extremes. Maintain interior work above 60 degrees F.
 2. Provide heat and humidity control as needed to prevent damage to existing work and new work.
 3. Provide dust partitions as needed to prevent damage to existing work and new work.

1.07 CUTTING AND PATCHING

- A. Scope: Provide the necessary cutting, fitting and patching required to complete all elements of the Work including, but not limited to, the following procedures:
 1. To integrate with other work, to fit properly together.
 2. To uncover work to provide for installation of ill-timed work.

3. To remove and replace defective and / or non-conforming work.
 4. To remove installed material for testing.
 5. To provide openings for penetration of mechanical and electrical work.
- B. Preparation: Prior to commencing cutting and patching, examine existing conditions (including structure and elements subject to movement) and advise Project Engineer in writing of any condition that could be adversely affected by cutting and patching.
1. Submit written request in advance of cutting or alteration that affects:
 - a. Structural integrity of any element of the Project.
 - b. Integrity of weather-exposed or moisture-resistant element.
 - c. Efficiency, maintenance, or safety of any operational element.
 - d. Visual qualities of sight exposed elements.
 - e. Work of User or separate contractor.
 2. Include in the request:
 - a. Identification of Project.
 - b. Location and description of affected work.
 - c. Necessity for cutting or alteration.
 - d. Description of proposed work, and products to be used.
 - e. Alternatives to cutting and patching.
 - f. Effect on work of User or separate contractor.
 - g. Written permission of affected separate contractor.
 - h. Date and time work will be executed.
- C. Procedures: Perform cutting and patching as required in Part 3 Execution of this Section.
1. Proceed only when permitted and after temporary supports and other devices are in place to ensure structural integrity and to protect other portions of the Project from damage.
 2. Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
 3. Cut rigid materials using masonry saw or core drill. Pneumatic tools are not allowed without prior approval from the Project Engineer.
 4. Restore work with new products in accordance with requirements of the Contract Documents.
 5. Fit work air tight to pipes, sleeves, ducts, conduits and other penetrations through surfaces.
 6. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.
 7. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

1.08 WORK RESTRICTIONS

- A. Project participants shall not perform any work on any Sunday or any Legal Holidays (as defined in Section 3-3-7, Mississippi Code of 1972, Annotated) except as required by emergency conditions and approved by the Project Engineer.
- B. "No Smoking" shall be observed in the work areas.

PART 2 PRODUCTS

2.01 SALVAGED MATERIALS

- A. Coordinate with Project Engineer in identifying salvageable materials. The Owner has first right of refusal for all items.
- B. Contractor shall take proper care in removing and placement where directed in designated area on Site.
- C. Salvage sufficient quantities of cut or removed material to replace damaged work of existing construction, when material is not readily obtainable on current market.
 - 1. Items not required for use in repair of existing work to remain shall be discarded if of no value to the Owner.
 - 2. Do not incorporate salvaged or used material in new construction unless approved in writing by the Project Engineer.

2.02 PRODUCTS FOR PATCHING, EXTENDING AND MATCHING

- A. Provide products or types of construction same as in existing structure, as needed to patch, extend or match existing work to make work complete and consistent to standards of quality of connected and / or similar adjacent construction. Except otherwise indicated all products shall be new.
- B. Where Contract Documents do not define products or standards of workmanship in existing construction, Contractor shall determine products by inspection and any necessary testing, and upgrade by use of the existing as a sample of comparison.

PART 3 EXECUTION

- 3.01 EXAMINATION: Verify that demolition is complete and areas are ready for beginning of repairing, refinishing and new construction.
- 3.02 PREPARATION: Cut, move, or remove existing construction as necessary for access to alterations and renovations work; repair, replace, and restore where existing affected construction is to remain a part of final completed work.
- 3.03 ADJUSTMENTS
 - A. Where partitions are removed, patch floors, walls, and ceilings for installation of new materials.
 - B. Where removal of partition(s) results in adjacent spaces becoming one space, rework floor surfaces and ceilings to provide smooth planes without breaks, steps, or bulkheads.
 - C. Where extreme change of plane occurs, request instructions from Project Engineer as to method of making transition.
 - D. Where new work adversely affects existing conditions beyond work limits defined, new work shall extend to facilitate proper joining and finishing of work.

3.04 DAMAGED SURFACES

- A. Patch and replace any portion of an existing finished surface which as a result of this construction, is found to be damaged, lifted, discolored, or shows other imperfections, with matching material.
 - 1. Provide adequate support of substrate prior to matching the finish.
 - 2. Refinish patched portions of painted or coated surfaces in a manner to produce uniform color and texture over entire surface.
- B. Patch and replace any portion of an existing surface to be refinished as a finished surface that is found to be damaged, lifted, discolored or show imperfections that renders surface or substrate unsuitable for application of new finish material.
 - 1. Refinish patched portion to match existing adjacent surface in order to produce a uniform color and texture.
- C. Where new or existing wall is patched or damaged, the wall surface shall be patched and refinished from base to ceiling and end to end, or nearest natural break, and shall match new work in quality.

3.05 TRANSITION FROM EXISTING TO NEW WORK

- A. When new work abuts or finishes flush with existing work, make a smooth and workmanlike transition. Patched work shall match existing adjacent work in texture and appearance.
- B. When finished surfaces are cut in such a way that a smooth transition with new work is not possible, terminate existing surface in a neat manner along a straight line at a natural line of division.

3.06 CLEANING – PERIODIC AND FINAL

- A. General Requirements:
 - 1. Maintain the Project Space, including areas used for passage of Project personnel and materials, in a neat, clean and orderly condition at all times.
 - 2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for the Work.
 - 3. Provide adequate storage for all items awaiting removal from Site, observing all requirements for fire prevention and protection of the environment.
- B. Periodic Cleaning, as follows:
 - 1. Daily and more often if necessary, inspect the Project Space and pick up all scrap, debris, and waste material; remove to designated storage.
 - 2. At completion of work of each trade, clean area and make surfaces ready for work of successive trades.
 - 3. One each week, more often if necessary, remove all stored waste material and legally dispose of off the Site.
- C. Final Cleaning: Under provision of Section 01740.

END OF SECTION

SECTION 01425

REFERENCE DOCUMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Identification and purpose of Reference Documents.
- B. Administrative procedures and responsibility for the use of Reference Documents.

1.02 IDENTIFICATION AND PURPOSE

- A. Identification: Throughout the Contract Documents are references to nationally known and recognized Codes, Reference Standards, Reference Specifications, and similar documents that are published by Regulatory Agencies, Trade and Manufacturing Associations and Societies, Testing Agencies and others. References also include certain Project Documents or designated portions.
- B. Purpose: All named and otherwise identified "Reference Documents" are "by reference" hereby incorporated into these Specifications as though fully written and hereby serve to establish specific requirements and pertinent characteristics for materials and workmanship as well as methods for testing / reporting on compliance thereto.

1.03 PROCEDURES AND RESPONSIBILITIES

- A. Compliance with Laws and Codes of governmental agencies having jurisdiction shall be mandatory and take precedence over the requirements of all other Reference Documents. For products or workmanship specified by Associations, Trade, or Federal Standards, comply with the requirements of the standard, except when supplemented instructions indicate a more rigid standard and / or define more precise requirements. Should specified reference standards conflict with regulatory requirements or the Contract Documents, request Project Engineer's clarification before proceeding.
- B. The Contractor (including any and all Parties furnishing and / or installing any portion of The Work) shall be familiar with the indicated codes and standards. It shall be the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify (and provide written certification, when required) that the items procured for use in this Work (and their installation, as applicable) meet or exceed the specified requirements.
- C. When date of Reference Document is not specified, conform to latest edition of said Document except when earlier editions are specifically required by Codes.
- D. The contractual relationship of the Parties to the Contract shall not be altered from the requirements of the Contract Documents by mention or inference otherwise in any reference document.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01430

QUALITY ASSURANCE

PART 1 GENERAL

1.01 WORK QUALITY

- A. Shop and field work shall be performed by mechanics, craftspersons, artisans, and workers skilled and experienced in the fabrication and installation/application of the work involved. The Work of this Project shall be performed in accordance with the Drawings, reviewed and approved shop drawings, and these Specifications. Quality of work shall conform to the highest established standards and practices of the various trades involved.
- B. All work shall be erected and installed plumb, level, square, and true, or true to indicated angle, and in proper alignment and relationship to the work of other trades. Finished work shall be free from defects and damage.
- C. Nothing specified in these Specifications shall be construed as relieving the fabricator and installer/applicator of any responsibility for the quality of the finished work. Surfaces on which specified finishes are to be applied shall be in proper condition in every respect for superior finished work and long life without defects.
- D. The fabricator's and installer's/ applicator's performance of the work hereunder shall be to the satisfaction of the Architect and Owner. The Architect reserves the right to reject materials and work quality which are not considered to be up to the accepted high standards of the various trades involved. Such inferior material or work quality shall be repaired or replaced, as directed by the Architect, at no additional cost to the Owner.

1.02 MANUFACTURERS' SPECIFICATIONS AND INSTRUCTIONS

- A. Unless otherwise indicated or specified, manufactured materials, products, processes, equipment, systems, assemblies, and the like shall be erected, installed, or applied in accordance with the manufacturers' instructions, directions, or specifications. Said erection, installation, or application shall be in accordance with printed instructions furnished by the manufacturer of the material or equipment concerned for use under conditions similar to those at the jobsite. Two copies of such instructions shall be furnished to the Architect, and the Architect's acceptance therefore shall be obtained before work is begun.
- B. Any deviation from the manufacturers' printed recommendations shall be explained and acknowledged as correct and appropriate for the circumstances, in writing, by the particular manufacturer. Any deviations must be reviewed by the Architect prior to any action by the Contractor. The installer/applicator will be held responsible for installations contrary to the respective manufacturers' recommendations.

1.03 SPECIALIST APPLICATOR/INSTALLER

- A. Materials, equipment, systems, and assemblies requiring special knowledge and skill for the application or installation of such materials, equipment, systems, or assemblies shall be applied or installed by the specified product manufacturer or its authorized representative or by a skilled and experienced subcontractor qualified and specializing in the application or installation of the specified product with at least five years of successful experience in the type of work indicated and specified.

- B. The installation subcontractor shall be approved by the product manufacturer, as applicable, and a copy of the installer's approval letter from the manufacturer shall be submitted to the Architect.

1.04 MANUFACTURER'S FIELD SERVICES

- A. The manufacturer of a product, system, or assembly which requires special knowledge and skill for the proper application or installation of such product, system, or assembly shall provide appropriate field or job service at no additional cost to the Owner. The manufacturer shall inspect and approve the application or installation work.
- B. The Contractor shall make all necessary arrangements with the manufacturer of the products to be installed to provide onsite consultation and inspection services to assure the correct application or installation of the product, system, or assembly.
- C. The manufacturer's authorized representative shall be present at the time any phase of this work is started.
- D. The manufacturer shall inspect and approve all surfaces over which, or upon which the manufacturer's product will be applied or installed.
- E. The manufacturer's representative shall make periodic visits to the site as the work proceeds as necessary for consultation and for expediting the work in the most practical manner.

1.05 TOLERANCES

- A. Walls: Finished wall surfaces shall be plumb and shall have a maximum variation of 1/8 inch in 8 feet when a straightedge is laid on the surface in any direction, and no measurable variation in any 2-foot direction.
- B. Ceilings: Finished ceiling surfaces shall present true, level, and plane surfaces, with a maximum variation of 1/8 inch in 8 feet when a straightedge and water level are laid on the surface in any direction and no measurable variation in any 2-foot direction.
- C. Concrete floors: Tolerances for concrete floors and pavement are specified in Division 3.
- D. Finished Floors: Level to within plus or minus 1/8 inch in 10 feet for hardwood and resilient floor coverings.

1.06 PROTECTION OF WOOD

- A. Provide protection of all wood materials and products, whether or not installed, including erected and installed wood framing and sheathing, from water and moisture of any kind until completion and acceptance of the project.
- B. The Contractor shall keep informed of weather conditions and forecasts, and when there is a likelihood of rain, shall protect installed and exposed framing and sheathing and stored lumber exposed to the elements with suitable water-repellent coverings, such as canvas tarpaulins and polyethylene sheeting.

- C. Likewise, millwork and trim, paneling, cabinets, shelving, and products manufactured from wood shall be kept under cover and dry at the shop until time for delivery. Such materials shall not be delivered to the site until the building is roofed, and exterior walls are sheathed and protected with building paper as a minimum, the doors and windows are installed and glazed, and there is ample interior storage space for such materials and products. Delivery shall not occur during periods of rain, heavy dew, or fog.
- D. Wood materials or products which become wet from rain, dew, fog, or other source will be considered to have moisture damage and will be rejected, requiring replacement by the Contractor with new, dry materials or products at no increase in the Contract Price. Excepted materials: installed exterior wood siding, exterior wood trim, exterior wood doors, and exterior wood windows, after specified treatments, such as exterior wood stain or paint, have been applied.

1.07 GROUT FILL

- A. In applications where the grout installation may be subjected to moisture, the manufacturer shall submit a letter stating that the entire grout matrix does not contain any of the following:
 - 1. Added gypsum.
 - 2. Plaster-of-paris.
 - 3. Sulfur trioxide levels in a portland cement component exceeding ASTM C 150's published limits.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01455

TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 SUMMARY

- A. Scope: The Contractor shall use testing laboratory services of the Mississippi Department of Transportation for all testing required in this Section. These services will be provided to the Contractor by the MDOT at no charge. Use of said services shall in no way relieve the Contractor of his obligation to perform Work in accordance with the Contract.
- B. Inspection, Sampling and Testing are required for:
 - 1. Section 02315, Excavation, Filling, and Grading.
 - 2. Section 03200, Concrete Reinforcement.
 - 3. Section 03300, Cast-In-Place Concrete.

1.02 LABORATORY'S DUTIES

- A. Materials will be inspected and sampled in accordance with current Mississippi Department of Transportation SOP pertaining to inspecting and sampling.

1.03 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel to provide to laboratory in required quantities preliminary representative samples of materials to be tested.
- B. When required, furnish copies of mill test reports. Furnish to laboratory, casual labor to obtain and handle samples at the site and to facilitate inspections and tests.
- C. Notify laboratory in advance of operations to allow for assignment of personnel and scheduling of tests.

1.04 MATERIAL CERTIFICATIONS AND CERTIFIED TEST REPORTS

- A. All certifications shall meet the following requirements:
 - 1. Have letterhead of the manufacturer, producer, supplier, or fabricator.
 - 2. Include the project number.
 - 3. Itemized list of materials covered by the certification.
 - 4. Contain a material conformance statement, which certifies that the materials conform to the specific specification requirements.
 - 5. Certification for all steel and steel wire products must also include a certified statement by the manufacturer that all of the manufacturing processes are of domestic origin.
 - 6. Signature of a responsible company official.

B. All certified test reports shall meet the following requirements:

1. Have letterhead of the manufacturer, producer, supplier, fabricator, or laboratory.
2. Include name and description of material, lot, batch, or heat number, etc., as applicable.
3. Show results of each required test, and state that the test was run according to the test method specified.
4. Test reports for all steel and steel wire products must also include a certified statement by the manufacturer that all of the manufacturing processes are of domestic origin.
5. Signature of a responsible laboratory official.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

- 1.01 GENERAL: Establish and initiate use of each temporary facility at time first reasonably required for proper performance of the Work. Terminate use and remove facilities at earliest reasonable time, when no longer needed or when permanent facilities have, with authorized use, replaced the need.
- 1.02 FIELD OFFICE AND STORAGE FACILITIES: The Contractor will not be required to provide a temporary field office and storage shed(s).
- A. Copies of Construction Documents: It shall still be the responsibility of the Contractor to maintain storage files suitable to keep duplicates of all correspondence, shop drawings, plans, specifications, samples, etc. required to administer the project. These duplicates will be permanently kept as reference and shall not be used in the field. Contractor is to provide the Project Engineer with job site and emergency telephone numbers.
- B. Storage Facilities: It shall be the Contractor's option to provide watertight storage facilities for storage of cement, lime, and / or other materials subject to water damage. If storage facilities are used, it shall be of sufficient size to hold all materials required for logically grouped activities on the site at one time, and shall have floors raised at least 6 inches above the ground on heavy joists or sleepers. Fully enclosed trailer is allowed, but location must be coordinated with Project Engineer.
- 1.03 FURNISHING AND MAINTENANCE OF EQUIPMENT: Furnish and maintain all equipment such as temporary stairs, ladders, ramps, scaffolds, hoists, runways, derricks, chutes, elevators, etc. as required for proper execution of the Work of all trades. All such apparatus, equipment and construction shall meet all the requirements of the Labor Law and other applicable State or local laws
- 1.04 ELECTRIC LIGHTS AND POWER: Supply lights and power when necessary for the progress of the Work. The operating costs shall be borne by the Owner. Temporary wiring, where required, shall be run in conduits.
- 1.05 WATER: Supply water service. The operating costs shall be borne by the Owner.
- 1.06 ROADS AND ACCESS: The drive is to remain open at all times. A flagman will be required to control traffic when construction vehicles are present.
- 1.07 TOILETS FOR WORKMEN: Provide and maintain all necessary toilets for workmen. Toilets are to be maintained in strict accordance with the regulations of the State Board of Health. The toilets are to be located on the site as directed by the Project Engineer or his authorized representative.
- 1.08 SECURITY / PROTECTION PROVISIONS
- A. The types of temporary security and protection provisions required include, but are not limited to, fire protection, barricades, warning signs / lights, personnel security program (theft prevention), environmental protection, and similar provisions intended to minimize property losses, personal injuries and claims for damages at Project Site(s).
- B. Barricades and Construction Fence: Provide and erect all necessary barricades and any other protection required. Provide all necessary warning and danger lights from twilight to sunrise.

- C. Fire Extinguishers: Provide types, sizes, numbers and locations as would be reasonably effective in extinguishing fires during early stages, by personnel at project site. Provide Type A extinguishers at locations of low potential for either electrical or grease/oil flammable liquid fires; provide Type ABC dry chemical extinguishers at other locations; comply with recommendations of NFPA No. 10. Post warning and quick-instructions at each extinguisher location, and instruct personnel at Project Site, at time of their first arrival, on proper use of extinguishers and other available facilities at Project Site. Post local fire department call number on each telephone instrument at Project Site.
 - D. Environmental Protection Procedures: Designate one person, the Construction Superintendent or other, to enforce strict discipline on activities related to generation of wastes, pollution of air/water/soil, generation of noise, and similar harmful or deleterious effects which might violate regulations or reasonably irritate persons at or in vicinity of Project Site.
 - E. Water Control: Provide pumps as required to keep the excavation free from standing water and shall slope the excavation to prevent water from running toward existing buildings at all times.
- 1.09 BURNING OF TRASH: No burning of trash or debris shall be done on Owner's property. All such materials shall be removed from the site and disposed of in accordance with local laws and ordinances.
 - 1.10 POWDER ACTUATED TOOLS: The use of powder actuated tools shall be prohibited from use during all phases of the construction, unless explicitly approved in writing, prior to construction, by the Project Engineer.
 - 1.11 FIRE HAZARDS: Special precautions shall be taken to reduce fire hazards where electrical or gas welding or cutting Work is done and suitable fire extinguishing equipment shall be maintained near such operations.
 - 1.12 CONDUCT OF WORKERS: Workmen who, because of improper conduct or persistent violation of Owner's requirements, become objectionable, shall be removed at the Owner's request. Inform all workmen of Owner's requirements.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION
Not Used

END OF SECTION

SECTION 01610

BASIC PRODUCT REQUIREMENT

PART 1 GENERAL

1.01 SECTION INCLUDES: The products of The Work and the requirements for their quality, delivery, handling, storage, protection and installation.

1.02 DEFINITIONS

A. "Products". Defined as: The materials, machinery, equipment, components, and systems, in whole or in part, incorporated into The Work. "Products" does not include materials, tools, devices, machinery, equipment and systems used for the preparation, manufacture, fabrication, conveying and installation of The Work.

B. "Level of Excellence". Defined as: The degree of quality for the Products and Workmanship of this Project. The required "degree of quality" shall be established on the basis of one or more of the following criteria which shall become the minimum acceptable "level of excellence" for the Work of this Project:

1. Selected Products.
2. Specifications.
3. Reference Standards.
4. Manufacturer's Instructions.
5. Industry Standards.

a. In the absence of all the criteria from the Specifications Section, the normal local Industry Standard shall prevail. The Party or Parties responsible for the required work shall be experienced in the work to be provided; shall have knowledge as to what, in the local area, constitutes "good and acceptable practice" in producing the completed Work of this Section, and will be expected to provide nothing less.

- 1) Example: Masonry and Drywall Contractors are expected to know that Industry Standards, "good practice", and "common sense" dictate, to prevent cracks in the completed work, control joints must be installed at minimum distances or should be placed in certain locations where movement or other stress conditions are likely to occur. When such items are not specified or shown on the Drawings, the Contractor will be expected to request the Project Engineer's clarification for location (primarily for esthetic considerations) and then provide not less than the minimum Industry Standard, at no additional cost to the Owner.

C. "Standard of Quality". Defined as: A specific and particular manufacturer whose product(s) has / have been selected by the Architect / Engineer as amply suitable to meet the Project requirements in one or more of the following criterions: appearance, physical attributes, performance characteristics, appropriateness for intended use, and cost.

1. The work of the individual Specification Section will be based on product(s) of the "Standard of Quality Manufacturer" and the product(s) of that manufacturer, designated within the Specifications Section by catalog number(s) (or other identification), shall become "Standard of Quality Product(s) and the basis by which the product(s) of "Other Acceptable Manufacturers", and any substitutions, are judged.
2. In the absence of the designation "Standard of Quality", such as for generic product, material or system, then the specified item (product, material or system) shall be the reference standard and shall become the "Standard of Quality".

D. "Equivalent Products". Defined as: Products having a level of excellence which, in the Project Engineer's judgment, is equal to the level of excellence established by the product(s) selected as Architect's / Engineer's "Standard of Quality".

- E. "Manufacturer". Defined as: An entity whose principal business is the manufacturing, fabricating, assembling, and / or supplying of products / systems from off site for incorporation (in whole, or in part, such as components of a system) into the construction at the Project Site.
 - 1. The Architect's / Engineer's selection of a particular manufacturer usually is on the basis of the manufacturer's reputation within the Construction Industry, and / or "track record" with the Architect / Engineer, for producing quality products on time, and providing responsive follow-up and reliable warranties.
 - 2. The terms "Fabricator" and "Supplier" used in these Specifications shall be synonymous with "manufacturer".
- F. "Other Acceptable Manufacturers". Defined as: Manufacturers who have qualifications and products similar to those of the "Standard of Quality" Manufacturer (see above) selected by Architect / Engineer and are therefore "acceptable" to offer any of their products considered to be "equivalent" to the specified product(s).
 - 1. To the best of the Architect's / Engineer's knowledge, information and belief, the manufacturers, listed as "Other Acceptable Manufacturers", now have products available that are considered to be "equivalent" to the specified product (or selection) of the "Standard of Quality" Manufacturer. Where no "Standard of Quality" is indicated then any of the "Acceptable Manufacturers" listed may offer products complying with the specified requirements.
 - 2. The inclusion of particular manufacturers as "Other Acceptable Manufacturers" does not signify that other (that is, unlisted) manufacturers are not acceptable or that they do not have equivalent products nor does the omission of any manufacturer's name indicate unacceptability for any reason.
 - 3. Manufacturers, who are not listed in the Contract Documents, and who desire consideration, must submit their product under provisions of Section 01630-Product Options and Substitutions Procedures.

1.03 QUALITY ASSURANCE – GENERAL

- A. The quality of all products and workmanship shall be in accordance with the provisions of this Section and the requirements of the individual Specifications Section.
- B. Whenever a "level of excellence" higher than the minimum industry standard is expected for products and workmanship, the more rigid standards and precise requirements will be indicated within individual Specifications Sections.
 - 1. Example: For whatever reason, the Architect / Engineer may specify a "dry film thickness (DFT)" for a coating that is more than the manufacturer's recommendation or than normally available in a three coat system. It shall be the Contractor's responsibility to achieve the required DFT with one or more additional coats, none of which shall be more than the manufacturer's recommendation for wet film thickness, for a single coat, when applied.
- C. Establishing and maintaining Project Quality Control shall be the responsibility of the Contractor.

1.04 QUALITY ASSURANCE – PRODUCTS

- A. All products incorporated into The Work shall be new except where otherwise provided by the Contract Documents and shall comply with the requirements of the individual Specifications Sections and as supplemented herein. All products incorporated into the Work shall be asbestos free. Products containing asbestos are not acceptable and will be considered as defective material. Whenever these products containing asbestos are discovered, they shall be removed from the Work at no cost to the Owner. Contractor shall certify that all materials incorporated into the Work are asbestos free, refer to Section 01770 - Closeout Procedures.

B. Matching / Mating of Products:

1. Products required in quantity within a Specifications Section shall be the same, and shall be interchangeable.
2. All manufactured products exposed to view, especially those considered as "Finishes" (including, but not limited to, items as floor material, wall coverings, glass, paint ceiling tile, that are installed or applied directly from manufacturer's containers), shall be of the same factory "run".
3. The Contractor is expected to secure a sufficient quantity with initial purchase to avoid running short. Materials within an area that do not match, as a result of such failure, will be cause to reject all materials and will not be grounds for additional compensation.

C. Extra Materials: When required by individual Specifications Sections, provide products, spare parts and maintenance material in condition and quantities required. All "extra materials" shall be of the same factory "run" as installed materials. Deliver to Project Site, properly store in appropriate locations, and obtain receipt from authorized person prior to Final Payment.

1.05 QUALITY ASSURANCE – WORKMANSHIP

A. Comply with the "level of excellence" required by individual Specifications Sections. In the absence of specific requirements, comply with product(s) manufacturer's instructions and Industry Standards.

B. Use only suitably qualified craftsmen to produce work of the specified quality.

1. Craftsmen shall be of excellent ability, thoroughly trained and experienced in types of work required, completely familiar with the quality standards, procedures and materials required.
2. In the acceptance or rejection of manufactured and / or installed work, the Project Engineer will make no allowance for the lack of skill on the part of workmen.

C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

D. Provide finishes to match approved samples.

E. Adjusting of Operating Products: As follows:

1. Adjust moving parts of product / equipment (including, but not limited to, doors, drawers, hardware, appliances, mechanical and electrical equipment) to ensure smooth and unhindered operation and movement at time when Owner assumes control of item's use.
2. All items shall be properly set, calibrated, balanced, lubricated, charged, and otherwise prepared and ready for intended use.
3. Starting of Systems: When specified in individual Sections, require manufacturer's representative to be present at the Site to inspect, check, and approve equipment installation prior to start-up; to supervise placing equipment in operation; and to certify by written report that equipment has been properly installed, adjusted, lubricated, and satisfactorily operated under full load conditions.
4. Equipment/systems Demonstrations and Personnel Instruction: When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and systems and to instruct Owner's personnel on proper operation and maintenance manuals as basis of instruction and demonstration. Include start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at schedule times, at equipment location.

1.06 TRANSPORTATION AND HANDLING

- A. Transport products by means and methods to avoid product damage; deliver in undamaged condition in manufacturers' unopened containers or packaging, keep dry.
- B. Provide equipment and personnel to handle products by means to prevent soiling or damage.
- C. Promptly inspect shipments for compliance with requirements, quantities, and damage.

1.07 STORAGE AND PROTECTION

- A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weathertight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions. Protect prefinished surfaces from damage or deterioration by acceptable means; do not use adhesive papers, sprayed or strippable coatings that bond when exposed to sunlight or weather.
- B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering (do not use "Visqueen" or other polyethylene sheeting when subject to direct sunlight); provide ventilation to avoid condensation.
- C. Store loose granular materials on solid surface in a well-drained area; prevent mixing with foreign matter.
- D. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under specified conditions and are fit for use.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01630

PRODUCT OPTIONS AND SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Scope: To give the product options available to the Contractor and to set forth the procedure and conditions for substitutions.

1.02 CONTRACTOR'S OPTIONS

- A. For products specified only by reference standards, select any product meeting standards by any manufacturer.
- B. For products specified by naming several (minimum of three) products or manufacturers, select any product and manufacturer named. Contractor must submit request, as required for substitution, for any product not specifically named and give reasons for not using product specified. Substitution will **Not** be granted unless reasons are considered justified.
- C. For product specified by naming one or more products, but indicating the option of selecting equivalent products by stating "or approved equal" after specified product, Contractor must submit request, as required for substitution, for any product not specifically named.
- D. For products specified by naming only one product and manufacturer, an equivalent product will always be accepted if it is equal in all respects (size, shape, texture, color, etc.). The Contractor must submit a request for substitution as set forth in this section
- E. For products specified by naming only one product and manufacturer and stating no substitutions will be accepted, there is no option and no substitutions will be allowed.

1.03 PRODUCT SUBSTITUTION LIST

- A. Within 45 days after Notice to Proceed, submit to the MDOT Architect 4 copies of complete list of all proposed product substitutions.
- B. Tabulate list by each Specification Section.
- C. For named products specified with reference standards, include with listing of each product:
 - 1. Name and address of manufacturer.
 - 2. Trade name.
 - 3. Model or catalog designation.
 - 4. Manufacturer's data.
 - 5. Performance and test data.
 - 6. Reference standards.
- D. Proposed product will be reviewed for incorporation into the Project. Contractor will be notified for substitution rejection if not allowed, or will be instructed to submit in standard substitution submittal process for approval. See attached Substitution Request Form.

1.04 SUBSTITUTIONS

A. The MDOT Architect will consider formal written requests from Contractor for substitution of products in place of those specified. Only **One** request per product will be allowed. Refer to Section 01330 - Submittal Procedures. Include in request:

1. Complete data substantiating compliance of proposed substitutions with Contract Documents.
2. For products:
 - a. Product identification including manufacturer's name and address.
 - b. Manufacturer's literature: Submit literature of actual product specified and literature of proposed substitution with all comparable features or components highlighted. Highlighted information is to include, but shall not be limited to, product description, performance, test data and reference standards.
 - c. Samples of the proposed substitution.
 - d. Name and address of 3 similar projects on which product was used and date of installation.
3. For construction methods:
 - a. Detailed description of proposed method.
 - b. Drawings illustrating methods.
4. Itemized comparison of proposed substitution with product or method specified.
5. Data relating to changes in construction schedule.
6. Accurate cost data on proposed substitution in comparison with product or method specified.

B. In making request for substitution, Contractor represents:

1. He has personally investigated proposed product or method, compared the product specified with the proposed substitution, and determined that it is equal or superior in all respects to that specified.
2. He will provide the same guarantee for substitution as for product or method specified.
3. He will coordinate installation of accepted substitution into Work, making such changes required of Work to be complete in all respects.
4. He waives all claims for additional costs related to substitution that consequently becomes apparent.
5. Cost data is complete and includes all related costs under his Contract.

C. Substitutions will **Not** be considered if:

1. They are indicated or implied on Shop Drawings or product data submittals without formal request submitted in accordance with this Section.
2. Acceptance will require substantial revision of Contract Documents.
3. In the MDOT Architect's judgment, the product or material is not equal.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

SUBSTITUTION REQUEST FORM

PROJECT: _____ PROJECT NO. _____

OWNER: _____

CONTRACTOR: _____

ARCHITECT: _____

CONTRACTOR'S REQUEST, WITH SUPPORTING DATA

1. Section of the Specifications to which this request applies:

☐ Product data for specified item and proposed substitution is attached (description of product, reference standards, performance and test data).

☐ Sample is attached

☐ Sample will be sent if requested by Authority having Jurisdiction.

2. Itemized comparison of proposed substitution with product specified.

ORIGINAL PRODUCT	SUBSTITUTION
Name, brand _____	_____
Catalog No. _____	_____
Manufacturer _____	_____
Significant variations: _____	

3. Proposed change in Contract Sum:

Credit to Owner: \$ _____

Additional Cost to Owner: \$ _____

4. Effect of the proposed substitution on the Work:

Contract Time: _____

Other Contracts, if any: _____

CONTRACTORS STATEMENT OF CONFORMANCE OF PROPOSED
SUBSTITUTION TO CONTRACT REQUIREMENTS

I/We have investigated the proposed substitution. I/We

1. Believe that it is equal or superior in all respects to originally specified product, except as stated in 2. above;
2. Will provide same warranty as required in Contract Documents;
3. Have included all cost data and cost implications of proposed substitution; including, if required, costs to other contractors, and redesign and special inspection costs caused by use of proposed substitution;
4. Will coordinate incorporation of proposed substitution in the Work;
5. Will modify other parts of the Work as may be needed, to make all parts of the Work complete and functioning;
6. Have verified that use of this substitution conforms to all applicable codes.
7. Waive future claims for added cost to Owner caused by proposed substitution.

CONTRACTOR _____ DATE: _____

Signature

ARCHITECT'S REVIEW AND ACTION

___ Accepted

___ Not Accepted

___ Provide more information in the following categories and resubmit _____

___ Sign Contractor's Statement of Conformance and resubmit

___ Proposed substitution is accepted, with the following conditions:

Change Order will make the following changes:

(Add to) (Deduct from) Contract Sum: \$ _____

(Add to) (Deduct from) Contract Time: _____ days

ARCHITECT: _____ DATE _____

OWNER: _____ DATE _____

___ Accepted ___ Not accepted

END OF SECTION

SECTION 01735

CUTTING AND PATCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Scope: To set forth broad general conditions covering cutting and patching that applies to everyone and everything on the job.
- B. Execute cutting including excavating, fitting or patching or work required to:
 - 1. Make several parts fit properly.
 - 2. Uncover work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to Contract requirements.
 - 5. Install specified work in existing construction.
- C. In addition to Contract requirements, upon Project Engineer's written instructions:
 - 1. Uncover work for observation of covered work.
 - 2. Remove samples of installed materials for testing.
 - 3. Remove work to provide alteration of existing work.
- D. Do not cut or modify work of another Contractor without his consent.
- E. Payment for Costs: Costs caused by ill-timed, defective or work not conforming to the Contract will be borne by party responsible for ill-timed, defective or non-conforming work.

PART 2 PRODUCTS

- 2.01 GENERAL: Materials for replacement of work removed shall comply with individual Specifications Sections for type of work to be done.

PART 3 EXECUTION

3.01 GENERAL

- A. Inspection: Inspect existing conditions of work, including elements subject to movement or damage during cutting and patching.
- B. Preparation prior to cutting: Provide shoring, bracing and supports required to maintain structural integrity. Provide protection for other portions of project and protection from the elements.

C. Performance:

1. Execute cutting and demolition of methods that prevent damage to other work and will provide surfaces to receive installation of repairs and new work.
2. Execute excavating and backfilling by methods that prevent damage to other work and prevent settlement
3. Restore work that has been cut or removed install new products to provide completed work in accordance with requirements of the Contract Documents.
4. Refinish entire surfaces as necessary to provide an even finish. Refinish continuous surfaces to the nearest intersection and assemblies.

END OF SECTION

SECTION 01740

CLEANING

PART 1 GENERAL

1.01 SUMMARY

- A. Scope: Maintain premises and public properties from accumulations of waste, debris, and rubbish, caused by operations. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials and clean all sight-exposed surfaces; leave project clean and ready for occupancy.
- B. Dispose of all waste, debris and rubbish in accordance with the Owner's requirements.

PART 2 PRODUCTS

- 2.01 MATERIALS: Use only cleaning materials recommended by the manufacturer of surface to be cleaned, but cross reference cleaning materials used on surfaces to insure they are recommended by the cleaning material manufacturer.

PART 3 EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute cleaning to insure that structure, grounds, and surrounding properties are maintained free from accumulations of waste materials and rubbish. Wet down dry materials and rubbish to lay dust and prevent blowing dust. Clean site and surrounding properties at reasonable intervals during progress of Work, and remove waste materials, debris and rubbish from site and legally dispose of at public or private dumping areas off MDOT owned property. Handle materials in a controlled manner with as few handling as possible; do not drop or throw materials from heights. Schedule cleaning operations so that dust or other contaminants resulting from cleaning process will not fall on wet or newly painted surfaces.
- B. No materials may be disposed of by dumping them in the sanitary or storm sewer systems without specific approval by the Owner.
- C. Washdown of cement trucks will be done at locations determined by the Project Engineer.

3.02 FINAL CLEANING

- A. Employ experienced workmen, or professional cleaners, for final cleaning. In preparation for Inspection of structure, conduct final inspection of sight-exposed surfaces and concealed spaces. Remove grease, dust, dirt, stains, labels, fingerprints and other foreign materials from sight-exposed finished surfaces. Repair, patch and touch up marred surfaces to specified finish to match adjacent surfaces.
- B. Broom clean paved surfaces; rake clean other surfaces of grounds.
- C. Remove temporary fencing and leave in same condition as surrounding landscaped areas.
- D. Keep Project clean until occupied by Owner.

END OF SECTION

SECTION 01770

CLOSEOUT PROCEDURES

PART 1 GENERAL

- 1.01 DESCRIPTION: The Scope of Work required under this Section consists of the Final Inspections, submitting of all closeout Documents and related items to complete the Work indicated on the Drawings and described in the Project Manual.
- 1.02 FINAL INSPECTIONS
- A. Engineer's Inspection: The Contractor shall make written request for a Final Inspection to the Project Engineer. Notice is to be given 10 calendar days prior to this inspection. At the day of inspection, the Contractor shall have in hand 6 copies of the HVAC Test and Balance Report, Reference Specification Section 15080 and 6 copies of a list prepared by the Contractor of deficiencies, which will be edited by the Project Engineer. A copy of these composite lists will be given to the Contractor for correcting the Work. Within 15 calendar days after this revised list is received, the Contractor shall make all corrections of the items listed. If, in the Project Engineer judgment, the Project is not ready for an Inspection, the Project Engineer may schedule another inspection.
 - B. Owner's Inspection: After the Project Engineer has determined the Project to be Complete and all punch list items have been corrected, an Owner's Inspection will be scheduled. The Contractor shall submit a letter that states all items have been corrected and submit required closeout Documents. The Owners may add to the punch list items if it is determined that corrective work still needs to be done. Within 15 calendar days after this revised list is received, the Contractor shall make all corrections of the items listed.
 - C. Correction of Work before Final Payment: Contractor shall promptly remove from the Owner's premises, all materials condemned for failure to conform to the Contract, whether incorporated in Work or not, and Contractor shall, at his own expense, replace such condemned materials with those conforming to the requirements of the Contract. Failure to remedy such defects after 10 days written notice will allow the Owner to make good such defects and such costs shall be deducted from the balance due the Contractor or charged to the Contractor in the event no payment is due.
 - D. Should additional inspections by the MDOT Consultants of the Work be required due to failure of the Contractor to remedy defects listed, the Project Engineer may deduct the expense of additional Consultants inspections from the Contract Sum in the Owner / Contractor Agreement. The additional expense will be based on the rate shown for services in the Consultants' Architect or Engineering Services Contract.
- 1.03 FINAL ACCEPTANCE: The Mississippi Department of Transportation presently does not recognize the term "Substantial Completion". Therefore, the Project is not complete and time does not end until all defects are remedied and Final Acceptance is given.
- 1.04 CLOSEOUT DOCUMENTS: Unless otherwise notified, the Contractor shall submit to the Owner through the Project Engineer, 2 copies of the following before final payment is made:
- A. Request for Final Payment: AIA Document G702, current edition, completed in full or a computer generated form having similar data.
 - B. Contractor's Affidavit of Payment of Debts and Claims: AIA Document G706, current edition, completed in full.

- C. Release of Liens and Certification that all Bills Have Been Paid: AIA Document G706A, current edition, completed in full or a sworn statement and affidavit from the Contractor to the Owner stating that all bills for this project have been paid and that the Owner is released from any and all claims and / or damages.
- D. Consent of Surety Company to Final Payment: AIA Document G707, current edition, completed in full by the Bonding Company.
- E. Power of Attorney: Closeout Documents should be accompanied by an appropriate Power of Attorney.
- F. Guarantee of Work: Sworn statement that all Work is asbestos free and guaranteed against defects in materials and workmanship for one year from Date of Final Acceptance, except where specified for longer periods.
 - 1. Word the guaranty as follows: "We hereby guarantee all Work performed by us on the above captioned Project to be free from asbestos and defective materials. We also guarantee workmanship for a period of one (1) year or such longer period of time as may be called for in the Contract Documents for such portions of the Work".
 - 2. All guarantees and warranties shall be obtained in the Owner's name.
 - 3. Within the guaranty period, if repairs or changes are requested in connection with guaranteed Work which, in the opinion of the Owner, is rendered necessary as a result of the use of materials, equipment, or workmanship which are inferior, defective, or not in accordance with the terms of the Contract, the Contractor shall promptly, upon receipt of notice from and without expense to the Owner, place in satisfactory condition in every particular, all such guaranteed Work, correct all defects wherein and make good all damages to the building, site, equipment or contents thereof which, in the opinion of the Owner, is the result of the use of materials, equipment, or workmanship which are inferior, defective or not in accordance with the terms of the Contract; and make good any Work or materials or the equipment and contents of said buildings or site disturbed in fulfilling any such guaranty.
 - 4. If, after notice, the Contractor fails to proceed promptly to comply with the terms of the guaranty, the Owner may have the defects corrected and the Contractor and his sureties shall be liable for all expense incurred.
 - 5. All special guaranties applicable to definite parts of the Work stipulated in the Project Manual or other papers forming part of the Contract shall be subject to the terms of this paragraph during the first year of the life of such special guaranty.
- G. Project Record Documents: Furnish all other record documents as set forth in Section 01785 - Project Record Documents.
 - 1. Provide all certificates, warranties, guarantees, bonds, or documents as called for in the individual Sections of the Project Manual. The Contractor is responsible for examining the Project Manual for these requirements.

H. Additional Documents Specified Within the Project Manual:

1. General: Provide all Operational and Maintenance documents as called for in the individual Sections of the Project Manual. The Contractor is responsible for examining the Project Manual for these requirements.
2. Maintenance Stock: Deliver to Owner all required additional maintenance materials as required in the various Sections of the Specifications.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION
Not Used

END OF SECTION

SECTION 01783

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Emergency manuals.
 - 2. Operation manuals for systems, subsystems, and equipment.
 - 3. Maintenance manuals for the care and maintenance of products, materials, a finishes systems and equipment.
- B. Related Sections include the following:
 - 1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Division 1 Section "Closeout Procedures" for submitting operation and maintenance manuals.
 - 3. Division 1 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
 - 4. Divisions 2 through 16 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.02 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.03 SUBMITTALS

- A. Initial Submittal: Submit 2 draft copies of each manual at least 15 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. MDOT Architect will return one copy of draft and mark whether general scope and content of manual are acceptable.
- B. Final Submittal: Submit 2 copies of each manual in final form at least 15 days before final inspection. MDOT Architect will return one copy with comments (if required) within 15 days after final inspection.
 - 1. Correct or modify each manual to comply with MDOT Architect's comments. Submit 2 copies of each corrected manual within 15 days of receipt of MDOT Architect's comments.

1.04 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.01 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name, address, and telephone number of Contractor.
 - 6. Name and address of Architect.
 - 7. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
 - 1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2 inches by 11 inches paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
 - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.

3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2 inches by 11 inches white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.02 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 1. Type of emergency.
 2. Emergency instructions.
 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 1. Fire.
 2. Flood.
 3. Gas leak.
 4. Water leak.
 5. Power failure.
 6. Water outage.
 7. Chemical release or spill.
 8. System, subsystem, or equipment failure.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
 1. Instructions on stopping.
 2. Shutdown instructions for each type of emergency.
 3. Operating instructions for conditions outside normal operating limits.
 4. Required sequences for electric or electronic systems.
 5. Special operating instructions and procedures.

2.03 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 1. System, subsystem, and equipment descriptions.
 2. Performance and design criteria if Contractor is delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.

5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.04 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

2.05 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard printed maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training videotape, if available.

- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.01 MANUAL PREPARATION

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original Project Record Documents as part of operation and maintenance manuals.
 - 2. Comply with requirements of newly prepared Record Drawings in Division 01 Section "Project Record Documents."
- F. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION

SECTION 01785

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 DESCRIPTION

- A. Scope: To set forth the minimum procedure and requirements for keeping the Project Record Documents. One of these Documents is to be kept on site throughout the Project.
- B. Maintenance of Documents:
 - 1. Maintain 2 copies of all: Half-size Contract Drawings, Project Manual (Proposal), Addenda, Change Orders, Warranties, Certificates, Guarantees, Bonds, reviewed Shop Drawings, reviewed submittals (materials, fixtures, appliances, etc.), hardware schedules, field and laboratory test records, equipment brochures, spare parts lists, maintenance and operation manuals and other modifications to the Contract.
 - 2. Store Record Documents apart from Documents used for construction.
 - 3. Maintain Record Documents in clean, dry, and legible condition. Do not use Record Documents for construction purposes.
 - 4. Make Record Documents available at all times for inspection by the Project Engineer and Owner.
- C. Recording:
 - 1. General: Mark all modifications in red pencils. Keep Record Documents current. Review log at Progress Meetings. Do not permanently conceal any Work until required information has been accurately recorded.
 - 2. Contract Drawings: Legibly mark to record actual construction:
 - a. Horizontal and vertical location of underground and overhead utilities with their connections referenced to permanent surface improvements.
 - b. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - c. Field changes that involve dimension and detail.
 - d. Changes made by Supplemental Agreement (Change Order) or Field Order.
 - 3. Product Data List: Legibly list by each Specification Section to record manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed. The list shall include the supplier / subcontractor's name, contact person, street address, e-mail address, telephone and fax numbers.
 - 4. Shop Drawings: Maintain as Record Documents; legibly mark Drawings to record changes made after review.

D. Submittals:

1. Furnish two (2) copies of all Record Documents.
2. The information, except Contract Drawings, shall be arranged and labeled by corresponding Specification Section, neatly bound in three ring binders, indexed, and all drawings readable without being removed or unstapled.
3. The Product Data list with name and address of each subcontractor and material supplier shall be listed in front of each binder.
4. Sufficient information, such as as-built control drawings for air handling system and variable drive controls, shall be furnished to allow qualified personnel to service equipment.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION
Not Used

END OF SECTION

SECTION 02226

PARTIAL DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

- A. Extent of demolition Work is indicated on Drawings. Demolition requires selective removal and subsequent offsite disposal. The building is intended to be completely vacated after bid day, but it shall be necessary for existing building to be protected during the demolition and construction.
- B. Types of Demolition Work include, but are not limited to the following items:
 - 1. Portions of building structure indicated on Drawings and as required to accommodate new construction.
 - 2. Removal of all or portions of interior or exterior partitions as indicated on Drawings.
 - 3. Removal of all exterior building or site items indicated on Drawings.
 - 4. Removal of doors and frames indicated "remove".
 - 5. Removal and protection of existing fixtures and equipment items indicated "salvage".

1.02 REMOVAL WORK SPECIFIED ELSEWHERE

- A. Cutting non-structural concrete floors and walls for piping, ducts, and conduit is included with the Work of the respective mechanical and electrical Divisions 15 and 16 Specification Sections.
- B. Remodeling and patching is included within the respective sections of Specifications, including removal of materials for re-use and incorporated into remodeling or new construction.
- C. Relocation of pipes, conduits, ducts, fans, and other mechanical and electrical work are specified by respective trades.

1.03 SUBMITTALS

- A. At least 7 calendar days prior to beginning demolition submit schedule indicating proposed methods and sequence of operations for selective demolition Work to Project Engineer for review prior to commencement of Work. Include coordination for shut-off, capping, and continuation of utility services as required, together with details for dust and noise control protection.
- B. Provide detailed sequence of demolition and removal Work to ensure uninterrupted progress of Owner's on-site operations.

1.04 JOB CONDITIONS

- A. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished. Conditions existing at time of commencement of Contract will be maintained by Owner insofar as practicable.
- B. Partial Demolition and Removal: Items indicated to be removed but of salvable value to Contractor may be removed from structure as Work progresses. Items indicated to be removed and turned over to Owner are to be removed from structure as Work progresses and stored as directed by Owner. Items requested at time of Pre-Construction Meeting to be turned over to Owner are to be removed from structure as Work progresses and stored as directed by Owner. Transport salvaged items not indicated to be turned over to Owner from site as they are removed. Storage or sale of removed items not indicated to be turned over to Owner on site will not be permitted.

1.05 PROTECTIONS

- A. Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition Work.
- B. Provide protective measures as required providing free and safe passage of Owner's personnel and general public to and from occupied portions of building.
- C. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished, and adjacent facilities or work to remain.
- D. Protect from damage existing finish Work that is to remain in place and becomes exposed during demolition operations.
- E. Protect floors with suitable coverings when necessary.
- F. Construct temporary insulated solid dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks if required.
- G. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces, and installation of new construction to insure that no water leakage or damage occurs to structure or interior areas of existing building.
- H. Remove protections at completion of work.

1.06 DAMAGES: Promptly repair damages caused to adjacent facilities by demolition Work at no cost to Owner.

1.07 TRAFFIC

- A. Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, corridors, and other adjacent occupied or used facilities.
- B. Do not close, block or otherwise obstruct streets, walks, entrances, canopies, or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by Owner.

1.08 EXPLOSIVES: Use of explosives will not be permitted.

1.09 UTILITY SERVICES

- A. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.
- B. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

1.10 ENVIRONMENTAL CONTROLS

- A. Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.
- B. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION

3.01 INSPECTION: Prior to commencement of selective demolition work, inspect areas in which Work will be performed. Photograph existing conditions to structure surfaces, equipment or to surrounding properties which could be misconstrued as damage resulting from selective demolition Work; file with Project Engineer prior to starting Work.

3.02 PREPARATION

- A. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain. Cease operations and notify the Project Engineer immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
- B. Erect and maintain dust-proof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.
- C. Provide weatherproof closures for exterior openings resulting from demolition Work.
- D. Locate, identify, stub out and disconnect utility services that are not indicated to remain. Provide by-pass connections as necessary to maintain continuity of service to occupied areas of other buildings on site. Provide minimum of 7 calendar days advance notice to Owner if shutdown of service is necessary during changeover. Schedule electrical shut-offs to begin at 6:00 a.m., Saturdays, unless indicated otherwise by Project Engineer.

3.03 DEMOLITION

- A. Perform selective demolition Work in a systematic manner. Use such methods as required to complete Work indicated on Drawings in accordance with demolition schedule and governing regulations. Schedule demolition at times acceptable to the Owner, which may include after-hours or weekends.
- B. All cutting and patching shall be done in such a manner that at all times the building shall remain dust free and dry at no additional cost to the Owner. All patching upon completion shall meet the following requirements:
 - 1. Blend with the existing materials.
 - 2. Shall be painted.
 - 3. Shall have trim, gaskets, and / or sealant for water and vermin tight construction.
- C. Caution and protective measures shall be used and in place before cutting of any metal or other materials that might spark a fire from combustible oils, dusts, rags, etc.
- D. Demolish concrete in small sections. Cut concrete at junctures with construction to remain using power-driven masonry saw or hand tools. Do not use power-driven impact tools.
- E. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.
- F. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
- G. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Project Engineer in written, accurate detail. Pending receipt of directive from Owner's representative rearrange selective demolition schedule as necessary to continue overall job progress without delay.

3.04 SALVAGE MATERIALS

- A. Where indicated on drawings as "Salvage" or "To be Reused", carefully remove indicated items, clean, store and protect for later reuse and installation.
- B. As directed in the Pre-Construction meeting as specific items to be salvaged and given to the Owner, carefully remove indicated items and store where directed by Project Engineer.

3.05 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove debris, rubbish and other materials resulting from demolition operations from building site. Transport and legally dispose of materials off site.
- B. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.
- C. Burning of removed materials is not permitted on project site.
- D. Contractor is required to provide a dumpster for this Project and is not to use the Owners dumpster at any time. Location of the Contractor's dumpster is to be coordinated with the Project Engineer.

3.06 CLEAN-UP AND REPAIR

- A. Upon completion of demolition Work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.
- B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition Work. Repair adjacent construction or surfaces soiled or damaged by selective demolition Work.

END OF SECTION

SECTION 02315

EXCAVATION, FILLING AND GRADING

PART 1 GENERAL.

- 1.01 SECTION INCLUDES: The extent of excavation, filling and grading is shown on the Drawings. Preparation of subgrade for building slabs, walks, and pavements is included as part of this Work. Backfilling of trenches within the building lines is included as part of this Work. Preparation of topsoil in grassed areas is included as part of this Work.
- 1.02 RELATED SECTIONS: Section 01455 – Testing Laboratory Services.
- 1.03 SUBMITTALS: Notification shall be provided to Project Engineer indicating source of borrow material in advance of start of Work and certification provided that proposed soil material is satisfactory for specified use.
- 1.04 QUALITY ASSURANCE:
- A. Perform excavation Work in compliance with applicable requirements of governing authorities having jurisdiction.
 - B. Compaction density shall be 95 percent of the maximum dry density value as determined by ASTM D 698 (Standard Proctor Test) of AASHTO T-99.
 - C. Soils compaction control tests shall be performed as specified herein and under Section 01455 - Testing Laboratory Services. Stability is defined as absence of significant yielding or pumping of soils under compaction effort.
 - D. Number of Tests: Make test(s) in accordance with AASHTO T-99 for each class of material. Make in-place density tests in accordance with AASHTO T-238 (Nuclear Method) for density tests, as the fill and backfill work progresses. At least one test per lift of any isolated portions and each footing.
 - E. Work on Non-Tested Areas: Placing permanent construction over fill that has not been tested and approved may require removal of permanent Work, re-compacting the fill and replacing the Work at no additional cost to the Owner.
- 1.05 EXISTING UTILITIES
- A. Locate existing underground utilities in the areas of Work. If utilities are to remain in place, provide adequate means of protection during earthwork operations. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the Utility Owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
 - B. Do not interrupt existing utilities serving facilities occupied and used by Owner or others except when permitted in writing by Project Engineer and then only after acceptable temporary utility services have been provided. Demolish and completely remove from site existing underground utilities indicated "To Be Removed". Coordinate with utility companies for shut off of services if lines are active.

- 1.06 PROTECTION OF PERSONS AND PROPERTY: Barricade open excavations occurring as part of this Work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
- 1.07 USE OF EXPLOSIVES: The use of explosives is not permitted.

PART 2 PRODUCTS

- 2.01 BACKFILL AND FILL: Select fill shall be an approved select material free from trash, debris, stones larger than 3 inches, roots and other organic matter.
- 2.02 GRANULAR FILL
 - A. Below existing natural grade line: Sandy clay with a liquid limit less than 45 and PI in range of 10 to 22, or clayey sand with PI not less than 7 and liquid limit not greater than 35.
 - B. Above existing natural grade under slabs and footings: Silty or sandy clay as above or clayey-sand with LL less than 35 and PI of 3 to 15.
- 2.03 TOPSOIL: Provide topsoil to supplement that for reuse at site. Provide clean, fertile, friable, natural loam obtained from a local, well drained source.

PART 3 EXECUTION

- 3.01 INSPECTION: Examine the areas and conditions under which excavating, filling, and grading are to be performed and notify the Contractor, in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.
- 3.02 EXCAVATION
 - A. Excavation consists of removal and disposal of material encountered when establishing required grade elevations.
 - B. Earth excavation includes removal and disposal of pavements and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and removed, material of any classification indicated in data on subsurface conditions, and other materials encountered that are not classified as rock excavation or unauthorized excavation.
 - C. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Project Engineer. Unauthorized excavation, as well as remedial Work directed by the Project Engineer, shall be at the Contractor's expense. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Project Engineer.
 - D. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by the Project Engineer.

- E. Additional Excavation: When excavation has reached required subgrade elevations, notify the Project Engineer / Architect who will make an inspection of conditions. If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material as directed by the Project Engineer / Architect. Removal of unsuitable material and its replacement as directed will be paid on the basis of contract conditions relative to changes in work.
- F. Stability of Excavations. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- G. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross braces, in good serviceable condition. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.
- H. Dewatering: Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding area. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrade and foundations.
 - 1. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
 - 2. Convey water removed from excavations and rainwater to collecting or run-off areas. Establish and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.
- 3.03 MATERIAL STORAGE: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage. Locate and retain soil materials away from edge of excavations. Dispose of excess soil material and waste materials as herein specified.
- 3.04 EXCAVATION FOR STRUCTURES: Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive concrete.
- 3.05 EXCAVATION FOR PAVEMENTS: Cut surface under pavements to comply with cross-sections, elevations and grades as shown.
- 3.06 EXCAVATION FOR TRENCHES: Dig trenches to the uniform width required for the particular item to be installed, sufficiently wide to provide ample working room. Excavate trenches to the depth indicated or required. Carry the depth of trenches for piping to establish the indicated flow lines and invert elevations. Beyond the building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups.

- A. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for the entire body of the pipe. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and which are carried below the bottom of such footings, or which pass under wall footings. Place concrete to the level of the bottom of adjacent footings.
 - B. Do not backfill trenches until tests and inspections have been made and backfilling authorized by the Project Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.
- 3.07 COLD WEATHER PROTECTION: Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.
- 3.08 COMPACTION: Control soil compaction during construction providing minimum percentage of density specified for each area classification. Compact soil to not less than the following percentages of maximum dry density.
- A. Building Slabs and Steps: Compact top 12 inches of subgrade and each layer of backfill or fill material at 95 percent maximum dry density.
 - B. Lawn or Unpaved Areas: Compact top 6 inches of subgrade and each layer of backfill or fill material at 90 percent maximum dry density.
 - C. Walkways and Pavements Compact top 6 inches of subgrade and each layer of backfill or fill material at 95 percent maximum dry density.
- 3.09 MOISTURE CONTROL: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
- 3.10 BACKFILL AND FILL: Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.
- A. In excavations and under grassed areas by Owner; use satisfactory excavated or borrow material. Under grassed areas by Owner, loosen subgrade to depth of 4 inches, and spread topsoil to depth of 4 inches. Till surface to a level, fine texture.
 - B. Under buildings, walks and pavements, use sub-base material, or satisfactory excavated or borrow material, or combination of both. Backfill excavations as promptly as work permits, but not until completion of the following:
 - 1. Acceptance by Project Engineer of construction below finish grade including, where applicable, dampproofing, waterproofing, and soil treatment.
 - 2. Inspection, testing, approval, and recording locations of underground utilities.
 - 2. Removal of concrete formwork, shoring and bracing, and backfilling of voids with satisfactory materials.
 - 4. Removal of trash and debris.
- 3.11 GROUND SURFACE PREPARATION: When existing ground surface has a density less than that specified under "Compaction" for the particular area classification, break up the ground surface, pulverize, moisture condition to the optimum moisture content, and compact to required depth and percentage of maximum density.

- 3.12 PLACEMENT AND COMPACTION: Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- A. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to required percentage of maximum dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - B. Place backfill and fill materials evenly adjacent to structures, to required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift.
- 3.13 GRADING: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
- A. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes, and as follows:
 - 1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 feet above or below the required subgrade elevations.
 - 2. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10 feet above or below the required subgrade elevation.
 - 2. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 1/2 inch above or below the required subgrade elevation.
 - 4. Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2 inch when tested with a 10-foot straightedge.
- 3.14 COMPACTION: After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.
- 3.15 MAINTENANCE: Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- A. Reconditioning Compacted Areas: Where subsequent construction operations or adverse weather disturbs completed compacted areas, scarify surface, re-shape, and compact to required density prior to further construction.
- 3.16 DISPOSAL OF EXCESS AND WASTE MATERIALS: Remove waste materials, including unacceptable excavated material, trash and debris, and dispose of it off the Owner's property.

END OF SECTION

SECTION 02365

SOIL TREATMENT FOR TERMITE CONTROL

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Soil treatment for termite control.
- 1.02 SUBMITTALS
- A. Submit manufacturer's technical product data and application instructions prior to application for Project Engineer's approval.
 - B. Submit sample copies of the Termite Soil Treatment Guarantee form prior to application for Project Engineer's approval.
 - C. Quality Control: Submit identification of at least 3 projects of similar scope along with name, address, and telephone number of the Architect, Owner and General Contractor.
- 1.03 QUALITY ASSURANCE: In addition to the requirements of these Specifications, comply with manufacturer's instructions and recommendations for the Work, including preparation of substrate and application.
- A. Engage a professional pest control operator, licensed by the State of Mississippi, Mississippi Department of Agriculture and Commerce, Bureau of Plant Industry, and in accordance with regulations of governing authorities for application of soil treatment solution. The pest control operator is to have the aforementioned valid license, the company technician is to have a valid identification card for pest control, and the company vehicle is to be clearly marked with the company name.
 - B. The professional pest control operator specializing in Soil Treatment for Termite Control, with 5 years minimum experience, shall have completed work similar to that indicated for this Project and have a record of successful in-service performance.
 - C. Comply with Mississippi Regulations Governing Pest Control Operators in following the labels of the termiticide.
- 1.04 PROJECT CONDITIONS
- A. Do not apply soil treatment solution until excavating, filling and grading operations are completed, except as otherwise required in construction operations.
 - B. To insure penetration, do not apply soil treatment to frozen or excessively wet soils or during inclement weather. Comply with other handling and application instructions of the soil toxicant manufacturer.
 - C. Remove all non-pressure treated wood contacting soil. Remove grade stakes prior to applying horizontal barrier and all form boards, stakes and concrete over pour prior to applying vertical soil treatment.
- 1.05 GUARANTEE: Furnish 3 copies of written guarantee certifying that the applied soil poisoning treatment will prevent the infestation of subterranean termites and, that termite contractor will re-treat the soil and also repair or replace any damage caused by termite infestation without expense to the Owner. Provide guarantee for a period of 5 years from the date of treatment, signed by the Applicator and the Contractor.

PART 2 PRODUCTS

2.01 SOIL TREATMENT SOLUTION

- A. Use an emulsible concentrate insecticide for dilution with water specially formulated to prevent infestation by termites as recommended by the Southern Forest Experiment Station, Forest Insect Laboratory at Gulfport, Mississippi, and registered by the Bureau of Plant Industry for use in structural pest control work. Fuel oil will not be permitted as a diluent. Provide a working solution of one of the following chemical elements:
 - 1. Horizontal barrier: Cypermethrin, Prevail or Talstar.
 - 2. Vertical barrier: Fipronil.
- B. Other solutions may be used as recommended by Applicator and if acceptable to local and state governing authorities. Use soil treatment solutions that are not injurious to plants.

PART 3 EXECUTION

3.01 INSPECTION: Applicator must examine the areas and conditions under which soil treatment for termite control is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Applicator.

3.02 APPLICATION

- A. Remove foreign matter, which could decrease effectiveness of treatment on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and foundations. Toxicants may be applied before placement of compacted fill under slabs, if recommended by toxicant manufacturer.
- B. Application Rates: Under slab-on-grade, suspended slab, foundation footings and other similar structures, treat the soil before concrete slabs are poured using either power sprayer or tank-type garden sprayer. Apply soil treatment solution, using **Color Dye** marking agent to insure the area is treated, as follows:
 - 1. Termiticide applied for the prevention of termites shall comply with the manufacturer's label and shall not be applied at concentrations or volumes less than specified on the label.
 - 2. Reapply soil treatment solution to areas disturbed by subsequent excavation or other construction activities following application.
- C. Allow a minimum of 12 hours for drying after application, before beginning concrete placement or other construction activities.

3.03 PROTECTION

- A. Prior to each application, the applicator shall notify the Contractor of the intended application and instruct the responsible person to notify construction workers and other site individuals to leave the treated area and not to return until chemical has been installed into the soil.
- B. Post signs in the areas of application warning workers that soil poisoning has been applied. Remove signs when areas are covered by other construction.

END OF SECTION

SECTION 02775

CONCRETE SIDEWALKS

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Concrete sidewalks.
- 1.02 RELATED SECTIONS: Prepared sub-base is specified in Section 02315. Concrete and related materials are specified in Division 3. Joint fillers and sealers are specified in Section 07920.
- 1.03 QUALITY ASSURANCE: Comply with local governing regulations, codes and standards if more stringent than herein specified.

PART 2 PRODUCTS

- 2.01 FORMS
 - A. Use steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects. Use flexible spring steel forms to form radius bends as required.
 - B. Coat forms with a non-staining form release agent that will not discolor or deface the surface of the concrete.
- 2.02 WELDED WIRE MESH: Welded plain cold-drawn steel wire fabric, ASTM A 185. Furnish in flat sheets, not rolls, unless otherwise acceptable to the Project Engineer.
- 2.03 REINFORCING BARS: Deformed steel bars, ASTM A 615, Grade 60, unless otherwise indicated.
- 2.04 JOINT DOWEL BARS: Plain steel bars, ASTM A 615, Grade 60 unless otherwise indicated. Cut bars true to length with ends square and free of burrs.
- 2.05 METAL EXPANSION CAPS: Furnish for one end of each dowel bar in expansion joints. Design caps with one end closed and a minimum length of 3 inches to allow bar movement of not less than 1 inch, unless otherwise indicated.
- 2.06 HOOK BOLTS: ASTM A 307, Grade 307, Grade A bolts, internally and externally threaded. Design the hook bolt-joint assembly to hold the coupling against the pavement form and in position during concrete placement, and to permit removal without damage to the concrete or hook bolt.
- 2.07 CONCRETE MATERIALS: Comply with requirements of applicable Division 3 Sections for concrete materials, admixtures, bonding materials, curing materials, and others as required.
- 2.08 EXPANSION JOINT MATERIALS: Comply with requirements of Section 07920 for performed expansion joint fillers and sealers.

- 2.09 CONCRETE MIX DESIGN: All concrete shall be Class B having 3000-psi minimum compressive strengths at 28 days, unless noted otherwise. Maximum slump for normal weight concrete shall be 4 inches. All concrete shall have 5 to 7 percent entrained air.

PART 3 EXECUTION

- 3.01 INSPECTION: Examine the areas and conditions under which concrete curbs, walks, and paving are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.
- 3.02 SURFACE PREPARATION: Remove loose material from the compacted sub-base surface immediately before placing concrete. Check for unstable areas and the need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.
- 3.03 FORM CONSTRUCTION: Set forms to the required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of the work and so that forms can remain in place at least 24 hours after concrete placement.
- A. Check completed formwork for grade and alignment to the following tolerances:
1. Top of forms not more than 1/8 inch in 10 feet.
 2. Vertical face, on longitudinal axis, not more than 1/4 inch in 10 feet.
- B. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.
- 3.04 REINFORCEMENT: Locate, place and support reinforcement as specified in Division 3 sections, unless otherwise indicated.
- 3.05 CONCRETE PLACEMENT: Comply with the requirements of Division 3 sections for mixing and placing concrete, and as herein specified.
- A. Do not place concrete until sub-base and forms have been checked for line and grade. Moisten sub-base if required to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- B. Place concrete using methods that prevent segregation of the mix. Consolidate concrete along the face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices. Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hour, place a construction joint.
- 3.06 JOINTS: Construct expansion and construction joints true to-line with face perpendicular to surface of the concrete, unless otherwise indicated. Construct transverse joints at right angles to the centerline, unless otherwise indicated. When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated. Where load transfer-slip dowel devices are used, install so that one end of each dowel bar is free to move, as shown on drawings.

- A. Construction Joints: Place construction joints at the end of all pours and at locations where placement operations are stopped for a period of more than 12 hours, except where such pours terminate at expansion joints. Construct joints as shown or, if not shown, use standard metal keyway section forms.
 - B. Expansion Joints: Provide pre-molded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated. Locate expansion joints at 50 feet on center unless otherwise indicated.
 - C. Extend joint fillers full-width and depth of joint, and not less than 1/2 inch or more than one inch below finished surface where joint sealer is indicated. If no joint sealer, place top of joint filler flush with finished concrete surface. Furnish joint fillers in continuous lengths for the full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler sections together. Protect the top edge of the joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.
 - D. Fillers and Sealants: Comply with the requirements of Section 07920 for preparation of joints, materials, installation, and performance and as herein specified.
- 3.07 CONCRETE FINISHING: After striking-off and consolidating concrete, smooth the surface by screening and floating. Use hand methods only where mechanically floating is not possible. Adjust the floating to compare the surface and produce a uniform texture. After floating, test surface for flatness with a 10-foot straightedge. Distribute concrete as required to remove surface irregularities, and re-float repaired areas to provide a continuous smooth finish.
- A. Work edges of slabs and formed joints with an edging tool, and round to 1/1 inch radius, unless otherwise indicated. Eliminate any tool marks on concrete surface.
 - B. After completion of floating and when excess moisture or surface sheen has disappeared, apply broom finish by drawing a fine-hair broom across concrete surface, perpendicular to line of traffic. Repeat operation if required to provide a fine line texture acceptable to MDOT Architect.
 - C. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Project Engineer.
- 3.08 CURING: Protect and cure finished concrete paving, complying with applicable requirements of Division 3 Sections. Use moist-curing methods for initial curing whenever possible.
- 3.09 REPAIRS AND PROTECTIONS
- A. Repair or replace broken or defective concrete, as directed by Project Engineer. Drill test cores where directed by Project Engineer, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy resin grout.

- B. Protect concrete from damage until acceptance of Work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur. Sweep concrete pavement and wash free of stains, discoloration, dirt and other foreign material just prior to final inspection.

END OF SECTION

SECTION 03100

CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

- 1.01 SECTION INCLUDES: All concrete formwork and other related items necessary to complete project indicated by Contract Documents unless specifically excluded.
- 1.02 RELATED ITEMS SPECIFIED ELSEWHERE
 - A. Section 03200 – Concrete Reinforcement.
 - B. Section 03300 – Cast-in-Place Concrete.
- 1.03 PROJECT CONDITIONS: Contractor shall examine the substrate over which concrete forms are installed and advise the Project Engineer of conditions detrimental to the installation of concrete formwork. Do not proceed until unsatisfactory conditions have been corrected.

PART 2 PRODUCTS

- 2.01 MATERIALS
 - A. Wood forms: 3/4-inch exterior grade plywood on studs and joists.
 - B. Form Ties: Standard snap ties, 1-1/2 inch break-back.
 - C. Form Oil: Approved non-staining type, "Noxcrete" or equal. Oil must not affect bonding of finishes on exposed concrete.

PART 3 EXECUTION

- 3.01 FORM CONSTRUCTION: Forms shall be properly aligned, adequately braced and mortar tight to produce concrete shapes required by Drawings. Align forms so that the actual surface does not vary from true surface more than 1/8 inch. The surface shall be clean, undamaged, and free of offsets and irregularities at joints. Adequately brace and frame to retain true shapes under vibration and placing strains without leaks, bowing, or deflection.
 - A. Studs, girts, and walls shall not be less than 2 by 4's, S4S, construction of standard grade Douglas fir, or equal, selected for straightness. All walls shall consist of at least two 2 by 4's. Studs shall not be spaced more than 16 inches, girts not more than 24 inches and ties not more than 27 inches, on center.
 - B. Lightly oil wood forms prior to placing reinforcing, and with oil not permitted on the reinforcing. Where oil form is used, remove excess before pouring concrete.
 - C. Meet recommendations of "Recommended Practice for Concrete Form work" ACI 347 unless specified herein otherwise.

3.02 INSERTS AND FASTENING DEVICES FOR OTHER WORK

- A. Provide for installation of inserts, hangers, metal ties, anchors, bolts, dowels, nailing strips, grounds and other fastening devices required for attachment of other Work
- B. Locate partitions for other trades prior to pouring concrete in order that conduits, sleeves and inserts required by others will be installed in the proper locations
- C. Do not install sleeves in any concrete beams or piers except upon approval of the Project Engineer.
- D. Do not put aluminum conduits in concrete.

3.03 FORM REMOVAL

- A. Grade beam forms may be removed 24 hours after a pour is completed.
- B. Floor slab wood forms may be removed 10 days after pour, providing compressive strength has reached a minimum of 2500 psi based on job cast cylinders.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

- 1.01 SECTION INCLUDES: All concrete reinforcing and the related items necessary to complete the Project indicated by the Contract Documents unless specifically excluded.
- 1.02 RELATED ITEMS SPECIFIED ELSEWHERE
- A. Section 03100 – Concrete Forms and Accessories.
 - B. Section 03300 – Cast-in-Place Concrete.
- 1.03 SUBMITTALS
- A. Submit reinforcing steel shop drawings and materials list prior to placement for MDOT Architect's approval. Shop drawings shall include complete placing plans, order lists, bend diagrams and details showing dimensions with clearances.
 - B. Furnish mill certificates for steel bar reinforcement, to the Project Engineer certifying that each shipment meets specifications. The fabricator will furnish certificates with bar lists to designate location of shipment and the time steel is delivered to the project.
- 1.04 QUALITY ASSURANCE
- A. Reinforcing bars shall conform to ASTM A 615 "Deformed Billet-Steel Bars for Concrete".
 - B. Mesh reinforcement shall conform to ASTM A 185 "Welded Steel Wire Fabric for Concrete Reinforcement".
 - C. Accessories shall conform to American Concrete Institute ACI 301 "Specifications for Structural Concrete for Buildings".
 - D. Placement shall be in accordance with approved shop drawings and ACI 318 "Standard Building Code Requirements for Reinforced Concrete".
 - E. Comply with ACI 315 "Manual of Standard Practice of Detailing Reinforced Concrete Structures".
- 1.05 DELIVERY, STORAGE, AND HANDLING
- A. Reinforcing bar steel and mesh shall be handled, shipped and stored in a manner that will prevent distortion or other damage.
 - B. Materials shall be stored in a manner to prevent excessive rusting and fouling with dirt, grease, or other bond-breaking coatings.
- 1.06 PROJECT CONDITIONS: Placement of concrete reinforcing shall be coordinated with installation of concrete formwork, vapor barriers, concrete inserts, conduit and all other items occurring in the area.

PART 2 PRODUCTS

- 2.01 STEEL BAR REINFORCEMENT: Bar reinforcement shall conform to ASTM A 615, grade 60, of domestic manufacture. Bars shall be new; free from rust, scale, oil, or other coatings that will prevent bond.
- 2.02 WELDED STEEL WIRE FABRIC: Shall conform to ASTM A 185, new, free from rust and other coatings that will prevent bond.
- 2.03 ACCESSORIES: Metal accessories as required shall support reinforcing bars and comply with ACI 315. Chairs and bolsters for use in exposed concrete shall have plastic coated or stainless steel legs or shall be plastic.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Fabricate and place reinforcement in accordance with the latest requirements of the American Concrete Institute and the approved shop drawings. Fabrication shall not proceed until MDOT Architect's approval is obtained.
- B. Reinforcing for one day's pour shall be completely placed and an inspection made by the Project Engineer / MDOT Architect prior to starting the pour.
- C. Concrete Protection for Reinforcement: Minimum coverage shall be as follows unless shown otherwise on drawings:
 - 1. Footings
(bottom and sides) 3 inches clear
 - 2. Slabs 1-1/2 inches clear top and 3/4 inch clear bottom
 - 3. Beams 1-1/2 inch clear to stirrups
 - 4. Walls 2-1/2 inches clear
- D. Steel Dowels for successive work shall be wired in correct position before placing concrete. The "sticking" of dowels after placing concrete will not be permitted.
- E. Lap all bars 24 bar diameters at corners, splices and intersections.
- F. Do not weld reinforcing steel unless specifically approved by the Project Engineer.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

- 1.01 SECTION INCLUDES: All cast-in-place concrete and other related items necessary to complete Project indicated by Contract Documents unless specifically excluded.
- 1.02 RELATED SECTIONS
- A. Section 03100 – Concrete Forms and Accessories.
 - B. Section 03200 – Concrete Reinforcement.
 - C. Section 07260 – Vapor Retarders
 - D. Section 09900 – Paints and Coatings
- 1.03 SUBMITTALS: Submit concrete mix design, concrete compression test reports and product data and manufacturer's installation instructions for concrete curing compound.
- 1.04 TESTING LABORATORY SERVICES: The Owner will provide testing as specified in Section 01455.
- 1.05 QUALITY ASSURANCE
- A. Concrete work shall conform to all requirements of ACI 301, Specifications for Structural Concrete for Buildings and ACI 318 Building Code Requirements for Reinforced Concrete, latest editions, except as modified by supplemental requirements herein.
 - B. Concrete mix design proportioning shall be by a certified MDOT Class III technician and submitted to the Project Engineer prior to placing concrete. Mix proportions shall meet the requirements of the 804.02.10 Section of the MDOT's Standard Specifications, 2004 Edition, except concrete requiring a trowel finish shall not be air entrained. Concrete shall be sampled according to ASTM C 172 and compression test cylinders made and cured according to ASTM C 31. Control of mixes is to be maintained at the Ready-Mix Plant and on the job site. Adjustments of the mix proportions shall meet the requirements of Section 804.02.10.4 of MDOT's Standard Specifications, 2004 Edition.
 - C. The Owner will provide testing as specified in Section 01455 – Testing Laboratory Services. Cylinders, 3 specimens from each sample, are to be cast on the job in accordance with ASTM C 31. Specimens will be tested in accordance with ASTM C 39. One cylinder from each location will be tested at 7 days for information and the other two at 28 days for acceptance. Owner is to make at least one strength (average of two cylinders) for each class of concrete placed on any one day and an additional one strength test for each 100 cubic yards, or fractions thereof, of concrete placed in any one day. Copies of all test reports shall be furnished to the ready mixed concrete producer and as directed by the Project Engineer.
- 1.06 COORDINATION
- A. Verify that all pipes under grade have been installed and tested before being covered. Check and verify materials and locations of inserts, anchors, and items required by other trades before pouring concrete. Concerned subcontractors shall be notified of date of pour in sufficient time to allow for completion of their work.

- B. The Contractor shall notify the Project Engineer upon completing formwork and all reinforcing steel for the next intended pour, and shall not commence pouring operation until all forms and steel are approved by the Project Engineer.
- C. Project Engineer shall have free access to all materials used, and the required samples are to be furnished by the Contractor, as directed.
- D. Inspection and written approvals from the floor-covering installer and the floor-coating applicator are required for slab finish receiving floor covering and floor coating/sealer.

PART 2 PRODUCTS

2.01 CONCRETE

- A. All concrete, unless otherwise specifically approved in writing by the Project Engineer, shall be transit-mixed in accordance with ASTM C94. Control of concrete shall be under supervision of testing laboratory as described in Section 01455.
- B. All concrete shall have 3,500-psi minimum compressive strengths at 28 days, unless noted otherwise.
- C. Maximum slump for normal weight concrete shall be 4 inches. Sump may be increased to 6 inches with an approved mid-range water reducer and up to 8 inches with an approved high-range water reducer.

2.02 CONCRETE MATERIALS

- A. Portland Cement: ASTM C-150, Type I.
- B. Water: From an approved source.
- C. Structural Concrete Aggregate: Nominal maximum aggregate size 67 shall be used and shall meet the requirements of MDOT Standard Specifications, 2004 Edition.
- D. Admixtures: Admixtures shall be from the MDOT Approved List. Non-uniform addition of mixtures that result in erratic setting of the concrete will cause rejection of the concrete with subsequent removal from the structure at the concrete producer's expense.

2.03 RELATED MATERIALS

- A. Preformed Expansion Joint Fillers: Provide pre-molded, asphalt impregnated board in widths and thickness required by conditions (1/2-inch minimum). Joint fillers shall conform to ASTM D994, D1751 or D1752.
- B. Chemical Hardener (Sealer): Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent containing not less than 2 pounds of fluosilicates per gallon. Sealer shall not interfere with floor finish.
- C. Curing Compound: Clear bond, manufactured by Guardian Chemical Co., Kure-N-Seal, manufactured by Sonneborn, Safe-Cure, manufactured by Dayton Superior Corp. or approved equal. Compound shall not interfere with bonding or floor finish.
- D. Non-shrink Grout: Shall be one part Portland cement to 2-1/2 parts of fine aggregate or Cement grout ASTM C 387 Dry Package mixtures similar and equal to Masterflow 713, Master Builders; Sonnogrout, Sonneborn; Five Star Grout, U.S. Grout Company.

2.04 CONCRETE MIXES

- A. The ready-mix concrete shall be mixed and delivered in accordance with requirements of ASTM C 94. Uniformly and accurately control proportions of material weight. Slump tolerances given in ASTM C 94 apply. Calcium chloride shall not be used.
- B. Failure of concrete to meet the specified requirements may result in rejection with subsequent removal and replacement or re-testing (including coring, load test, etc.) at the supplier's expense. Concrete exhibiting adverse reaction as a result of the presence of deleterious substances shall be removed and replaced or repaired in a manner completely satisfactory to the Project Engineer. All cost of such corrective action, including all necessary testing, shall be borne by the concrete producer.
- C. The Contractor may request adjustment to concrete mix design when characteristics of materials, job conditions, weather, test results, or circumstances warrant, at no additional cost to the Owner and as approved by the Project Engineer. Laboratory test data for revised mix designs and strength results must be submitted to and approved before using in the Work.

PART 3 EXECUTION

3.01 PLACING CONCRETE

- A. Concrete shall be placed so as to avoid segregation of materials and to prevent cold joints by avoiding re-handling, by keeping pours generally level, and by adequate vibration. Placing is not to be started during rain or snow, and if placing is underway when such conditions occur, continue operations only long enough to provide a suitable construction joint.
- B. During hot weather or periods of low humidity combined with a definite breeze, rapid loss of moisture shall be discouraged by thorough wetting of forms and by using a fine fog spray when finishing. At these times particular attention shall be given to providing an adequate number of finishers to expedite this operation. During cold weather fresh concrete shall be protected from freezing.
- C. Prior to placing, forms shall be cleaned free of foreign material and shall be washed down with water. Placing shall be a continuous operation between planned construction joints with fresh cement mixed only with plastic concrete already in place. Avoid cold joints.
- D. Vibration shall be thorough, using vibrators small enough to work within reinforcing. The vibrator shall be inserted at many points about 24 inches apart. Avoid over-vibration and transporting concrete in form by vibration. A spare vibrator, which will operate, shall be kept on the job during all placing operations.

3.02 CONSTRUCTION JOINTS: Locate construction joints and provide shear keys as directed by the Project Engineer / MDOT Architect. Allow concrete to set for 24 hours before an adjoining pour is started. Slabs across the joint shall be level and the surface shall be level and shall not be feathered. Before proceeding with the following pour at a joint, thoroughly clean the joint, remove all loose material, and brush in a thick cement slurry.

3.03 CURING: Keep all concrete moist for 5 days after placing by covering with concrete curing paper, by leaving forms in place or by using curing compound. All combined with regular wetting as necessary.

3.04 PATCHING

- A. Honeycombed and defective concrete shall be removed and replaced, or repaired, as directed by the Project Engineer. Form tie holes and minor areas, as determined by the Project Architect, shall be repaired as follows:
1. Completed patch shall be indistinguishable from surrounding surfaces in color and texture.
 2. Patching mixture, using same cement sand as used in concrete shall consist of 1 part cement to 2-parts sand, with just enough mixing water to permit placing. Premix mixture, allow standing at least 30 minutes before using, stirring with trowel during this period.
 3. Remove material to sound concrete, dampen surface and brush thick 1 to 1 cement sand bond coat into surface.
 4. When bond coat begins to lose water sheen, thoroughly pack patching mixture in place, leaving it somewhat higher than adjacent surface. Embed pieces of gravel by hand into patch.

3.05 FINISHES FOR FLATWORK

- A. Trowel finish floor surfaces scheduled as concrete finish walking surfaces, or floor surfaces scheduled to receive floor covering. Trowel finished surfaces shall be true planes within 1/8 inch in 10 feet as determined by a 10 foot straightedge placed anywhere on the slab in any direction.
- B. Smooth trowel finish after the surface is screeded and floated. Start troweling when all water has disappeared from the surface to first level the surface, then start final troweling when concrete has set where it no longer shows indentation from finger pressure. Trowel to a hard, smooth surface free of marks. Dusting of cement or cement and sand will not be permitted.
- C. Interior floors, with concrete finish scheduled, shall receive an application of hardener compound applied according to manufacturer's published instructions. Concrete surfaces to receive ceramic floor tile or brick shall receive float finish.
- D. Exterior walks and ramps shall have smooth trowel and fine broom finish.
- E. Exterior sign base shall have a Class 2, Rubbed Finish as follows:
1. After removal of forms, the Class 1 finish shall be completed and the rubbing of concrete shall be started as soon as its condition will permit. Immediately before starting this work, the concrete shall be kept thoroughly saturated with water for at least three hours.
 2. Surfaces shall be rubbed with a medium course Carborundum stone using a small amount of mortar on its face. The mortar shall be composed of cement and sand mixed in the proportions used in the concrete being finished. Rubbing shall be continued until all form marks, projections, and irregularities have been removed, all voids filled, and a uniform surface has been obtained.
 3. The final finish shall be obtained by rubbing with a fine Carborundum stone and water. This rubbing shall continue until the entire surface is a smooth texture and uniform color.
 4. After the final rubbing is completed and the surface has dried, it shall be rubbed with burlap to remove loose powder and objectionable marks.

3.06 FINISHES FOR GRADE BEAMS

- A. Exposed grade beam faces shall have a smooth form finish obtained by using selected form facing plywood, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with all fins or other projections completely removed and smoothed. Provide grout cleaned finish consisting of 1 part Portland Cement to 1-1/2 parts fine sand by column, and mix with water to the consistency of thick paint. Blend standard Portland cement and white Portland cement, amounts determined by trial patches, so that the final color of dry grout will closely match adjacent concrete surfaces.
- B. Thoroughly wet concrete surfaces and apply grout immediately to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

END OF SECTION

SECTION 04200

MASONRY UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES: Masonry wall work as shown on the Drawings and schedules.

1.02 RELATED SECTIONS

- A. Section 04500 – Masonry Restoration and Cleaning
- B. Section 09050 – Color Design.

1.03 SUBMITTALS: Submit product data, specifications and other data for each type of masonry unit and accessory required, including certification that each type complies with the specified requirement. Include instructions for handling, storage, installation, cleaning and protection of each. Indicate by transmittal that the Installer has received a copy of each instruction.

1.04 QUALITY ASSURANCE

- A. Fire-rated Masonry: Wherever a fire-resistance classification is shown or scheduled for unit masonry construction (4 hour, 3 hour, and similar designations), comply with the requirements for materials and installation established by the American Insurance Association and other governing authorities for the construction shown.
- B. Job Mock-up: Prior to installation of masonry work, erect sample wall panel mock-up materials, bond and joint tooling shown or specified for final Work. Provide special features as directed for caulking and contiguous work. Build mock-up at the site, where directed, of full thickness and approximately 4 feet by 3 feet unless otherwise shown, indicating the proposed range of color, texture and workmanship to be expected in the completed Work. Obtain Project Engineer / MDOT Architect's acceptance of visual qualities of the mock-up before start of masonry work. Retain mock-up during construction as a standard for judging completed masonry work. Do not alter, move or destroy mock-up until Work is completed. Provide mock-up panel for each type of exposed unit masonry work.

1.05 PROJECT CONDITIONS

- A. Protect partially completed masonry against weather, when Work is not in progress, by covering top of walls with strong, waterproof, non-staining membrane. Extend membrane a minimum of 2 inches down both sides of walls and anchor securely in place.
- B. Protect masonry against freezing when the temperature of the surrounding air is 40 degrees F. and falling. Heat materials and provide temporary protection of completed portions of masonry work. Comply with the requirements of the governing code and with the "Construction and Protection Recommendations for Cold Weather Masonry Construction" of the Technical Notes on Brick and Tile Construction by the Brick Institute of America (BIA).

PART 2 PRODUCTS

- 2.01 MASONRY UNITS: Obtain masonry units from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.
- 2.02 CONCRETE MASONRY UNITS, GENERAL: Manufacturer's standard units with nominal face dimensions of 16 inches long by 8 inches high (15-5/8 inches by 7-5/8 inches actual), unless otherwise shown. Provide special shapes where shown and where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions. Provide UL certified units where indicated.
- A. Hollow Load-Bearing: Provide units complying with ASTM, C 90. Provide lightweight units using ASTM C 33I aggregate for a dry net weight of not more than 105 lbs. per cubic foot.
 - B. Classification: Curing shall comply with ASTM C 90, Type II, Nonmoisture-Controlled Units.
 - C. Exposed Face: Provide manufacturer's standard color and texture, unless otherwise indicated.
- 2.03 MORTAR MATERIALS: Mortar mixes shall comply with the requirements of ASTM C 270 Standard Specification for Mortar for Unit Masonry. Type S mortar shall be used for exterior Work. Type N mortar shall be used for interior Work. Mortar color for face brick shall be as selected by the Project Engineer / MDOT Architect from manufacturer's standard colors. Mortar color for building (common) brick shall be natural color or white cement as required to produce the required standard mortar color.
- A. Portland Cement: ASTM C 150 Type I, except Type III may be used for cold weather protection.
 - B. Hydrated Lime: ASTM C 207, Type S.
 - C. Sand: ASTM C 144, except for joints less than 1/4 inches, use aggregate graded with 70 to 100 percent passing the No. 16 sieve.
- 2.04 MASONRY ACCESSORIES: Provide welded wire units prefabricated in straight lengths of not less than 10 feet, with matching corner and tee units. Fabricate from Cold-drawn steel wire complying with ASTM A 82, with deformed continuous side rods and plain cross-rods, crimped for cavity wall construction (if any), and a unit width of 1-1/2 inches to 2 inches less than thickness of wall or partition. Provide units fabricated with single pair of 9 gage side rods and 9-gage perpendicular cross-rods spaced not more than 16 inches on center. For composite exterior walls with concrete masonry back up, fabricate units with additional side rod spaced for embed in inside face of back up wythe. All units shall be hot-dip galvanized after fabrication and shall conform to ASTM A 153 Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware, Class B-2.
- A. Anchoring Devices for Masonry: Provide straps, bars, bolts and rods fabricated from not less than 16 gage sheet metal or 3/8 inch diameter rod stock, unless otherwise indicated.

PART 3 EXECUTION

- 3.01 INSPECTION: Masonry installer must examine the areas and conditions under which masonry is to be installed and notify the Project Engineer and the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to masonry installer.
- 3.02 INSTALLATION: Building masonry construction to the full thickness shown, except, build single-wythe walls to the actual thickness of the masonry units, using units of nominal thickness shown or specified.
- A. Build chases and recesses as shown and as required for the work of other trades. Provide not less than 8 inches of masonry between chase or recess and jamb of openings and between adjacent chases and recesses.
 - B. Cut masonry units with motor-driving saw designed to cut masonry with clean, sharp, un-chipped edges. Cut units as required to provide pattern shown and to fit adjoining Work neatly. Use full units without cutting wherever possible.
 - C. Wet brick having ASTM C67 absorption rates greater than 0.025 oz. per sq. inch per minute. Determine absorption by drawing a circle the size of a quarter on typical units and place 20 drops of water inside the circle. Wet brick units only if water is absorbed within 1-1/2 minutes. The units shall be wetted thoroughly 3 to 24 hours prior to their use so as to allow moisture to become distributed throughout the unit. The units shall be surface dry when laid.
 - D. Do not wet concrete masonry units.
 - E. Frozen Materials and Work: Do not use frozen materials or materials mixed or coated with ice or frost. For masonry, which is specified to be wetted, comply with the BIA recommendations. Do not use calcium chloride in mortar or grout.
 - F. Pattern Bond: Lay masonry work in a running bond unless indicated otherwise.
 - G. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to properly locate openings, movement type joints, returns and offsets. Avoid the use of less-than half-size units at corner, jambs and wherever possible at other locations. Lay-up walls plumb and true and with courses level, accurately spaced and coordinated with other work.
 - H. Stopping and Resuming Work: Rack back 1/2 masonry unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if specified to be wetted), and remove loose masonry units and mortar prior to laying fresh masonry.
 - I. Built-in Work: As the work progresses, built-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items. Fill space between hollow metal frames and masonry solidly with mortar.

3.03 MORTAR BEDDING AND JOINTING

- A. Mix mortar ingredients for a minimum of 5 minutes in a mechanical batch mixer. Use water clear and free of deleterious materials, which would impair the work. Do not use mortar, which has begun to set, or if more than 2-1/2 hours has elapsed since initial mixing. Re-temper mortar during 2-1/2 hour period as required restoring workability.
- B. Lay brick and other solid masonry units with completely **Filled** bed and head joint; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.
- C. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with concrete or grout.
- D. Joints: Maintain joints widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8" joints. Cut joints flush for masonry walls that are to be concealed or to be covered by other materials. Tool exposed joints slightly concave. Rake out mortar in preparation for application of caulking or sealant where shown.
- E. Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units that have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.

3.04 HORIZONTAL JOINT REINFORCING: Provide continuous horizontal joint reinforcing as shown and specified. Fully embed longitudinal side rods in mortar for their entire length with a minimum of cover of 5/8 inch on exterior side of walls and 1/2 inch at other locations. Lap reinforcement a minimum of 6 inches at ends of units. Do not bridge control and expansion joints with reinforcing except at wall openings. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions. Space continuous horizontal reinforcing as follows:

- A. For single-wythe walls, space reinforcing at 16 inches on center vertically, unless otherwise shown.
- B. Reinforce masonry opening greater than 12 inches wide, with horizontal joint reinforcing placed in 2 horizontal joints approximately 8 inches apart, both immediately above the lintel and immediately below the sill. Extend reinforcing a minimum of 24 inches beyond jambs of the opening, bridging control joints where provided.

3.05 ANCHORING MASONRY WORK

- A. Provide anchoring devices of the type shown and as specified. If not shown or specified, provide standard type for facing and back-up involved. Anchor masonry to structural members where masonry abuts or faces such members to comply with the following:
 - 1. Provide an open space not less than 1/2 inch in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials.

2. Anchor masonry to structural members with metal ties embedded in masonry joints and attached to structure. Provide anchors with flexible tie sections unless otherwise shown. Space anchors as shown, but not more than 24 inches on center horizontally.
- 3.06 LINTELS: Install loose lintels of steel and other materials where shown.
- 3.07 CONTROL AND EXPANSION JOINTS
- A. Provide vertical expansion, control and isolation joints in masonry. Build-in related masonry accessory items as the masonry work progresses. Rake out mortar in preparation for application of caulking and sealants.
 - B. Control Joint Spacing: If location of control joints is not shown, place vertical joints spaced not to exceed 50'-0" on center for concrete masonry wythes if reinforced, or 25'-0" on center if not reinforced. Locate control joints at points of natural weakness in the masonry work.
- 3.08 FLASHING OF MASONRY WORK
- A. Provide concealed flashing in masonry work as shown. Prepare masonry surfaces smooth and free from projections, which might puncture flashing. Place through-wall flashing on bed of mortar and cover with mortar. Seal flashing penetrations with mastic before covering with mortar. Terminate flashing 1/2 inch from face of wall, unless otherwise shown. Extend flashing beyond edge of lintels and sills at least 4 inches and turn up edge on sides to form pan to direct moisture to exterior. Provide weep holes in the head joints of the first course of masonry immediately above concealed flashing, spaced 24 inches on center, unless otherwise shown.
 - B. Install reglets and nailers for flashing and other related Work where shown to be built into masonry Work.
- 3.09 REPAIR, POINTING AND CLEANING:
- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged or if units do not match adjoining units as intended. Provide new units to match units and install with fresh mortar or grout, pointed to eliminate evidence of replacement.
 - B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point up all joints at corners, openings and adjacent work to provide a neat uniform appearance, properly prepared for application of caulking or sealant compounds.
 - C. Good workmanship and job housekeeping practices shall be used to minimize the need for cleaning the masonry. Clean exposed brick masonry surfaces as recommended by BIA Technical Notes 20 "Cleaning Clay Products Masonry" and masonry manufacturer. Clean exposed masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings. Protect the base of the wall from mud splashes and mortar droppings. Should additional cleaning be required apply chemical (muriatic acid is **Not** acceptable) or detergent cleaning solutions in accordance with the masonry and chemical manufacturers' recommendations.

END OF SECTION

SECTION 04500

MASONRY RESTORATION AND CLEANING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. The extent of masonry restoration and cleaning required is shown on the drawings. The work of this section includes the following:
 - 1. Cleaning exposed brick masonry and cast stone surfaces
 - 2. Replace deteriorated brick
 - 3. Repointing brick masonry and cast stone joints
 - 4. Waterproofing existing brick masonry and cast stone surfaces
 - 5. Sealing joints at masonry cracks
 - 6. Sealing building expansion joints

1.02 RELATED SECTIONS

- A. Section 04200 – Masonry
- B. Section 07920 – Joint Sealants

1.03 QUALITY ASSURANCE

- A. Work shall be performed by a restoration contractor with not less than 5 years successful experience in masonry restoration projects similar in size and scope to the work of this project. The contractor shall employ personnel skilled in the restoration processes and operations indicated. The restoration contractor shall be licensed by the State of Mississippi as a masonry / restoration contractor.
- B. Prior to start of general masonry restoration, prepare the following sample panels on building where directed by Project Engineer / MDOT Architect. Obtain Project Engineer / MDOT Architect's acceptance of visual qualities before proceeding with the work:
 - 1. Prepare one sample area of approximately 3 feet high by 6 feet wide for waterproofing, demonstrating methods of surface preparation and waterproofing application. Tests shall be applied using the same equipment as for job application.
 - 2. Prepare on sample area of approximately 3 feet x 3 feet for sealing joints in cast stone columns, demonstrating methods of joint preparation and sealant application.
 - 3. Prepare one sample area of approximately 3 feet high by 6 feet wide for cleaning masonry surfaces, demonstrating methods of cleaning. Tests should be applied using the same equipment as for job application.
- C. Obtain materials for masonry restoration from a single source for each type material required (cement, sand, etc.) to ensure match of quality, color, pattern, and texture to the existing building.

1.04 SUBMITTALS

- A. Submit manufacturer's technical data (not material safety data sheets) for each product indicated including recommendations for their application and use. Include reports and certifications substantiating that products comply with requirements.

- B. Submit restoration contractor's and manufacturer's sample warranties prior to application for Project Engineer / MDOT Architect's approval.
- C. Submit restoration contractor's qualifications including list of completed projects.
- D. Submit written program for each phase of restoration process including protection of surrounding materials on building and site during operations.
- E. Submit samples of the following prior to erection of mock-up:
 - 1. Mortar for pointing and masonry rebuilding and repair, in form of 6 inch long by 1/2 inch wide sample strips of mortar set in aluminum or plastic channels or on-site samples.
 - 2. Chemical cleaning material.
 - 3. Breathable masonry coating in form of 12 inch x 12 inch sample on plywood.
 - 4. Caulking.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original and unopened containers and packaging, bearing labels indicating type and names of products and manufacturers.
- B. Protect masonry restoration materials during storage and construction from wetting by rain, snow, or ground water, and from staining or intermixture with earth or other types of materials.

1.06 PROJECT CONDITIONS

- A. Clean masonry surfaces only when air temperatures are 40 degrees F (4 deg. C) and above and will remain so until masonry has dried out, but for not less than 7 days after completion of cleaning.
- B. Do not repoint mortar joints or repair masonry unless air temperatures are between 40 degrees F (4 degrees C) and 80 degrees F (27 degrees C) and will remain so for at least 48 hours after completion of work.
- C. Prevent grout or mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Remove immediately grout and mortar in contact with exposed masonry and other surfaces.
- D. Protect sills, ledges and projections from mortar droppings.

1.07 SEQUENCING/SCHEDULING

- A. Perform masonry restoration work in the following sequence:
 - 1. Rake out mortar from brick masonry and cast stone joints.
 - 2. Replace deteriorated brick.
 - 3. Seal joints at cast stone and masonry cracks.
 - 4. Repoint brick masonry and cast stone joints.
 - 5. Seal building expansion joints.
 - 6. Clean exposed brick masonry and cast stone surfaces.
 - 7. Waterproof existing brick masonry surface and cast stone surfaces.
 - 8. Clean and/or repair adjacent finishes damaged or soiled during the progress of the work.

1.08 WARRANTIES

- A. Masonry restoration work shall be guaranteed for a period of 5 years. The guarantee period shall begin upon issuance of notice of completion. This shall be a notarized guarantee from the Restoration Company performing this work stating that their work will be guaranteed for this period. This guarantee is to include labor and material with no cost to the Owner.
- B. A 10-year water repellant material warranty shall be issued by manufacturer upon completion.

PART 2 PRODUCTS

2.01 MASONRY MATERIALS

- A. Portland Cement: ASTM C 150, Type 1
- B. Hydrated Lime: ASTM C 207, Type S
- C. Aggregate for Mortar: ASTM C 144. Match size, texture and gradation of existing mortar as closely as possible.
- D. Colored Mortar Pigment: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes to match existing mortar. Use only pigments with record of satisfactory performance in masonry mortars which are clean, free of oils, acids, alkalis and organic matter.

2.02 CLEANING MATERIALS AND EQUIPMENT

- A. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.
- B. Brushes: Fiber bristle only.
- C. Acidic Cleaner: Manufacturer's standard strength acidic masonry restoration cleaner composed of hydrofluoric acid blended with other acids including trace of phosphoric acid and combined with special wetting systems and inhibitors. Equal to Sure Klean Restoration Cleaner by ProSoCo, Inc.
- D. Spray Equipment: Provide equipment for controlled spray application of water and chemical cleaners, if any, at rates indicated for pressure, measured at spray tip, and for volume.
- E. For spray application of chemical cleaners, provide low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray-tip.
- F. For spray application of water, provide fan-shaped spray-tip which disperses water at an angle of not less than 15 degrees.
- G. Unless otherwise indicated, dilute chemical cleaning materials with water to produce solutions of concentration indicated but not greater than that recommended by chemical cleaner manufacturer.

2.03 MORTAR MIXES

- A. Measure cementitious and aggregate material in a dry condition by volume or equivalent weight. Do not measure by shovel, use known measure. Mix materials in a clean mechanical batch mixer.
- B. Mix pointing mortar in strict accordance with manufacturer's written instructions.

- C. Where colored mortar pigments are indicated do not exceed pigment-to-cement ration of 1 to 10, by weight.
 - D. Do not use admixtures of any kind in mortar, unless otherwise indicated.
 - E. Mortar Proportions:
 - 1. Comply with ASTM C 270, Proportion Specification, Type N, unless otherwise indicated with cementitious material content limited to portland cement-lime.
 - 2. Add colored mortar pigment to produce mortar colors required.
- 2.04 SEALANT MATERIALS
- A. Bond Breaker Tape: Equal to that manufactured by Trimco.
 - B. Sealant: 1 part urethane equal to Sonolastic NP 1 manufactured by Rexnord Chemical Products, Inc., a Sonneborn building product. Color to match mortar.
 - C. Backer Rod: Equal to Sonofoam Backer Rod by Sonneborn.
- 2.05 WATERPROOFING MATERIALS: An alkyd-alkoxy base high solids coating equal to Weather Seal Siloxane by ProSoCo, Inc.
- 2.06 MASONRY COATING: A pigmented water based breathable coating equal to Breathable Masonry Coating by ProSoCo, Inc. Use recommended primer where required.
- 2.07 MATERIALS FOR CAST STONE REPAIR
- A. Adhesive for Injection: Epoxy equal to Perm-Inject by Permagile Industries, Inc., 101 Commercial Street, Plainview, NY 11803.
 - B. Adhesive for other repairs: Epoxy PG-2130 by Permagile Industries.
 - C. Patching compound: Thorite as manufactured by Standard Drywall. 5743 PSI after 28 days.

PART 3 EXECUTION

3.01 PREPARATION

- A. Comply with recommendations of manufacturers of chemical cleaners for protecting building surfaces against damage from exposure to their products.
- B. Protect persons, motor vehicles, surrounding surfaces of building whose masonry surfaces are being restored, building site, and surrounding buildings from injury resulting from masonry restoration work.
- C. Prevent cleaning and waterproofing solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings and other surfaces which could be injured by such contact.
- D. Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles which must remain in operation during course of masonry restoration work.

- E. Protect glass, unpainted metal trim and polished stone from contact with acidic chemical cleaners by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent to comply with manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces.
- F. Protection can be eliminated subject to Project Engineer / MDOT Architect's approval, if testing demonstrates no detrimental effect from exposure to cleaning solutions.

3.02 CLEANING

- A. Proceed with cleaning in an orderly manner. Work from top to bottom of each scaffold width and from one end of each elevation to the other. Use only those cleaning methods indicated for each masonry material and location. Perform each cleaning method indicated in a manner which results in uniform coverage of all surfaces, including corners, moldings, interstices and which produces an even effect without streaking or damage to masonry surfaces. Rinse off chemical residue and soil by working upwards from bottom to top of each treated area at each stage or scaffold setting.
- B. Water Application Methods:
 - 1. Spray Applications: Spray-apply water to masonry surfaces to comply with requirements indicated for location, purpose, water temperature, pressure, volume and equipment. Unless otherwise indicated, hold spray nozzle not less than 6 inches from surface of masonry and apply water from side to side in overlapping bands to produce uniform coverage and an even effect.
 - 2. Low Pressure Spray: 100-400 psi, 3-6 gallons per minute.
- C. Chemical Cleaner Application Methods:
 - 1. Apply chemical cleaners to masonry surfaces to comply with chemical manufacturer's recommendations using brush or spray application methods, at Contractor's option, unless otherwise indicated. Do not allow chemicals to remain on surface for periods longer than that indicated or recommended by manufacturer.

3.03 MORTAR REMOVAL

- A. Joint Raking: Rake out mortar from joints to depths equal to 2-1/2 times their widths but not less than 1/2 inch nor less than that required to expose sound, unweathered mortar.
- B. Remove mortar from brick masonry and cast stone within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar or caulk. Brush, vacuum or flush joints to remove dirt and loose debris.
- C. Do not spall edges of brick masonry or cast stone units or widen joints. Repair any units which become damaged.
- D. Cut out old mortar by hand with chisel and mallet, unless otherwise indicated. No power tools will be allowed.

3.04 REPLACING DETERIORATED BRICK

- A. Preparatory Work: The Contractor shall determine the areas where deteriorated brick will be replaced and review the work at the building with the Project Architect. No bricks shall be replaced prior to the approval of the Project Architect.
- B. Replacement of deteriorated brick shall be as specified in Section 04200, Masonry.

3.05 REPOINTING BRICK MASONRY

- A. Rinse brick masonry joint surfaces with water to remove any dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water as evaporated or run off, and joint surfaces are damp but free of standing water.
- B. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Compact each layer thoroughly and allow to become thumbprint-hard before applying next layer.
- C. After joints have been filled to a uniform depth, place remaining pointing mortar in 3 layers with each of first and second layers filling approximately 2/5 of joint depth and third layer the remaining 1/5. Fully compact each layer and allow to become thumbprint-hard before applying next layer. Where existing bricks have rounded edges recess final layer slightly from face. Take care not to spread mortar over edges onto exposed masonry surfaces, or to featheredge mortar.
- D. When mortar is thumbprint-hard, tool joints to match original appearance of joints, unless otherwise indicated. Remove excess mortar from edge of joint by brushing.
- E. Where repointing work precedes cleaning of existing masonry allow mortar to harden not less than 21 days before beginning cleaning work.

3.06 SEALING MASONRY JOINTS

- A. Cut out existing mortar. Surface to receive sealant must be structurally sound, dry, clean, free of dirt, moisture, loose particles, oil, grease, asphalt, tar, paint, wax, rust, waterproofing, curing and parting compounds, membrane materials, and other foreign substances.
- B. All oil and grease should be removed by using toluol xylol, then wiped clean and dry until no solvent film or fingerprints remain.
- C. Apply bond breaker tape at the back of joint.
- D. Apply sealant in accordance with manufacturer's instructions. Additional requirements are found in Section 07920 – Joint Sealants. Caulking and sealing shall be performed when temperatures are above 40 degrees F (+4 degrees C) in order to avoid application to moisture laden surfaces. Moisture on substrates will adversely affect adhesion.

3.07 SEALING BUILDING EXPANSION JOINTS

- A. Remove any existing backer rod and sealant. Surface to receive sealant to be dry, clean, free of dirt, moisture, loose particles, oil, grease, asphalt, tar, paint, wax, rust, waterproofing, curing and parting compounds, and membrane materials, and other foreign substances.
- B. All oil and grease should be removed by using toluol, xylol, then wiped clean and dry until no solvent film or fingerprints remain.
- C. Apply backer rod at back of joint.
- D. Apply sealant in accordance with manufacturer's instructions. Additional requirements for execution are found in Section 07920 – Joint Sealants. Caulking and sealing shall be performed when temperatures are above 40 degrees F (+4 degrees C) in order to avoid application to moisture laden surfaces. Moisture on substrates will adversely affect adhesion.

3.08 COATING SURFACES

- A. Clean the existing surfaces. Apply primer for masonry coating. Apply in strict accordance with manufacturer's instructions. Allow to dry 10 hours.
- B. Protect adjacent surfaces from overspray or splash of primer. Remove splashes promptly using mineral spirits.
- C. Apply two coats of breathable masonry coating, with brush, roller, or spray in strict accordance with manufacturer's instructions. Allow 24 hours between coats.
- D. Strip existing sealer on all interior brick floors and apply three coats of approved glossy sealer.

3.09 WATERPROOFING

- A. Waterproofing contains blended solvents and should be handled accordingly. Do not use near fire or extreme heat and provide good ventilation to avoid buildup of solvent fumes.
- B. Adjoining glass, metal and painted surfaces shall be protected from overspray and splash of waterproofing. Inadvertent splashes shall be removed using mineral spirits before the solution has dried on the surface.
- C. Surface Preparation: Surface cracks and voids of more than 1/16 inch shall be tuckpointed or patched prior to application of waterproofing. All caulks and sealants should be in place and cured prior to application.
- D. The surface should be clean and free of surface dirt, dust, oil or other surface contaminants. Use proprietary cleaning compounds where necessary followed by thorough rinsing with water. Surfaces to be treated may be damp but should be absorbent to assure good penetration of waterproofing.
- E. Waterproofing shall be applied as packaged. Do not dilute or alter material. Preferred method of application is with low pressure (20 PSI) airless spray equipment or with a heavily saturated brush or roller. Sprayer should be fitted with solvent resistant hoses and gaskets.
- F. Apply waterproofing in a flooding application, from the bottom up with sufficient material applied to produce a 6 inches to 8 inches rundown below the contact point of spray pattern with the surface. Allow the first application to penetrate the surface (approximately three to five minutes) and reapply in the same saturating manner. Less material will be required to saturate the surface on the second application.
- G. When using brush, or rollers, care should be taken to assure that enough solution is applied. Apply sufficient material to thoroughly saturate the surface making sure to brush out heavy runs or drips that do not penetrate.
- H. When applying to horizontal surfaces, waterproofing shall be applied in a single saturating application with sufficient material applied so that the surface remains wet for a few minutes before penetrating into the masonry. Surface residues, pools and puddles shall be broomed out thoroughly until they completely penetrate into the surface.
- I. Porosity and texture of the surface will affect the amount of material necessary for effective treatment. Use manufacturer's guidelines for estimating material requirements for various surfaces. Always test on actual surface to get precise consumption rates.

3.10 REPAIRING DAMAGED CAST STONE

- A. Carefully remove loose stone fragments. Reuse only pieces of spalled stone which are in sound condition.
- B. Remove soil, loose stone particles, mortar, and other debris and foreign material from surfaces to be bonded.
- C. Apply adhesive to comply with adhesive manufacturer's directions. Coat bonding surfaces of building stone and fragment with adhesive completely filling all voids and covering all surfaces. Fit fragments onto building stone while adhesive is still tacky and hold fragment securely in place until adhesive has cured.
- D. Clean any residual adhesive from edges. Wet stone and fill any chipped areas deeper than 1/8 inch with patching mortar. Avoid featheredging. Patched areas to match texture of and be level with adjoining stone surfaces. Keep patching mortar damp for 72 hours.
- E. All hairline cracks to be cut out to a depth of 1 inch and refilled with patching compound.
- F. In areas where original stone is missing, rebuild with patching compound to match contours and finish of original stone. Apply in accordance with manufacturer's instructions.

END OF SECTION

SECTION 05120

STRUCTURAL STEEL

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Structural steel framing members, support members, with required bracing, welds, fasteners, base plates, bearing plates, anchor bolts and other related items necessary to complete Project indicated by Contract Documents unless specifically excluded.
- 1.02 RELATED SECTIONS
- A. Section 09050 – Color Design.
 - B. Section 09900 – Paints and Coatings.
- 1.03 SUBMITTALS
- A. Shop drawings shall conform to requirements of current AISC Specifications. Indicate sizes, spacing, connections, and location of structural members. Indicate net weld lengths and welded connections with AWS welding symbols.
 - B. Mill Test Reports shall be furnished; certifying that each shipment meets specified structural strength.
 - C. Welders' Certificates indicating that all welders employed on the Work are qualified operators, verifying AWS qualifications within the previous 12 months.
- 1.04 QUALITY ASSURANCE
- A. Structural steel shall be furnished in accordance with current edition of the American Institute of Steel Construction "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings".
 - B. Qualification of Welders: All welding shall be in accordance with the "Code of Arc and Gas Welding in Building Construction" of the American Welding Society. Certification that each welder is qualified in accordance with American Welding Society Code D1.1 shall be provided.

PART 2 PRODUCTS

- 2.01 STRUCTURAL STEEL MATERIALS: All structural steel shall conform to ASTM A-36, domestic manufacture, except tube sections, which shall conform to ASTM A-501. Unless shown otherwise on Drawings, all bolts shall conform to ASTM Specification A307. Where indicated on Drawings, high strength bolts shall conform to ASTM Specification A 325.
- A. Welds shall be E70XX Series electrodes for manual arc welding and grade SAW-1 for submerged arc process.
 - B. All bolts not indicated otherwise on the plans are 3/4 inch. All connections not noted otherwise on the Drawings shall be framed connections.

- C. Grout for base plates shall be precision, premixed, non-shrink and non-metallic in conformance with ASTM C827. Grout shall be easily workable as well as being made flowable with an initial setting time of not less than 45 minutes and shall meet the requirements of ASTM C191. Grout shall have a 14-day compressive strength of 6000 psi when mixed to its flowable state.
- 2.02 PAINT MATERIALS: Shop coat paint, ICI Devflex 4020, Rustoleum 769, Tnemec 99, Southern Coatings 476, or approved equal. Shop coat shall be compatible with finish coats specified in Section 09900 Paints and Coatings.

PART 3 EXECUTION

- 3.01 FABRICATION AND ERECTION: Fabricate and erect steel in accordance with the latest requirements of the American Institute of Steel Construction and the approved shop drawings. Fabrication shall not proceed until Project Architect's approval is obtained.
 - A. Shop connections shall be welded. Field connections shall be bolted, unless welded connections are detailed. Welded connections shall be detailed consistent with requirements of the American Welding Society. Bolted connections shall be proportioned as shown in AISC Manual, using 3/4 inch unfinished bolts (A307), unless shown otherwise on Drawings.
 - 1. Shop and field welders shall have been recently certified as qualified structural welder according to requirements of the American Welding Society.
 - 2. Any splices not shown on the drawings shall be indicated clearly on the shop drawings and shall be made only with the Project Architect's approval.
 - B. Members shall be straight, plumb, and level so that the error does not exceed 1 to 1,000. During erection provide guys, stays, and braces to hold steel in position until the frame is permanently secured.
 - C. Neatly miter joints, weld full and grind welds smooth where steel shapes are used as finish members.
- 3.02 PAINTING
 - A. Apply one shop coat of paint to all structural steel. After erection, touch up joints and abraded areas with the same brand of paint.
 - B. Areas around welded joints and members to be encased in concrete shall not be painted in the shop. Thoroughly clean scale and loose rust from steel prior to painting. Steel shall be dry when painted and paint shall be allowed to dry before material is handled.
 - C. All steel exposed to view shall be painted additional coats as specified in Section 09900.

END OF SECTION

SECTION 05400

COLD-FORMED METAL FRAMING

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Provide all labor, materials and equipment necessary to complete the furnishing and installation of all cold-formed metal framing as shown, detailed and otherwise required, including lightgauge framing and exterior non-load bearing wall framing.
- 1.02 WORK NOT INCLUDED: Steel studs for interior non-structural walls are specified in Section 09250.
- 1.03 QUALITY ASSURANCE
- A. Systems designed and manufactured by Dale/Incor Industries products establish a minimum of quality required. Framing system shall meet or exceed all the requirements of the Standard Building Code, latest edition, and shall be designed to withstand wind loading of 25 lbs. per sq. ft. inward or 100 mph wind with Importance Factor of 1.5 with Exposure C, whichever is greater, and 25 lbs. per sq. ft. outward. Structural design of the system shall be the responsibility of the manufacturer.
 - 1. The out-of-plane deflection for brick veneer walls shall not exceed the lightgauge framing members span length divided by 600 ($L/600$).
 - B. Installer qualifications: An experienced installer who has successfully completed cold-formed metal framing similar in material, design and extent to the indicated for this project.
 - C. Welding: Quality procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel," and AWS D1.3, "Structural Welding Code - Sheet Steel."
 - D. AISC Specifications: Comply with AISI's Specification for the Design of Cold-Formed Steel Structural Members" for calculating structural characteristics of cold formed metal framing. Comply with CCFSS Technical Bulletin: AISI Specification Provisions for Screw Connections.
- 1.04 DELIVERY, STORAGE AND HANDLING
- A. Protect cold formed metal framing from corrosion, deformation or other damage during deliver, storage and handling.
 - B. Store cold-formed metal framing protected with a weatherproof covering and ventilate to avoid condensation.
- 1.05 SUBMITTALS
- A. Prior to the commencement of fabrication and erection, the Contractor shall submit fabrication and erection drawings for review and approval.
 - 1. The Drawings shall show all erection procedures and accessories required and shall bear a certification stating that the system is designed to meet all governing codes and the loading requirements stated in paragraph 1.03. The Drawings shall be prepared and stamped by a registered professional engineer licensed in the State of Mississippi.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All stud and framing members shall be of the type and size as shown on the plans and shall be equal to products as manufactured by Dale/Incor Industries.
 - 1. Provide 6" studs at all exterior walls at gage as indicated by manufacturer's calculations, unless shown or specified otherwise.
 - 2. All runner and end tracks, bridging and non-load bearing studs shall be of the type and size required and shall be manufactured by Dale/Incor Industries.
 - 3. 11, 12, 14 and 16 gage track and bridging shall be formed from steel that corresponds to the requirements of the following Standards with a minimum yield of 33,000 psi: Painted Material - ASTM A570-75, grade C; Galvanized Material - ASTM A446-72, grade A.
 - 4. All 16 gage steel studs and accessories shall be formed from steel that corresponds to the requirements of the following Standards with a minimum yield of 33,000 psi: Painted Material - ASTM A611-72, grade C; Galvanized Material - ASTM A446-72, grade A.
 - 5. All stud components shall be primed with paint meeting the performance requirements of TT-P-636C, or shall be formed from steel having a G-60 galvanized coating.
 - 6. The physical and structural properties listed by Dale/Incor Industries shall be considered the minimum permitted for all framing members.

2.02 FABRICATION

- A. Dale/Incor framing components may be prefabricated into panels prior to erection. Prefabricated panels shall be square with components attached by welding to prevent racking. Handling and lifting of panels shall be done in a manner as to not cause distortion in any member.
- B. All framing components shall be cut squarely for attachment to perpendicular members, or as required for an angular fit against abutting members. Members shall be held positively in place until properly fastened.
- C. Axial loaded bearing studs shall be installed in a manner which will assure that stud ends are positioned against the inside track web prior to stud and track attachment.

PART 3 EXECUTION

2.03 INSPECTION

- A. Examine condition of slab and other related surfaces prior to installation and do not proceed until any defects are corrected.

2.04 INSTALLATION

- A. Install lightgage framing, fasteners, trim and accessories in conformance with approved drawings and manufacturer's specifications.

- B. Install all studs at 16" oc maximum spacing.

2.05 ERECTING FOR WINDLOAD MEMBERS

- A. Tracks shall be securely anchored to the supporting structure in a manner which will transfer imposed load.
- B. Studs shall be plumbed, aligned and securely attached to each side of the flange or web of the top and bottom tracks.
- C. At track butt joints, abutting pieces of track shall be securely anchored to common structural element, or they shall be butt welded or spliced together.
- D. Splices in wind loaded only studs shall be avoided if possible. When necessary, splice sections shall be of same or heavier size, a minimum of 18" long and attached in a manner to maintain original strength.
- E. Jack studs shall be installed below window sills, above window and door headers, at free standing stair rails, and elsewhere to furnish structural support and shall be securely attached to supporting members.
- F. Wall stud bridging shall be installed in accordance with Dale/Incor Industries recommendations.
- G. Provision for structure vertical movement shall be provided where required using the Dale/Incor Vertical Slide Clip or other means in accordance with Dale/Incor Industries recommendations.

2.06 ERECTING FOR AXIAL LOAD BEARING MEMBERS

- A. Tracks shall be securely anchored to the supporting structure to properly transfer imposed loads.
- B. Complete, uniform and level bearing support shall be provided for the bottom track at each bearing stud location. If not provided, install full size shims below bottom track at stud locations as needed or set bottom track in high strength grout.
- C. At intersection or abutting track joints, abutting pieces of track shall be securely anchored to a common structural element, or they shall be spliced together.
- D. Splices in axial loaded studs shall not be permitted.
- E. Framed wall openings shall include a properly designed header and multiple (or heavier) studs at each edge of the opening, to compensate for those removed.
- F. Diagonal bracing shall be installed at locations required to be "shear walls" for frame stability and to resist wind lateral loads. Bracing shall be securely anchored for uplift and horizontal shear. Additional stud(s) shall be positioned to resist the vertical component.
- G. Bridging for wall framing shall be installed in accordance with Dale/Incor Industries recommendations.

END OF SECTION

SECTION 05500

METAL FABRICATION

PART 1 GENERAL

- 1.01 SECTION INCLUDES: All miscellaneous metal work. The Work includes, but is not limited to, pipe railings, steel lintels and miscellaneous framing & supports.
- 1.02 RELATED SECTIONS
- A. Section 09050 – Color Design.
 - B. Section 09900 - Paints and Coatings: Painting for all ferrous metal exposed to view.
- 1.03 SUBMITTALS: Submit shop drawings for shop fabricated items. Indicate profiles, sizes, materials connection details, attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, with plans, elevations, and details where applicable.

PART 2 PRODUCTS

- 2.01 MATERIALS: Structural shapes shall be standard sections conforming to the American Society for Testing Materials Specification A-36. Punch and drill as necessary for work of others. Provide all bearing plates and all anchors, bolts, and etc. The Work shall be true and free of twists, bends and open joints between component parts. Materials shall be thoroughly straightened in the shop before laid off or worked in any way, care being used to avoid injury to the material.
- A. Gray cast iron shall conform to ASTM A48-83, class 30. All castings shall be of uniform quality, free from blowholes, shrinkage defects, swells, cracks or other defects. Castings shall be free of fins, burrs and slag.
 - B. Expansion bolts shall be equal to Phillips Red Head or "cinch" bolts as manufactured by the National Lead Company. Hilti Fasteners, Rawlplug Company and Wej-it Corporation are acceptable manufacturers. Use toggle type bolts or similar for all anchorage into hollow construction.
 - C. Bolt or weld connections: Provide necessary lugs and brackets for anchorage. Welding shall be in accordance with current "Code of Fusion, Welding and Gas Cutting in Building Construction, Part A - Structural Steel" issued by the American Welding Society, both for fabrication and erection. All welders shall have certification, as a result of tests prescribed by the American Welding Society.
 - D. Detail metal Work for ample size, strength and stiffness and as indicated. Countersink and provide reinforcement where necessary; drill or punch holes for bolts and screws. At the proper time furnish the necessary templates, patterns and items of miscellaneous metal, such as sleeves, inserts and similar items to be built into adjoining Work.
 - E. Fabricate metal Work with sharp lines and angles, with smooth true surfaces and clean edges. Form exposed joints to exclude water. Furnish certificates from manufacturers stating that materials comply with the specification requirements.
 - F. Provide as necessary holes of proper number and spacing for the attachment of Work of other trades. Do not use cutting torch in field without permission of the Project Engineer.

- G. Anchor bolts, washers, nuts and clamps shall be furnished where indicated on the Drawings and where necessary for properly securing Work in place. All bolts and anchors used on the exterior of the building or built into exterior walls shall be cadmium plated. Miscellaneous angles and plates not indicated or specified otherwise shall not be less than 1/4 inch thick.
 - H. Shop paint and field touch up shall be ICI Devflex 4020, Rustoleum 769, Tnemec 99, Southern Coatings 476, or approved equal. Shop coat shall be compatible with finish coats specified in Section 09900 – Paints and Coatings.
 - I. Fastenings shall be invisible where possible. Where exposed, screws, bolts, and the like shall be vandal-proof. All welded exposed joints on steel manufactured items; etc. shall be ground smooth and filled to receive paint.
- 2.02 METAL PRIMER: Where materials come in contact with dissimilar materials which may cause harmful reaction, where exposed to moisture, or such as aluminum to cement mortar or concrete, the surface shall be protected by zinc chromate primer or approved paint.
- 2.03 PIPE RAILINGS: Fabricate railings and posts from 1-1/4 inch round tube steel, ASTM A 53, Type E or S, Grade A, Schedule 40. Shop prime after fabrication. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32-inch, unless otherwise shown.
- A. Welded Connections: Cope intersections of rails and posts, weld joints and grind smooth. Butt weld end-to-end joints of railings or use welding connectors, at fabricator's option. At connections to steel supports, weld post directly to steel supports, unless otherwise indicated.
 - B. Anchorage: Use type of bracket with pre-drilled hole for exposed bolt anchorage. For stud partitions and framing use lag bolts set into wood backing between studs and framing members. Coordinate with stud installations for accurate location of backing members.
 - C. Expansion: Provide expansion joints at locations indicated, or if not indicated, at intervals not to exceed 40 feet. Provide slip joint with internal sleeve extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6 inches of posts.
- 2.04 LOOSE LINTELS: Provide loose galvanized steel lintels for openings and recesses in masonry walls and partitions. Weld adjoining members together to form a single unit where indicated. Provide a minimum of 8 inches bearing at each side of openings.
- 2.05 MISCELLANEOUS FRAMING AND SUPPORTS: Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete Work.
- A. Fabricate miscellaneous units to sizes, shapes, and profiles indicated, or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise indicated, fabricate from structural steel shapes, plates and steel bars of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
 - B. Galvanize exterior miscellaneous frames and supports.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Perform cutting, drilling and fitting required for installation; set Work accurately in location, alignment and elevation measured from established lines and levels. Provide anchorage devices and fasteners where necessary for installation to other Work.
- B. Set loose items on cleaned bearing surfaces, using wedges or other adjustments as required. Solidly pack open spaces with bedding mortar, consisting of 2 part Portland Cement to 3 parts sand and only enough water for packing and hydration, or use commercial non-shrink grout material.

- 3.02 Touch-up shop paint after installation. After cleaning field welds, bolted connections and abraded areas, apply same type paint as used in shop. Color to be selected from standard colors available. Use galvanizing repair paint on damaged galvanized surfaces.

END OF SECTION

SECTION 05515

METAL LADDERS

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Aluminum access ladder with platform and railings as indicated on the Drawings including indications of sizes and locations.
- 1.02 RELATED SECTION
- A. Section 05500 – Metal Fabrication for fasteners and installation requirements used to attach ladders to structure.
- 1.03 REFERENCES
- A. AA – Aluminum Association.
- B. ASTM B 209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. ASTM B 221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars.
- D. OSHA 1910.27-Fixed Ladders.
- 1.04 SUBMITTALS
- A. Product Data: Submit manufacturer's specifications; certified test data, where applicable; and installation instructions for required products, including finishes.
- B. Shop Drawings: Submit Shop Drawings for the fabrication and erection of Ladder units and accessories. Include plans, elevations and details of sections and connections to adjoining Work. Indicate materials, finishes, fasteners, joinery and other information to determine compliance with specified requirements. Provide reaction loads for each hanger and bracket.
- 1.05 QUALITY ASSURANCE
- A. Manufacturer's Qualifications: A firm experienced in producing aluminum metal ladders similar to those indicated for this Project and with Professional engineering competent in design and structural analysis to fabricate ladders, platforms and railings in compliance with industry standards and local codes.
- B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing ladders to attain operational and structural performance.
- C. Product Qualifications: Product design shall comply with OSHA 1910.27 minimum standards for ladders.
- 1.06 DELIVERY, STORAGE, AND HANDLING: Deliver materials and products in labeled protective packages. Store and handle in strict compliance with manufacturers' instructions and recommendations.
- 1.07 Warranty: Manufacturer shall guarantee materials and workmanship against defects for a period of 5 years after Final Completion. Within the warranty period, the manufacturer shall, at its option, repair or replace with new defective products.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and Specifications are based on products manufactured by O'Keefe's, Inc., 325 Newhall Street, San Francisco, CA 94124. Tel. (888) 653-3333.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. ACL Industries, Inc., Manchester, NH. (603) 668-1276.
 - 2. Precision Ladders, LLC, Morristown, TN. Tel. (800) 225-7814.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures

2.02 APPLICATION / SCOPE: Fixed access wall ladder with platform and guard rail, around platform and top of ladder as shown.

2.03 FINISHES: Mill finish as extruded.

2.04 MATERIALS

- A. Aluminum Sheet: ASTM B 209, Alloy 5005-H34 with temper as required for forming or as otherwise recommended by metal producer to provide required finish.
- B. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.

2.05 FABRICATION

- A. Rungs: Not less than 1-1/4 inches in section and 18-3/8 inches long, formed from tubular aluminum extrusions. Squared and deeply serrated on all sides. Rungs shall withstand a 1,000 pound load without deformation or failure.
- B. Channel Side Rails: Not less than 1/8 inch wall thickness by 3 inches wide.
- C. Heavy Duty Tubular Side Rails: Assembled from two interlocking aluminum extrusions not less than 1/8 inch wall thickness by 3 inches wide. Construction shall be self-locking stainless steel fasteners, full penetration TIG welds and clean, smooth and burr-free surfaces.
- D. Landing Platform: 1-1/2 inches or greater diameter, tubular aluminum guardrails and decks of serrated aluminum treads. Railing shall be not less than 3'-6" above the landing.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Coordinate anchorages. Provide setting drawings, templates, and anchorage structural loads for fastener resistance.
- B. Do not begin installation until supporting structure is complete.

3.02 INSTALLATION: Install in accordance with manufacturer's written instructions.

3.03 PROTECTION

- A. Protect installed products until Final Completion.
- B. Touch-up, repair or replace damaged products before Final completion.

END OF SECTION

SECTION 05800

EXPANSION CONTROL

PART 1 GENERAL

1.01 SUMMARY

- A. Provide all labor, materials, equipment and services, and perform all operations required for complete installation of Expansion Control and related work as indicated on the drawings and specified herein.
- B. Work Included: The work of this section shall include, but not be limited to the following:
 - 1. Floor expansion joint cover assemblies.
 - 2. Wall/ceiling expansion joint cover assemblies.
 - 3. Exterior expansion joint seals.
- C. Related Work Specified Elsewhere
 - 1. Concrete - Section 03300.
 - 2. Unit Masonry - Section 04200.
 - 3. Miscellaneous Metal - Section 05500.
 - 4. Flashings and Sheet Metal - Section 07620.
 - 5. Sealants and Caulking - Section 07920.
 - 6. Color design - Section 09050.

1.02 QUALITY ASSURANCE

- A. Materials and work shall conform to the latest edition of reference specifications specified herein and to all applicable codes and requirements of local authorities having jurisdiction.
- C. Loading Characteristics:
 - 1. Standard Floor Covers: Shall be designed to withstand a minimum load of 500 lbs. without damage or permanent deformation. Heavy duty covers should withstand a point load of 2,000 lbs.
 - 2. Wall Covers: Shall be designed to withstand a minimum impact load of 75 ft/lbs without damage or permanent deformation.
- D. Single-Source Responsibility: Obtain expansion joint cover assemblies from one source from a single manufacturer.

1.03 SUBMITTALS

- A. Product Data: Submit copies of manufacturer's latest published literature for materials specified herein for approval, and obtain approval before materials are fabricated and delivered to the site. Data to clearly indicate movement capability of cover assemblies and suitability of material used in exterior seals for UV exposure.

- B. Shop Drawings: Submit shop drawings for work specified herein for approval and obtain approval prior to fabrication and shipment of materials to the job site.
 - 1. Shop Drawings showing full extent of expansion joint cover assemblies; include large-scale details indicating profiles of each type of expansion joint cover assembly, splice joints between sections, joinery with other types, special end conditions, anchorage's, fasteners, and relationship to adjoining work and finishes. Include description of materials and finishes and installation instructions.
- D. Samples: Samples of materials specified herein shall be submitted for approval, and approval obtained before materials are delivered to the site. Samples shall include the following:
 - 1. Samples for each type of metal finish indicated on metal of same thickness and alloy to be used in work. Where normal color and texture variations are to be expected, include 2 or more units in each set of samples showing limits of such variations.
 - 2. Samples of each type of flexible seal to be used in work with color samples as above.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Exercise proper care in the handling of all work so as not to injure the finished surface, and take proper precautions to protect the work from damage after it is in place.
- B. Deliver materials to the job site ready for use, and fabricated in as large sections and assemblies as practical. Assemblies shall be identical to submitted and reviewed shop drawings, samples and certificates.
- C. Store materials under cover in a dry and clean location off the ground. Remove materials that are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials at no additional cost.

1.05 PROJECT CONDITIONS

- A. Where necessary, check actual locations of walls and other construction to which work must fit, by accurate field measurements before fabrication. Show recorded measurements on final shop drawings and coordinate fabrication schedule with construction progress to avoid delay of work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Expansion joint cover assemblies specified herein and indicated on the drawings are based on products manufactured by Conspec Systems, Inc., P.O. Box 380, Muncy, PA., Telephone (570) 546-5941.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Architectural Art Mfg., Riverdale, MD, Telephone (800) 835-0028.
 - 2. Balco, Inc., Wichita, KS, Telephone (800) 767-0082.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 MATERIALS

- A. Aluminum: ASTM B 221, alloy 6063-T5 for extrusions; ASTM B 209, alloy 6061-T6, sheet and plate.
 - 1. Protect aluminum surfaces in contact with cementitious materials with heavy metal free high solids primer or chromate conversion coating.
- B. Stainless Steel: ASTM A 167, Type 304 with 2B finish, unless indicated otherwise, for plates, sheets and strips.
- C. Extruded Preformed Seals: Single or multilayered rubber extrusions as classified under ASTM D 2000, designed with or without continuous, longitudinal, internal baffles and formed to fit compatible frames, in color indicated, or, if not indicated, as selected by architect from manufacturer's standard colors.
- D. Exterior Seals: Typically two single layered flexible extrusions, one interior PVC and one exterior Santoprene 8000 Series non-hydroscopic, thermoplastic rubber, as classified under ASTM D 2000, retained in a set of compatible frames, in color indicated, or, if not indicated, as selected by architect from manufacturer's standard colors.
- E. Accessories: Manufacturer's standard anchors, fasteners, set screws, spacers, flexible vapor seals and filler materials, drain tubes, adhesive and other accessories compatible with material in contact, as indicated or required for complete installations.

2.03 FABRICATION

- A. General: Provide expansion joint cover assemblies of design, basic profile, materials, and operation indicated. Select units comparable to those indicated or required to accommodate joint size, variations in adjacent surfaces, and structural movement. Furnish units in longest practicable lengths to minimize number of end joints. Provide hairline-mitered corners where joint changes directions or abuts other materials. Include closure materials and transition pieces, tee-joints, corner, curbs, cross-connections, and other accessories as required to provide continuous joint cover assemblies.
- B. Interior Expansion Joint
 - 1. Flush Cover Assemblies: Provide continuous extruded aluminum frame assemblies of a suitable profile to receive free floating cover plate of design indicated. Furnish colorable, thermoplastic frame seal with rigid edges for positive attachment to frame and center plate free from grooves or ridges. Seals to have flexible core of shore hardness 73 to allow movement of joint width without gaps occurring between seal and cover assembly. Seals to be replaceable without removal of center plate and to be in one of four standard colors unless otherwise specified. All aluminum in contact with concrete to receive heavy metal free/high solids primer, exposed aluminum to be mill finish. All as C/S Flush Series manufactured by Conspec Systems, Inc.
 - a. Floor Cover: C/S Model GFST-100.
 - b. Wall Cover: C/S Model FWF-100.
 - c. Ceiling Cover: C/S Model HC-100.

C. Exterior Joint Covers

1. Vertical Exterior Seals: Thermoplastic rubber primary seals extruded in Santoprene retained in extruded aluminum side frames complete with independent continuous PVC back seal. Side frames mounted on butyl caulk tape with appropriate anchors 18" o.c. Installation to include factory, heat welded transitions where applicable to ensure a watertight system. Color of primary seal to be one of four standard colors or custom color selected by architect. All as C/S Exterior Seals manufactured by Conspec Systems, Inc.
 - a. Vertical Wall Cover: C/S model SF-200.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Make a thorough examination of all surfaces receiving the work of this Section and before starting the installation, notify the Architect, in writing, of any defect which would affect the satisfactory completion of the work of this section.

3.02 PREPARATION

- A. Examine the Contract Drawings and specifications in order to insure the completeness of the work required under this Section.
- B. Verify all measurements and dimensions at the job site and cooperate in the coordination and scheduling of the work of this Section with the work of related trades, with particular attention given to the installation of items embedded in concrete and masonry so as not to delay job progress.
- C. Provide all templates as required to related trade for location of all support and anchorage items.

3.03 INSTALLATION

- A. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for all phases of work, including preparation of substrate, applying materials, and protection of installed units.
- B. Provide anchorage devices and fasteners where necessary for securing expansion joint cover assemblies to in-place construction, including threaded fasteners with drilled-in fasteners for masonry and concrete where anchoring members are not embedded in concrete. Provide fasteners of metal, type, and size to suit type of construction indicated and provide for secure attachment of expansion joint cover assemblies.
- C. Perform all cutting, drilling and fitting required for installation of expansion joint covers. Install joint cover assemblies in true alignment and proper relationship to expansion joints and adjoining finished surfaces measured from established lines and levels.
- D. Allow adequate free movement for thermal expansion and contraction of metal to avoid buckling.
- E. Set floor covers at elevations to be flush with adjacent finished floor materials.

- F. Locate wall and ceiling covers in continuous contact with adjacent surfaces. Securely attach in place with all required accessories.
 - G. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches on centers.
 - H. Maintain continuity of expansion joint cover assemblies with end joints held to a minimum and metal members aligned mechanically using splice joints. Cut and fit ends to produce joints that will accommodate thermal expansion and contraction of metal to avoid buckling of frames.
 - I. Adhere flexible filler materials (if any) to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
 - 1. Installation of Extruded Preformed Seals: Install seals to comply with manufacturer's instruction and with minimum number of end joints.
 - 2. For straight sections provide preformed seals in continuous lengths.
 - 3. Vulcanize or heat-seal all field splice joints in preformed seal material to provide watertight joints using manufacturer's recommended procedure.
 - 4. Apply manufacturer's approved adhesive, epoxy, or lubricant-adhesive to both frame interfaces prior to installing preformed seal.
 - 5. Seal transitions in accordance with manufacturer's instruction.
 - J. Installation of Exterior Seal Joint Assemblies
 - 1. Seal all end joints within continuous runs and joints at transitions in accordance with manufacturer's directions to provide a watertight installation.
 - 2. Install exterior flexible seal in standard lengths.
 - 3. Seal transitions and butt joints in accordance with manufacturer's instructions.
 - 4. Install secondary seals in continuous lengths; vulcanize all field splice joints in secondary seal material to provide watertight joints using manufacturer's recommended procedures.
- 3.04 CLEANING AND PROTECTION
- A. Do not remove strippable protective material until finish work in adjacent areas is complete. When protective material is removed, clean exposed metal surfaces to comply with manufacturer's instructions.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Concealed wood grounds and blocking to frame openings, form terminations, to provide anchorage and / or support of other interior and exterior locations; plywood and rough hardware.
- 1.02 RELATED SECTIONS
 - A. Section 03100 - Concrete Forms and Accessories.
 - B. Section 06400 - Architectural Woodwork.
 - C. Section 08710 - Door Hardware.
- 1.03 COORDINATION: Fit carpentry Work to other Work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other Work.
- 1.04 QUALITY CONTROL: Factory mark each piece of lumber and plywood to identify the type, grade, agency providing the inspection service, the producing mill and other qualities as specified.
- 1.05 DELIVERY, STORAGE AND PROTECTION: Keep materials dry during delivery and storage. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood, and provide air circulation within stacks. Protect installed carpentry work from damage by work of other trades until Owner's acceptance of the Work. Contractor shall comply with manufacturer's required protection procedures.
- 1.06 PROJECT CONDITIONS: Installer must examine all parts of the supporting structure and the conditions under which the carpentry Work is to be installed, and notify the Contractor in writing of any conditions detrimental to the proper and timely completion of the Work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

PART 2 PRODUCTS

- 2.01 LUMBER: For each use, comply with the "American Softwood Lumber Standard" PS 20 by the U.S. Department of Commerce. Nominal sizes are shown or specified; provide actual sizes complying with the minimum size requirements of PS20 for the moisture content specified for each use. Provide dressed lumber, S4S, unless otherwise shown or specified. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and complying with dry size requirements of PS 20, unless otherwise specified.
- 2.02 FRAMING LUMBER
 - A. Where wood framing is shown or scheduled, provide lumber complying with grading rules which conform to the requirements of the "National Grading Rule for Dimension Lumber" of the American Lumber Standards Committee established under PS 20.
 - B. For Light Framing: Standard Grade.

- C. For Structural Framing: (4 inches and wider and from 2 inches to 4 inches thick), provide the following: No. 1 Grade; Douglas Fir (WCLB or WWPA), Southern Pine (SPIB). Fb (minimum extreme fiber stress in bending); 1,250 psi. E (minimum modulus of elasticity); 1,700,000 psi.

2.03 BOARDS

- A. Where lumber less than 2 inches in nominal thickness and 2 inches or more in nominal width is shown or specified, provide boards complying with dry size requirements of PS 20.
- B. Concealed Boards: Where boards will be concealed by other work, provide the following:
 - 1. Moisture Content: 19 percent maximum, mark boards "S- Dry".
 - 2. Species and Grade: Provide one of the following:
 - a. Southern Pine (SPIB) No. 2 boards.
 - b. WCLB (any species) No. 3 boards.

2.04 PLYWOOD

- A. For each use, comply with the requirements for "Softwood Plywood/Construction and Industrial" PS 1 by the U.S. Department of Commerce.
- B. Concealed Plywood: Where plywood will be concealed by other work, provide 5/8-inch minimum thickness Interior Type plywood C-D Plugged Grade, unless otherwise specified or shown on Drawings. For backing panels for electrical or telephone equipment, provide fire-retardant treated Standard grade plywood with exterior glue.
- C. Exposed Plywood: Where plywood will be exposed to view, provide 5/8 inch minimum thickness Interior Type plywood C-D Plugged Grade, unless otherwise specified or shown on Drawings. Unless specifically stated otherwise, all exposed plywood shall be painted or stained from standard colors as selected by Project Architect.
- D. Exterior Plywood: Exterior type, medium density, C Grade for concealed faces.
 - 1. Wall sheathing: 1/2 - inch thick.

- 2.05 ANCHORAGE AND FASTENING MATERIALS: For each use, select proper type, size, material and finish complying with the applicable Federal Specifications. Zinc electroplated steel fasteners for high humidity and treated wood locations. All nails shall be coated.

- 2.06 TREATED WOOD: Complete fabrication of treated items prior to treatment, wherever possible. If cut after treatment, coat cut surfaces with heavy brush coat of same fire-retardant chemical used for treatment. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

- A. Preservative Treatment: Where lumber or plywood is indicated as "Treated", or is specified herein to be treated, comply with the applicable requirements of the American Wood Preservers Institute (AWPI). Mark each treated item to comply with the AWP Quality Mark requirements for the specified requirements.

1. Pressure-treat aboveground items with water-borne preservatives complying with AWPI P-2. After treatment, kiln-dry to maximum moisture content of 15 percent. Treat indicated items and the following:
 - a. Wood cants, nailers, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers and waterproofing.
 - b. Wood sills, sleepers, blocking, furring stripping and similar concealed members in contact with masonry or concrete.
 - B. Fire-Retardant Treatment: Where "PR-S" lumber or plywood is shown or scheduled, comply with the AWPI Specification C-208 for pressure impregnation with fire-retardant chemicals to achieve a flame-spread rating of not more than 25 when tested in accordance with UL Test 723, ASTM E A4, or NFPA Test 355. Where treated items are indicated to receive a transparent or paint finish, use a fire-retardant treatment that will not bleed through or adversely affect bond of finish.
- 2.07 FELT: Refer to Section 07260 – Vapor Retarders for weather-resistive barrier on exterior face of wall sheathing.

PART 3 EXECUTION

- 3.01 INSTALLATION: Use only sound, thoroughly seasoned materials of the longest practical lengths and sizes to minimize jointing. Use materials free from warp that cannot be easily corrected by anchoring and attachment. Sort out and discard warped material and material with other defects that would impair the quality of the Work.
 - A. Securely attach carpentry work to substrates by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes.
 - B. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.
- 3.02 ATTACHMENT AND ANCHORAGE
 - A. Use common wire nails, except as otherwise shown or specified. Use finishing nails for finish Work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; pre-drill as required.
 - B. Plywood Sheathing: Panel ends and edges shall have spacing of 1/8 inch, unless otherwise indicated by the panel manufacturer. Nail 6 inches on center along supported panel edges and 12 inches on center at intermediate supports with 6d common nails for panels 1/2 -inch thick.
- 3.03 WOOD GROUND NAILERS, BLOCKING, AND SLEEPERS: Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Set true to line and level, plumb with intersections true to required angle. Coordinate location with other Work involved.
 - A. Attach to substrates securely with anchor bolts and other attachment devices as shown as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Building into masonry; anchor to formwork before concrete placement.

- B. Provide grounds of dressed, preservative treated, key-beveled lumber not less than 1-1/2 inch wide and of the thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.
- 3.04 WOOD FURRING: Install plumb and level with closure strips at all edges and openings. Shim with wood as required.
- A. Suspended Furring: Provide of size and spacing shown, complete including hangers and all attachment devices. Level to a tolerance of 1/8 inch in 12 feet.
- 3.05 WOOD FRAMING
- A. Set wood framing accurately to required lines and levels. Provide framing members of sizes and on spacing shown, and frame openings as shown, or if not shown, comply with the recommendation of the "Manual for Housing Framing" of the National Forest Products Association. Cut, join, and tightly fit framing around other Work. Do not splice structural members between supports unless otherwise detailed.
 - B. Anchor and nail as shown, or if not shown, to comply with the "Recommended Nailing Schedule - Table 1 of the "Manual of House Framing" and other recommendations of the N.F.P.A.

END OF SECTION

SECTION 06400

ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.01 SECTION INCLUDES: Architectural woodwork as shown on the Drawings and schedules. Architectural woodwork is defined to include (in addition to items so designated on the Drawings) miscellaneous exposed wood members commonly known as "Finish Carpentry" or "Millwork", except where specified under another Section of these Specifications. The types of architectural woodwork include, but are not limited to Standing and Running Trim, Cabinets with or for paint finish, Countertops, Shelving, Hardware and Miscellaneous work.

1.02 RELATED SECTIONS

- A. Section 05500 – Metal Fabrication.
- B. Section 06100 – Rough Carpentry.
- C. Section 09050 – Color Design.
- D. Section 09900 – Paints and Coatings

1.03 DEFINITIONS: Terms used in this Section are in accordance with terminology of the Architectural Woodwork Institute, Architectural Woodwork Quality Standards, Eighth Edition, Version 1.0, 2003.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, specifications, and installation instructions for each item of Factory-fabricated woodwork prior to fabrication.
- B. Shop Drawings: Submit Shop Drawings showing location of each item, including Lumber, Panel Products, Standing and Running Trim, Cabinets, Countertops, Shelving, and miscellaneous work. Dimensioned plans and elevations shall be provided and drawn at a minimum scale of $1/2" = 1'-0"$. Large scale details shall be provided and drawn at a minimum scale of $3" = 1'-0"$. Shop drawings shall clearly indicate location of joints, countertops, grommets, plastic laminates, brackets, hardware, metal finishes, attachment devices and other materials necessary for complete fabrication.

1.05 QUALITY ASSURANCE

- A. Comply with specified provisions of the Architectural Woodwork Institute (AWI) "Quality Standards". All construction, fabrication, finishes, and materials shall meet AWI Premium Quality Standards.
- B. Quality Marking: Mark each unit of architectural woodwork with mill's or fabricator's identification and grade marks, located on surfaces which will not be exposed after installation.
- C. The millwork manufacturer shall :
 - 1. Have a minimum of five (5) years documented experience and shall have completed projects of similar scope and size to the work of this project.

2. Have technologically advanced woodworking facilities employing the use of modern equipment and techniques for fabricating and finishing to meet the level of quality for the manufacture of all fabrication specified.
 3. Employ skilled workmen experienced in the fabrication and finishing of premium quality millwork.
 4. Be responsible for fabrication, finishing and installation of all products and procedures specified in this Section.
- D. For the following types of architectural woodwork, comply with the indicated standards as applicable:
1. Lumber: AWI Section 100.
 2. Standing and running trim: AWI Section 300.
 3. Cabinets and Countertops: AWI Section 400, A, B, C.
 4. Shelving: AWI Section 600.
 5. Miscellaneous work: AWI Section 700.
 6. Finishing: AWI Section 1500.
 7. Installation of woodwork: AWI Section 1700.
- 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING: Protect woodwork during transit, delivery, storage and handling to prevent damage, soiling and deterioration. Do not deliver woodwork until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, woodwork must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.
- 1.07 PROJECT CONDITIONS: The Installer shall examine the substrates and conditions under which the work is to be installed; and notify the Contractor in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- A. Conditioning: The Installer shall advise the Contractor of temperature and humidity requirements for woodwork installation areas. Do not install woodwork until the required temperature and relative humidity have been stabilized and will be maintained in installation areas.
 - B. Maintain temperature and humidity in installation area as required to maintain moisture content of installed woodwork within a 1.0-percent tolerance of the optimum moisture content, from the date of installation through the remainder of the construction period. The fabricator of the woodwork shall determine the optimum moisture content and required temperature and humidity conditions.
- 1.08 COORDINATION: Coordinate the work of this Section with work of other Sections that require penetrations, attachments, or supports for architectural woodwork.

PART 2 PRODUCTS

2.01 BASIC MATERIALS AND FABRICATION METHODS

- A. Except as otherwise indicated, comply with the following requirements for architectural woodwork not specifically indicated as pre-fabricated or pre-finished standard products.
- B. Wood Moisture Content: Provide kiln-dried lumber and maintain optimum 8 to 13 percent range (damp region) moisture content in solid wood (hardwood and softwood) through fabrication, installation, and finishing operations of interior Work.

- C. Wood for Painted Finish: Comply with AWI quality standards for selection of species, grade and cut (fabricator's option, except as otherwise indicated). Wood for trim shall be maple or other closed-grain hardwood subject to MDOT Architect's prior approval.
- D. Wood for Stained Finish: Comply with AWI quality standards for selection of species, grade and cut.
- E. Plastic Laminate: Comply with NEMA LD3; type, thickness, color, pattern and finish as indicated for each application. Refer to Section 09050 – Color Design for selection of manufacturer, color and finish.
- F. Solid Surfacing: Provide solid surfacing equal to Surell as manufactured by the Formica Corporation, Corian as manufactured by EI Dupont De Nemours & Company, Inc. or Gibraltar as manufactured by Wilsonart International, Inc.
- G. Quality Standards: For the following types of architectural woodwork, comply with the indicated standards as applicable.
 - 1. Lumber: AWI Section 100
 - 2. Standing and running trim: AWI Section 300
 - 3. Cabinets and Countertops: AWI Section 400, A, B, C
 - 4. Shelving: AWI Section 600
 - 5. Miscellaneous work: AWI Section 700
- H. Design and Construction Features: Comply with the details shown for profile and construction for architectural woodwork; and where not otherwise shown, comply with applicable AWI Quality Standards, with alternate details at fabricator's option.
- I. Pre-Cut Openings: Fabricate architectural woodwork with pre-cut openings, wherever possible, to receive hardware, appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately and use templates or roughing-in diagrams for proper size and shape. Smooth the edges of cut outs and where located in countertops and similar exposures, seal the edges of cut outs with a water resistant coating.
- J. Measurements: Before proceeding with fabrication of woodwork required to be fitted to other construction, obtain measurements and verify dimensions and shop drawing details as required for accurate fit. Where sequence of measuring substrates before fabrication would delay the project, proceed with fabrication (without field measurements) and provide ample borders and edges to allow for subsequent scribing and trimming of woodwork for accurate fit.

2.02 ARCHITECTURAL WOODWORK TYPES

- A. Wood cabinets: Fabricate millwork in accordance with AWI Premium Standards, Section 400 Cabinets and as indicated on the Drawings. On exposed portions provide solid wood and plywood (no plywood substitutes) meeting the requirements for the specified AWI Quality Grade.
 - 1. Exposed surfaces: Birch.
 - 2. Semi-Exposed surfaces: Birch.
 - 3. Concealed surfaces: Birch.
- B. Plastic Laminate Colors and Patterns: As selected by the MDOT Architect from manufacturer's standard products, satin finish (5-34 reflectance).

2.03 CABINET HARDWARE AND ACCESSORY MATERIALS

- A. Provide cabinet hardware and accessory materials associated with architectural woodwork, except for units that are specified as "door hardware" in other sections of these specifications. Except as otherwise indicated, comply with ANSI A156.9 "American National Standard for Cabinet Hardware." Unless shown or noted otherwise, cabinet hardware shall comply with the following:
 - 1. Hinges: Concealed type equal to Blum 125 Series using full side adjustment.
 - 2. Pulls: Wire type equal to Stanley 4484.
 - 3. Grommets: 2" diameter molded plastic grommet liner with cap.
 - 4. Drawer guides: Equal to K&V 1300.
 - 5. Adjustable shelf hardware (side support) K&V 255-256.
 - 6. Adjustable shelf hardware (back support) K&V 87-187 for 16" deep shelves.
 - 7. Closet Rods: Chrome pipe one inch in diameter, braced 4 feet on center maximum.
 - 8. Closet Rod Support: Equal to Stanley 7046.
 - 9. Keyboard: Multi-Platform Articulating Keyboard Platform equal to Kensington Model KMW60067. Equivalent products by Fellows and Safco are acceptable.
 - 10. Hardware finishes to be selected by the Project Engineer / MDOT Architect.

PART 3 EXECUTION

3.01 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.
- B. Deliver concrete inserts and similar anchoring devices to be built into substrates, well in advance of the time substrates are to be built. Prior to installation of architectural woodwork, examine shop fabricated work for completion, and complete work as required, including back priming and removal of packing.

3.02 INSTALLATION: All work shall be installed in strict accordance with the premium grade standards of Section 1700 – Installation of woodwork of AWI Quality Standards.

- A. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8-inch in 8 feet for plumb and level (including countertops); and with 1/16-inch maximum offsets in revealed adjoining surfaces. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
- B. Secure woodwork with anchors or blocking built-in or directly attached to substrates. Attach to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where pre-finished matching fastener heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork, and matching final finish where transparent finish is indicated.
- C. Casework: Install without distortion so that doors and drawers will fit openings properly and be accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.

- D. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns, miter at corners, and comply with AWI Quality Standards for joinery.
 - E. Countertops: Anchor securely to base units and other support systems as indicated.
- 3.03 PREPARATION FOR SITE FINISHING: Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth ready for painted or stained finishes.
- 3.04 ADJUSTMENT, CLEANING, FINISHING AND PROTECTION: Repair damaged and defective woodwork wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.
- A. Clean hardware, lubricate and make final adjustments for proper operation. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop applied finishes to restore damaged or soiled areas.
 - B. Refer to Section 09900 for final finishing of installed painted and stained architectural woodwork.
 - C. Protection: The Installer of architectural woodwork shall advise the Contractor of final protection and maintenance conditions necessary to ensure that the Work will be without damage or deterioration at the time of acceptance.

END OF SECTION

SECTION 07210

BUILDING INSULATION

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Building insulation for exterior walls, interior walls, and ceilings as shown on the Drawings and specified herein.
- 1.02 RELATED SECTIONS: Other types of insulation are specified in Roof Insulation under (Section 07612-Sheet Metal Roofing and Wall Panels under Batt Insulation) Specifications.
- 1.03 SUBMITTALS: Submit manufacturer's product and technical data for each type of insulation describing location, extent, material and method of fastening prior to installation for MDOT Architect's approval.
- 1.04 PRODUCT HANDLING: Protect the materials of this section before, during and after installation and to protect the installed work and materials of all other trades. In the event of damage, immediately make all repairs or replacements as necessary.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Equivalent products by the following manufacturers are acceptable:
 - 1. Celotex Building Products, Tampa, FL. Tel. (813) 873-4000.
 - 2. Dow Chemical Company, Midland, MI. Tel. (800) 441-4369.
 - 3. Johns Manville Corp, Denver, CO. Tel. (303) 978-2531.
 - 4. Owens Corning, Toledo, OH. Tel. (800) 438-7465.
 - 5. UC Industries, Inc., Tallmadge, OH. Tel. (330) 630-6134.
 - 6. United States Gypsum Company, Chicago, IL. Tel. (800) 874-4968.
- B. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

- 2.02 BATT INSULATION: Provide glass fibers and resinous binders formed into flexible batts conforming to ASTM C 665, Type III, Class B with density not less than 1.5 lbs. Per cubic foot and an R value of 3.17 per inch of thickness at 75 degrees F. mean temperature, with aluminum foil and asphalt vapor barrier laminated to one face. Thickness of insulation shall be as shown on the Drawings.

- 2.03 SOUND ATTENUATION INSULATION: Similar to above specified insulation except manufacturer's standard unfaced batt insulation manufactured for sound attenuation.

2.04 ACCESSORIES

- A. Tape: Bright aluminum, self-adhering type, mesh reinforced, and two inches wide.

PART 3 EXECUTION

- 3.01 INSPECTION: Examine the areas and conditions where building insulation is to be installed and notify the Project Engineer of conditions detrimental to the proper and timely completion of the work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Project Engineer / Architect.
- 3.02 INSTALLATION: Comply with manufacturer's instructions for the particular condition of installation in each case. If printed instructions are not available, or do not apply to the project conditions, consult the manufacturer's technical representative for specific recommendations before proceeding with the work.
- A. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections, which interfere with placement.
 - B. Apply a single layer of insulation to the required thickness, unless a double layer is required, to make up the total thickness shown.
 - C. Set vapor barrier faced units with vapor barrier to inside of construction, except as otherwise shown. Do not obstruct ventilation spaces. All joints at vapor barriers shall be sealed with 4 inches wide, foil faced duct tape to prevent vapor and air migration.
 - D. Tape joints and ruptures in vapor barriers, using tape specified above, and seal each continuous area of insulation to surrounding construction so as to ensure vapor tight installation of the units.
 - E. Where insulation is impaled on stick clips, provide clips not less than 3 inches from corners or edges and not more than 12 inches on center.
 - F. Adhesive Application - per manufacturer's printed directions. Apply adhesive over entire back of insulation and on edges of insulation, except as noted below.
 - G. Fastener Installation - per manufacturer's printed directions. Install fasteners 12 inches on center each way. Use adhesive as specified herein per fastener manufacturer's recommendations.
- 3.03 BATT INSULATION: Install blanket fiberglass insulation with edges closely butted. Cut and fit insulation to closely fit intersecting or penetrating surfaces.
- A. Walls: Install sound batt insulation between the studs at all interior partitions. Attach to studs with staples, adhesive or method as recommended by manufacturer. Tape and seal small joints and punctures and replace insulation where large tears occur.
 - B. Ceilings: Install above ceilings continuous with vapor barrier down. Lay above gypsum board at bottom chord of wood trusses in method recommended by manufacturer. Tape and seal small joints and punctures and replace insulation where large tears occur.

END OF SECTION

SECTION 07260

VAPOR RETARDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Vapor retarder under concrete floor slab.
- B. Concrete curing paper on top of freshly poured concrete floor slab. .
- C. Weather-resistive barrier on exterior face of wall sheathing.
- D. Floor protection paper used for positive protection of finished floors.

1.02 RELATED SECTIONS: Section 07650 - Flexible Flashing.

1.03 SUBMITTALS: Submit manufacturer's technical product data, installation instructions and recommendations for products specified.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on products manufactured by Fortifiber Corporation, 300 Industrial Drive, Fernley, NV 89408. Tel. (800) 773-4777.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Grace Construction Products, Cambridge, Ma. Tel: (800) 444-6459.
 - 2. Griffolyn ® Division, Reef Industries, Inc., Houston, TX. Tel: (800) 231-6074.
 - 3. Stego Industries LLC, San Juan Capistrano, CA. Tel: (877) 464-7834.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 VAPOR RETARDER

- A. Membrane shall be a 15 mil polyolefin film meeting ASTM E-1745-97 Class A Test Method, equal to Fortifiber Corporation, Moistop® Ultra™ 15, including Moistop® tape and sealants with the following characteristics:
 - 1. Moisture Vapor Permeance: ASTM E-154, Section 7 (E-96, Method A) = .02 Perms.
 - 2. Tensile Strength: ASTM E-154, Section 9 (Method D-882) = (70lb f/in min)-MD & CD.
 - 3. Puncture Resistance: ASTM D-1709, Method B = 4200 Grams.

2.03 CONCRETE CURING PAPER: Laminated tri directional glass fiber reinforced long fibered kraft curing papers with double coating of high-melting-point asphalt, meeting ASTM C-171 Test Method, equal to "Orange Label Sisalkraft®".

2.04 WEATHER-RESISTIVE BARRIER: Membrane shall be a single ply, asphalt saturated kraft 60 minute Grade D breather type sheathing paper, meeting ASTM E-1677-95 Type I Test Method, equal to "Fortify®".

- 2.05 FLOOR PROTECTION PAPER: Non-staining reinforced floor protection paper consisting of two heavy kraft sheets and glass reinforcing fibers laminated with a non-staining adhesive, meeting ASTM D 828 and ASTM D 781 Test Methods, equal to "Seekure®".

PART 3 EXECUTION

- 3.01 PREPARATION: Ensure items that pass through building paper / membrane are properly and rigidly installed, substrate is free of projections and irregularities that may be detrimental to proper installation of building paper / membrane.

3.02 INSTALLATION

- A. The underslab vapor retarder shall be unrolled over the thoroughly compacted subgrade and turned down at the inside perimeter of grade beams. Joints shall be sealed, watertight, with a pressure sensitive tape as recommended by the manufacturer, allowing a minimum overlap of 6 inches. Apply tape evenly over seams and rub out any wrinkles formed during application. Where pipes and conduits pass through the membrane, it shall be sealed with Moistop boot and tape. Inspect the membrane thoroughly and repair all punctures immediately before placing concrete. Equipment, tools, and procedures that might puncture the membrane shall not be used while placing and finishing the concrete. Comply with manufacturer's recommendations and installation procedures as outlined in ASTM E-1643.
 - B. The concrete curing paper shall be unrolled over the entire surface once the concrete has set sufficiently hard to permit application without marring the surface. All joints shall be lapped 4 inches and sealed with a pressure sensitive tape. Apply tape evenly over seams and rub out any wrinkles formed during application. Ensure that all tears or penetrations are repaired.
 - C. The weather-resistive barrier shall be installed in weather-board fashion over approved exterior sheathing, lapping horizontal joints a minimum of 2 inches and lapping vertical joints a minimum of 6 inches. Lapped joints shall be taped with Fortify Tape. Tears and punctures shall be sealed with Fortify Tape and/or Moistop Sealant.
 - D. The floor protection paper shall be applied immediately after the floor covering is installed and until final completion and acceptance by the Project Architect. The paper shall be laid in the widest practical width with 6-inch laps to provide complete coverage of flooring. Joints shall be sealed with minimum 2 inch wide pressure sensitive tape
- 3.03 CLEANING: Inspect vapor barrier membrane thoroughly and keep clean. Remove any dirt, oils, mud, debris, etc. prior to placing concrete.

END OF SECTION

SECTION 07612

SHEET METAL ROOFING AND WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES: Preformed, pre-finished, standing seam metal panels, vented metal soffit panels, metal gutters, metal downspouts, metal wall panels, batt insulation, sub-framing support members, related accessories, valleys, hips, ridges, eaves, corners, rakes, miscellaneous flashing and attaching devices as shown / or required for a complete metal roofing and wall system.

1.02 RELATED SECTIONS: Section 09050 – Color Design.

1.03 REFERENCES

- A. ASTM A-525 Steel Sheet, Zinc-Coated (Galvanized)
- B. ASTM E-1646
- C. ASTM E-1680
- D. Spec Data Sheet - Galvalume Sheet Metal by Bethlehem Corp.
- E. SMACNA - Architectural Sheet Metal Manual

1.04 SYSTEM DESCRIPTION

- A. Design Criteria: The following standards and criteria shall be used where covered by this specification:
 - 1. Manual of Steel Construction, American Institute of Steel Construction, 8th Edition.
 - 2. Cold Formed Steel Design Manual, American Iron and Steel Institute, 1996 Edition.
 - 3. Low Rise Metal Building Systems Manual, American Iron and Steel Institute, 1996 Edition.
 - 4. 2003 International Building Code.
 - 5. Test for Wind Uplift Resistance of Roof Assemblies (1999) Underwriters Laboratories, Inc. UL90 (minimum) and for ASTM E-1592-95.
- B. Design Loads: Design loads shall be developed using the procedures contained in "Design Practice and Building Practices" commentary in the MBMA publication, Low Rise Metal Building Systems Manual. The following data shall be used in developing design loads in addition to dead loads:
 - 1. Vertical Live Loads: Roof system shall be designed for a 20 PSF live load.
 - 2. Wind Loads: Basic wind speed of 100 miles per hour.
 - 3. Other superimposed dynamic and/or static loads such as exhaust fans and air conditioning equipment, shall be considered as part of the design requirements and combined with the normal design (live and wind) loads.
 - 4. Combination of normal loads and auxiliary loads or design purposes shall be as prescribed and recommended in the 2003 International Building Code.
 - 5. Framing and structural members shall be cold formed and designed in accordance with Cold Formed Steel Design Manual, AISI – 1996.
 - 6. Roof and wall panels shall be designed in accordance with Cold Formed Steel Design Manual, AISI – 1996.
 - 7. Rainfall Intensity: All exterior gutters and downspouts shall be designed for rainfall intensity, based upon a 5 year recurrence interval for 5 minute duration.

1.05 SUBMITTALS

- A. Submit detailed drawings showing layout of roof and soffit panels, sub-framing system, anchoring details, joint details, ventilation, trim, flashing, and accessories. Show details of weatherproofing terminations, and penetrations of metal work. Include structural analysis of the sub-framing system. Shop drawings and structural analysis shall be sealed and signed by a Professional Engineer, registered in the State of Mississippi.
- B. Submit a two-foot by two-foot representative sample of each type of panel and accessory indicating panels, standing seams, closure, edge trim and flashing complete with factory finish and color if product is not one of those specified.
- C. Submit results indicating compliance with minimum requirements of the Water Infiltration - ASTM E 1646 performance tests.
- D. Submit descriptive data on all material provided including batt insulation and sealants.
- E. Submit manufacturer's recommended installation method showing all requirements for panel installation, sealant application and sub-structural connections.
- F. Submit sample copies of the Paint Finish Guarantee and Weather Tightness Warranty prior to fabrication and installation for MDOT Architect's approval. **Do Not** start roofing installation without MDOT Architect's approval of Guarantee and Warranty.
- G. Submit executed Warranty per Section 01770 – Closeout Procedures for Owner's signature.

1.06 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in Architectural Sheet Metal Products with 10 years minimum experience.
- B. Installer: Company specializing in Architectural Sheet Metal Products, with 5 years minimum experience, who has completed work similar to that indicated for this project and with a record of successful in-service performance. Installer shall be certified by the manufacturer as trained and qualified to erect the manufacturer's product.

1.07 DELIVERY, STORAGE AND HANDLING: Upon receipt of panels and other materials, installer shall examine the shipment for damage and completeness. Panels should be stored on edge in a clean, dry place. One end should be elevated to allow moisture to run off. Panels with strippable film must not be stored in the open exposed to the sun. Stack all materials to prevent damage and to allow for adequate ventilation.

1.08 EXISTING CONDITIONS

- A. The manufacturer shall provide stamped and sealed drawings, by an Engineer, licensed in the State of Mississippi indicating the design for the retrofit metal roof assembly as compliant with wind and snow loads. Manufacturer shall provide horizontal and vertical reactions for the new roof system.

1.09 WARRANTY

- A. Paint Finish: Paint finish shall have a 20-year guarantee against cracking, peeling and fade (Not to exceed 5 N.B.S. units per ASTM D2244.68T).
- B. Weather Tightness: The entire installation (sub-framing, clips, panels, fasteners, rakes, eaves, ridge/valley flashing conditions, roof to wall conditions as well as all materials specified as supplied by the manufacturer) shall be **Guaranteed Weather Tight For A Minimum Of 20 Years**. This warranty shall be identified as neither Non-Depreciating, Non-prorated nor have exclusions that identify, valleys, curbs, and flashings. Provide written warranty, signed by metal roofing manufacturer and his authorized installer, agreeing to replace or repair defective materials and workmanship during the warranty period with **No Cost** to the Owner.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and Specifications are based on LOC-SEAM Standing Seam Panels as manufactured by Architectural Metal Systems, 1150 State Docks Road, Eufaula, AL 36027. Tel. (334) 687-2032.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Butler Manufacturing Company, Kansas City, MO. Tel. (816) 968-3000.
 - 2. Ceco Building System, Columbus, MS. Tel. (601) 328 6722.
 - 3. Englert, Inc., Perth Amboy, NJ, Tel: (732) 826-8614.
 - 4. Gulf States Manuf., Inc., Starkville, MS. Tel (601) 323-8021.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 PREFORMED METAL ROOFING SYSTEM

- A. The roof system shall be a concealed fastener interlocking standing seam system with faced batt insulation between supports and panels.
- B. The concealed attachment system shall eliminate all through penetration of the exposed roofing surface into structural supports and allow the roof covering to move independently of any differential thermal movement by the framing system.
- C. The panel to structural clip shall be designed to provide plus or minus one inch of thermal movement. It shall incorporate a self-centered feather to ensure one-inch movement in both directions.
- D. The standing seam shall have integral male and female interlocking ribs with a factory applied, non-hardening sealant, and the seams shall be continuously locked or crimped together by mechanical means during installation.
- E. Roof panels shall be fastened to the support framing members with a concealed clip or backing device of steel having a protective metallic coating. Through penetration of the roofing surface by exposed fasteners shall occur only for non-structural connection at panel termination and roof perimeter flashing location.
- F. Panel termination and perimeter flashing (attached to roof panels) shall be sealed with sealants recommended by the manufacturer.
- G. Required closures shall be metal. Non-metal closures shall not be acceptable.

2.03 ROOF PANEL MATERIALS

- A. Standing seam roof panels with striations shall have a configuration of 2-inch high vertical rib on 16-inch centers for roofing. The panel shall have flush horizontal and vertical surfaces to facilitate sealing at terminations. Panel configurations that create voids requiring supple metal closure devices shall not be acceptable. Panels shall be joined at the sidelap with an interlocking seam mechanically locked by a seaming machine after installation. The female panel seam shall have a factory-applied sealant, in compliance with UL90. Portable roll forming machines shall not be used.
- B. The panel shall be 24 gage commercially pure aluminum coated steel meeting military specifications MIL-C-4174A Type II, Galvalume. Minimum yield stress shall be 50,000 PSI.

- C. Panels shall have a factory color finish on the exposed side. The exposed finish shall consist of a 70 percent KYNAR 500 resin base coating applied to a cleaned, pretreated and primed surface. Color to be selected by the Project Engineer / MDOT Architect from manufacturer's full range of standard and premium colors. The dry film thickness of the exterior coating shall not be less than 0.9 mil, exclusive of primer. The interior color finish shall consist of a backer coat with a dry film thickness of 0.5 mil. Provide a low gloss finish to minimize the appearance of oil canning.
- D. The roofing manufacturer shall supply the Mechanical Fastening of the New Roof Assembly to the existing structure as shown on the Drawings. The roofing contractor shall perform a pull out test for fasteners to the existing roof assembly. This test shall meet wind uplift requirements for each zone as designed and engineered by the roofing manufacturer.
- E. Exposed roof fasteners shall be cadmium or zinc plated carbon steel with a molded head and a 9/16-inch OD aluminum and bonded EPDM washer. Screw head to match color of roofing sheets. Plastic caps shall not be used. Self-tapping / self-drilling screws shall be #12 by 1-1/4.
- F. Panel clip fasteners shall be cadmium plated carbon steel #12 by 1-1/4 self-drilling screws with hex washer head.
- G. Panel clips for the standing seam panels shall be die formed 24-gage aluminum coated steel. The clip base shall be 18-gage galvanized steel.
- H. Sidelap sealant shall be factory applied butyl base mastic. Its composition shall be 85 to 90 percent solids by weight. Service temperature range shall be minus 60 degrees F to plus 225 degrees F.
- I. Eave and ridge closure sealant shall be a 3/4-inch by 3/16-inch tape mastic. The mastic shall be a non-staining, non-corrosive, non-shrinking, non-oxidizing, non-toxic and non-volatile. Composition shall be 99 percent minimum solids with a butyl base meeting performance standards in Federal Specification TT-C-1796A, Type II, Class B. Service temperature shall be minus 60 degrees F to plus 212 degrees F.
- J. Panel endlaps shall be sealed with a precut tape pad. The material shall be non-staining, non-corrosive, non-toxic and non-volatile. Composition shall be 100 percent solid ethylene propylene copolymer tape meeting performance standards in Federal Specification TT-C-1796A, Type II, Class B. Service temperature shall be minus 60 degrees F to plus 212 degrees F.
- K. Flashing laps shall be sealed with urethane caulk. All caulk shall meet the performance standards in Federal Specification TT-S-0023OC, Type II, Class A.
- L. Wall trim, metal panel flashing, edge trims, rake trim and all exposed components shall have a colored finish to match fascia panels. Materials shall be 26-gage minimum galvanized steel, coating designation G-90, conforming to the requirements of ASTM A446 Grade D. Minimum yield stress shall be 50,000 PSI.
- M. Trim items and flat sheets for on site fabrication not required to have a color finish shall be 26-gage minimum aluminum coated steel, Type II, conforming to the requirements of ASTM A463. Minimum yield stress shall be 50,000 PSI.

2.04 THERMAL INSULATION

- A. Glass-fiber blanket. Comply with ASTM C 991, 0.5 lb. per cubic foot density, 3 inches thickness, R10, with UL flame spread classification of 25 or less, and 2-inch wide continuous vapor tight edge tabs. Provide 3/8 inch to one-inch thick thermal blocks / thermal spacers at all deck supports or as required by manufacturer.
- B. Vapor Barrier: Facing shall be equal to Lamtec Corporation model WMP-50. Facing shall be composed of .0015" white polypropylene film, 4 X 5 tri-directional scrim reinforcing layer, and .0005" metallized polyester film backing layer. The facing shall have a water vapor transmission rate of .02 US perm (ASTM E96, Procedure A), a beach puncture of 125 scale units and a mullen burst of 100 psi. Tensile strength shall be 55# in the machine direction and 50# in the cross-machine direction.
- C. Retainer Strips: 26 gage (0.0179-inch) formed galvanized steel retainer clips colored to match insulation facing.

2.05 WALL PANEL MATERIALS

- A. Wall panels shall be Architectural Metal Systems, Flat Panel. The panel shall provide not less than 12 inches of coverage with overall depth of 1-1/2 inches, minimum 24-gage. Flat panel connection shall provide for male/female interlocking connection, implementing concealed fasteners. The surface of the panel shall conform to 12-inch flat service with minor rib stiffener at 6 inches on center.
- B. Panels shall have been tested in compliance with ASTM E-283 and ASTM E-331 air and water infiltration test.
- C. Exterior finish shall be AZ50 Pre-Painted Kynar 500 Premium 70 Plus. Provide all trims, fasteners and sealants to match selected colors.

2.06 SOFFIT PANEL MATERIALS

- A. Perforated Soffit panels shall be 0.032-inch thick aluminum perforated panel with 12-inch coverage utilizing male/female-interlocking connection. Fasteners shall be concealed.
- B. Finish shall be Kynar 500. Color and trims shall be as selected by the Project Engineer / MDOT Architect from manufacturer' full range of standard and premium colors.

2.07 ROOF ACCESSORIES

- A. Openings 8 inches in diameter or smaller may be flashed and sealed to the roof panel by jacks.
- B. Provide flexible preformed "Deck Tight" units at pipes 10 inches in diameter and smaller; at larger than 10 inches diameter, provide curbs as described below.
- C. Metal roof curbs shall be fabricated of 18-gage galvalume material. Shell and base plate assembly shall be fully mitered and welded. The curb shall be provided with a horizontal flanged top projecting a minimum of 8 inches above the weather surface plane. Curb design shall incorporate a built-in water deflector on the up slope side to prevent ponding and direct water around the curb. The base shall fit the roof slope and shall be compatible with the roofing panels. Curb design shall utilize separate cap cells to allow positioning flexibility with roof ribs.

- D. Sealing compounds shall be as specified and supplied by the roofing manufacturer. Closures and fasteners shall conform to the roofing manufacturer's standards compatible with the roof covering furnished.
- E. The space between the new roof and existing roof shall be ventilated with eave, ridge and sidewall vents as detailed on the Drawings.

2.08 ROOF COVERING SUPPORT MEMBERS

- A. The roof covering support members shall be 16-gage (minimum) shop primed steel conforming to the requirements of ASTM A525 with a minimum yield stress of 50,000 PSI. Bracing shall be accomplished with 24-gage galvanized steel strapping coating designation G-90, conforming to the requirements of ASTM A446 Grade D. Minimum yield stress shall be 50,000 PSI.
- B. The configuration and spacing of supports shall be the roofing manufacturer's standard and shall be supported by a structural analysis. Design calculations shall be in accordance with the 1996 AISI Specifications of the design of cold-formed steel structural members.
- C. Deflection of roof covering support members shall not exceed L/180 of its span when supporting the design vertical live and applicable collateral loads and supported on spacings required on this project.
- D. The support members shall be designed to transfer roof dead loads as well as wind uplift loads directly to existing open web steel joist roof framing.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Installer must examine areas and conditions under which this Work is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- B. Verify roof openings, curbs, pipes, sleeves, ducts or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.
- C. In areas where the existing roof may have allowed saturation of insulation under the roofing membrane, the roofing membrane shall be slit to allow these areas to dry out.

3.02 INSTALLATION

- A. Comply with Drawings, manufacturer's installation instructions, and conform to standards set forth in the Architectural Sheet Metal Manual published by SMACNA, in order to achieve a completely watertight installation.
- B. Install panels in such a manner that horizontal lines are true and level and vertical lines are plumb.
- C. Install starter and edge trim before installing roof panels.
- D. Remove protective strippable film prior to installation of roof panels.
- E. Attach panels using manufacturer's standard clips and fasteners, spaced in accordance with approved shop drawings.
- F. Install sealants for preformed roofing panels as specified on shop drawings.

- G. Do not allow panels or trim to come into contact with dissimilar materials.
 - H. Do not allow traffic on completed roof. If required, provide cushioned walk board
 - I. Protect installed roof panels and trim from damage caused by adjacent construction until completion of installation.
 - J. Remove and replace any panels or components that are damaged beyond successful repair.
 - K. Panels shall be preformed in continuous lengths. Ribs shall be permanently locked using an electric seamer.
 - L. Gutter supports spaced at maximum 48 inches on center, constructed of same material as gutters.
 - M. Downspout straps shall be spaced 72 inches on center maximum (minimum of 3 per downspout) and be the same material as the downspout.
 - N. Water shall be prevented from entering the building during this Work. This shall involve keeping penetrations sealed, planning the Work to reroof sections and sealing new to old or other precautionary and effective safeguards.
 - O. Make suitable provisions to allow for free expansion and contraction of all Work without causing leaks or rupture. All Work shall be securely fastened and where necessary for strength and/or stiffness, provide suitable reinforcement.
- 3.03 CLEANING: Clean any grease, finger marks, or stains from the panels per manufacturer's recommendations. Remove all scrap and construction debris from the site.

END OF SECTION

SECTION 07650

FLEXIBLE FLASHING

PART 1 GENERAL

1.01 SECTION INCLUDES:

- A. Self-adhesive flashing used to seal around exterior windows, doors, and where required to weatherproof the building.
- B. Waterproof membrane flashing used to seal around common through-wall penetrations such as hose bibbs, vents, electrical boxes, exterior lights, and where required to waterproof the building.

1.02 SUBMITTALS: Submit manufacturer's technical product data, installation instructions and recommendations for product specified.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on product manufactured by Fortifiber Corporation, 300 Industrial Drive, Fernley, NV 89408. Tel. (800) 773-4777.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Grace Construction Products, 62 Whittermore Avenue, Cambridge, Ma 02140. Tel: (800) 444-6459.
 - 2. Griffolyn ® Division, Reef Industries, Inc., 9209 Alameda Genoa Road, Houston, TX 77075. Tel: (800) 231-6074.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 SELF-ADHESIVE FLASHING: Membrane shall be a multi-layer composite employing polyethylene, fiberglass membrane and self-adhesive backing, meeting ASTM E-96 (Method B), ASTM F-1249, ASTM D-779 and ASTM D-828 Test Methods, equal to "Moistop E-Z Seal".

2.03 WATERPROOF MEMBRANE FLASHING: Membrane shall be a self-sealing SBS modified asphalt waterproof membrane laminated to high density, cross-laminated polyethylene film reinforcement and self-adhesive backing, meeting ASTM E-96, ASTM D-779, ASTM D-903-98, ASTM D-412 Test Methods, equal to "FortiFlash".

PART 3 EXECUTION

3.01 PREPARATION

- A. Ensure items that pass through membrane are properly and rigidly installed, substrate is free of projections and irregularities that may be detrimental to proper installation of membrane.
- B. Prior to installation, window, door flanges, brick ledges and base materials shall be dry and cleaned free of any dirt or other substances that may interfere with adhesion.

3.02 INSTALLATION

- A. The self-adhesive flashing shall first be applied at the sill of window openings. Moistop Sealant is then applied to the back of the window flanges and windows are installed. E-Z Seal flashing is next applied over the window flanges at jambs and then the head, completing the installation. Flashing around door openings is similar to window application. To apply, peel away the release paper and place E-Z Seal over the substrate or window and door flanges. Apply firm pressure along the entire adhesive strip to ensure a continuous seal.
- B. To apply FortiFlash flashing, peel away the release paper and press membrane firmly over substrate, applying sufficient pressure along the entire membrane to ensure a continuous seal. If adhesion is inadequate, prime the surface with a polymer-emulsion-based primer designed specifically for SBS self-adhered membranes, in accordance with the manufacturer's instructions.

- 3.03 CLEANING: Inspect membrane and substrate thoroughly and keep clean. Remove any dirt, oils, mud, debris, etc. prior to installation.

END OF SECTION

SECTION 07840

FIRESTOPPING

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Firestopping as indicated on the drawings, specified herein, and/or required for completion of the work. Firestopping shall be required at all rated fire and smoke "fire barrier" walls and at floors.
- 1.02 SUBMITTALS: Submit manufacturer's product data, specifications and installation procedures for each type of firestopping and accessory required. Submit detailed location where each will be used. Submit UL data for assemblies where shown on the Drawings.
- 1.03 QUALITY ASSURANCE: Penetrations and miscellaneous openings in rated fire and smoke "fire barrier" walls shall be protected in accordance with NFPA 101, Life Safety Code, Chapter 6, Features of Fire Protection. All openings for air-handling ductwork or air movement, pipes, conduits, bus ducts, cables, wires, air ducts, pneumatic tubes and ducts and similar building service equipment that pass through or penetrate in any way a rated fire or smoke "fire barrier" wall or floor shall be protected. All firestopping materials used shall conform to ASTM E814, ASTM E119, and UL 1479 and tested in accordance with NFPA 90A and NFPA 251 as part of a rated assembly.
- A. FIRE AND SMOKE PARTITIONS AND RELATED ASSEMBLIES: Based on Underwriters Laboratories (UL) systems and tests and are designed in accordance with UL fire resistance ratings. Contractor shall comply with the applicable UL requirements for fire and smoke partitions and assemblies shown on the drawings.
- B. Materials not conforming to these firestopping specifications shall not be used. Materials that are not UL rated and approved shall not be allowed. Materials containing asbestos are not acceptable and shall not be used in this project.
- 1.04 DELIVERY, STORAGE, AND HANDLING: Deliver packaged materials in manufacturer's original unopened containers and store in weathertight enclosure. Handle and store all materials so as to prevent inclusion of foreign materials, breakage or damage by water.
- 1.05 WORKMANSHIP: Materials and workmanship not conforming to provisions of the specifications and manufacturer's printed instructions shall be rejected at any time during the course of the work. Rejected materials shall be removed from the site at the time of rejection. Rejected workmanship shall be corrected immediately after rejection.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Equivalent products by the following manufacturers are acceptable:
1. Hilti, Inc., Tulsa, OK. Tel. (800) 879-8000.
 2. International Protective Coatings Corp, Hatfield, PA. Tel. (800) 334-8796.
 3. 3M Fire Protection Products, Saint Paul, MN. Tel. (800) 328-1687.
 4. United States Gypsum Company, Chicago, IL. Tel. (880) 874-4968.
- B. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

- 2.02 SEALANT: Equal to Hilti, Inc. FS-One.
- 2.03 CAULKING AND PUTTY: Equal to 3M Brand Fire Barrier CP- 25 Caulk and Putty 303.
- 2.04 PENETRATION SEALANTS: Equal to 3M Fire Barrier Penetration Sealing Systems 7902 and 7904 series as required.
- 2.05 INSULATION: Equal to United States Gypsum Company "Therafiber" Safing Insulation, 4 pcf density, unfaced.
- 2.06 INTUMESCENT FIRESTOPPING: Equal to Hilti, Inc. FS-One, CP 642 and FS 657 Fire Block as required.
- 2.07 ACCESSORIES: Provide backing / filling materials, retainers, collars, clamps, sleeves, primers and other necessary items of types and duration required by regulatory requirements and / or as recommended by product manufacturer for the specific substrates, surfaces and applications.
- 2.08 FINISHES
 - A. Concealed locations: Manufacturer's Standards.
 - B. Exposed to View Locations: "Custom" Colors as selected by Project Architect unless Manufacturer's Standards closely matches finish of penetrated surfaces.

PART 3 EXECUTION

- 3.01 INSTALLATION: Installation of firestopping materials for small openings, cracks, crevices, and penetrations shall be in accordance with manufacturer's printed instructions.
 - A. Verify application required and location for each type of firestopping to be used and conform to manufacturer's exact instructions for specific applications.
 - B. After installation of all Work, including but not limited to ductwork, fire and smoke dampers, communication cabling, electrical conduit, etc., properly seal all openings, cracks, crevices and penetrations throughout the entire project, to maintain fire ratings shown.
 - C. Install fireproof sealant at all penetrations through rated walls and floors and at top and bottom on each side of rated walls.
 - D. Install approved metal sleeves with fireproof sealant at all communication and control wiring passing through rated walls throughout the entire project.
 - E. Install firestopping at fire and smoke walls and floors where construction passes through those areas.

END OF SECTION

SECTION 07920

JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preparation of substrate surfaces to receive materials.
- B. Sealant and joint backing (backer rod) materials and installation in the following general locations (even though not shown on the Drawings):
 - 1. Exterior and interior wall joints, including control / expansion joints and abutting like or similar materials (in walls, ceilings, and roof construction) that have spaces between in excess of 3/16 inch (except where less restrictive tolerances are indicated or where the condition is specifically the responsibility of others).
 - 2. Abutting dissimilar materials, exterior and interior.
 - 3. Exterior and interior wall openings (including at perimeter doors, exterior thresholds, windows, louvers, and penetrations required by piping, ducts, and other service and equipment, except for sealants provided by Section 07840-Firestopping).
 - 4. Joints in pavement and walks.
 - 5. Other locations, not included above but, specifically required by manufacturers of installed materials / products (except that sealing materials for glazing are under provision of other Section.).
- C. Accessories: Including, but not limited to, primer, cleaner, backer rod, bond breaker, and masking tape.

1.02 RELATED SECTIONS: Section 01330 – Submittal Procedures and Section 09050 – Color Design.

1.03 DEFINITIONS: Wherever the words "caulk" or "seal" occur, they shall be interpreted to mean "effectively seal the indicated joint with a material to render it air and watertight." "Caulk" shall indicate the use of the interior materials specified hereinafter and "Seal" shall indicate the use of the exterior materials.

1.04 WORK OF OTHER SECTIONS: Caulking and sealing may be performed as Work of other Sections when specified. However, all Work shall conform to the requirements of this Section.

1.05 SUBMITTALS: Submit manufacturer's product data and installation instructions for each type of sealant required. Product data shall include chemical characteristics, limitations, and color availability.

1.06 QUALITY ASSURANCE

- A. Applicator: Company specializing in the work of this Section with minimum 3 years documented satisfactory experience.
- B. Manufacturer's Certificate: Provide manufacturer's letter of certification that products meet or exceed specified requirements and are appropriate for uses indicated.
- C. Installation: Conform to Sealant and Waterproofers Institute requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver caulking and sealant material to the site in original unopened packages with manufacturer's labels, instructions and product identification and lot numbers intact and legible.
- B. Store materials under cover, protected from inclement weather and adverse temperature extremes, in original containers or unopened packages, in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and Specifications are based on products manufactured by Pecora Corporation, 165 Wambold Road, Harleysville, PA 19438. Tel: (800) 523-6688.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Dow Corning Corporation, Midland, MI. Tel: (800) 322-8723
 - 2. GE Silicones, Waterford, NY. Tel: (518) 233-2639.
 - 3. Sonneborn Building Products, Shakopee, MN. Tel: (800) 433-9517.
 - 4. Tremco, Inc., Beachwood, OH. Tel: (800) 562-2728.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 SEALANT TYPES AND USE SCHEDULE

- A. Type 1: Use for interior locations, sealing around windows, doors, louvers, drywall and other locations to be painted and where joints are less than 1/8 inch with none to slight movement anticipated: Pecora AC-20 + Silicone (Acrylic Latex Caulking Compound).
- B. Type 2: Use for sealing nonporous interior surfaces where conditions of high humidity and temperature extremes exist, including at and in conjunction with toilet fixtures, counters, vanities, thresholds and joints in tile finishes: Pecora 898 (Silicone Sanitary Sealant).
- C. Type 3: Use for horizontal floor and pavement joints: Pecora Urexpan NR-200 (two-part, self-leveling, traffic-bearing, polyurethane sealant).
- D. Type 4: Use for exterior sealing at door, louver, and window frames: Pecora 864 (one-part Architectural Silicone Sealant). Color(s) to be selected by the MDOT Architect from manufacturer's full range of standard Architectural colors plus 32 special Color-Flex Designer colors.

2.03 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

- C. Backer Rod: Open cell polyurethane foam or closed cell polyethylene foam, compatible with sealant, sized and shaped to provide proper compression upon insertion in accordance with manufacturer's recommendations.
- D. Bond Breaker: Pressure sensitive adhesive polyethylene, TEFLON, or polyurethane foam tape.
- E. Masking Tape: Pressure sensitive adhesive paper tape.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Installer must examine areas and conditions under which this Work is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.02 PREPARATION

- A. Cleaning: Clean joint surfaces, using joint cleaner as necessary, to remove dust, dirt, oil, grease, rust, lacquers, laitance, release agents, moisture, frost or other matter that might adversely affect adhesion of sealant. Rake joints out to a depth equal to one-half the width.
- B. Masking: Mask areas adjacent to joints.
- C. Priming: If required, prime substrate surfaces following manufacturer's instructions.
- D. Mixing: When required, mix components of sealant materials in accordance with manufacturer's instructions to achieve required characteristics of sealant.

3.03 APPLICATIONS

- A. Mixing, application, surface condition, weather condition shall be as recommended by the manufacturer. Do not use material that has exceeded the recommended pot life.
- B. Install backing material in joints using blunt instrument to avoid puncturing. Do not twist the backing rod while installing. Install backing rod so that joint depth is 50 percent of joint width, but a minimum of 1/8-inch deep and a maximum of 3/8-inch deep.
- C. Apply sealant in joints using a pressure gun with nozzle cut to fit joint width. Ensure sealant is deposited in a uniform, continuous bead without gaps or air pockets.
- D. Tool joints to the required configuration within 10 minutes of sealant application. Remove masking materials immediately after tooling.

3.04 CLEANING AND REPAIRING

- A. Do not allow sealant or compounds to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces. Clean adjoining surfaces by whatever means necessary to eliminate evidence of spillage.
- B. When using flammable solvents, avoid heat, sparks and open flames. Provide necessary ventilation. Follow all precautions and safe handling recommendations from the solvent manufacturer and pertinent local, state and federal regulations.
- C. Leave finished work in a neat, clean condition with no evidence of spillovers onto adjacent surfaces.
- D. Repair or replace defaced or disfigured finishes.

3.04 CURE AND PROTECTION

- A. Cure sealant and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability. Sealant Supplier / Applicator shall advise Contractor of procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at Time of Completion.

END OF SECTION

SECTION 08100

METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Hollow metal Work, including but not limited to, the following:
 1. Interior and exterior hollow metal doors and frames; rated and non-rated.
 2. Trimmed openings.
 3. Preparation of metal doors and bucks to receive finish hardware, including reinforcements, drilling and tapping necessary.
 4. Preparation of hollow metal door to receive glazing (where required).
 5. Steel louvers for hollow metal doors (where required).
 6. Factory prime painting of Work in this Section.

1.02 RELATED SECTIONS

- A. Section 06100- Rough Carpentry.
- B. Section 08210- Wood Doors.
- C. Section 08710- Door Hardware.
- D. Section 08800-Glazing.
- E. Section 09050-Color Design.
- F. Section 09900- Paints and Coatings.

1.03 QUALITY ASSURANCE: In addition to complying with all pertinent codes and regulations, manufacture labeled doors in accordance with specifications and procedures of Underwriters' Laboratories, Inc. In guarantee and shop drawings, comply with nomenclature established in American National Standards Institute publication A123.1, latest edition, "Nomenclature for Steel Doors and Steel Door Frames".

- A. Work is subject to applicable portions of the following standards:
 1. ANSI A115 "Door and Frame Preparation for Door Locks and Flush Bolts", American National Standards Institute.
 2. ANSI A123.1 "Nomenclature for Steel Doors and Steel Door Frames", American National Standards Institute.
 3. NFPA 80 "Fire Doors and Windows", National Fire Protection Association.
 4. NFPA 101 "Life Safety Code", National Fire Protection Association.
- B. Hollow metal doors and frames shall comply with the specifications for Custom Hollow Metal Doors and Frames, National Assoc. of Architectural Metal Manufacturers (NAAMM) Standard CHM 1-74, and the Steel Door Institute, SDI 100-80.

1.04 SUBMITTALS

- A. Product Data: Submit schedule and manufacturer's technical product data / literature.

- B. Shop Drawings: Shop drawings shall indicate door and frame elevations, frame configuration, anchor types and spacing, reinforcement, location of cut-outs for hardware, glazing and louvers (if required).
- C. Samples (not required for named products):
 - 1. Submit hollow metal frame, corner section of typical frame, of sufficient size to show corner joint, hinge reinforcement, dust cover boxes, anchors, and floor anchors.
 - 2. Submit hollow metal door section of typical door, of sufficient size to show edge, top and bottom construction, insulation, hinge reinforcement, face stiffening, corner of vision opening construction, glazing beads, corner of louver opening construction (if required).

1.05 PRODUCT IDENTIFICATION

- A. Deliver doors and frames and other work of this section properly tagged and identified.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle all metal doors and frames in a manner to prevent damage and deterioration.
- B. Provide packaging, separators, banding, spreaders, and individual wrappings as required to completely protect all metal doors and frames during transportation and storage.
- C. Store doors upright, in a protected dry area, at least 4 inches off the ground and with at least 1/4 inch air space between individual pieces, protect all pre-finished and hardware surfaces.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on products manufactured by Steelcraft Manufacturing Company, 9017 Blue Ash Road, Cincinnati, OH 45242 Tel. (513) 745-6400.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Amweld Building Products, Inc., Garrettsville, OH. Tel. (330) 527-4385.
 - 2. Ceco Door Products, Brentwood, TN. Tel. (615) 661-5030.
 - 3. Republic Builders Products, McKenzie, TN. Tel. (901) 352-3383.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 FABRICATION

- A. Fabricate hollow metal units rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Weld exposed joints continuously, grind, dress, and make smooth, flush and invisible. Metallic filler to conceal manufacturing defects is not acceptable. Unless otherwise indicated, provide countersunk flat Philips or Jackson heads for exposed screws and bolts.

- B. Prepare hollow metal units to receive finish hardware, including cutouts, reinforcing, drilling and tapping per final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 "Specifications for Door and Frame Preparation for Hardware".
- C. Locate finish hardware in accordance with approved shop drawings.

2.03 FRAMES

- A. Frames for exterior openings shall be made of commercial grade 14 gage minimum cold rolled steel conforming to ASTM A366-68 with a zinc coating conforming to ASTM A653, with a coating designation of A60 or G60 and a minimum coating thickness of 0.60 oz. per sq. ft. minimum. Frames for interior openings shall be commercial grade cold rolled steel conforming to ASTM A366-68 or commercial grade hot rolled and pickled steel conforming to ASTM A569-66T. Metal thickness shall be 16 gage for frames in openings 4 feet or less in width; 14 gage for frames in openings over 4 feet in width.
- B. Design and Construction: Frames shall be custom made welded units with integral trim, of the sizes and shapes shown on approved shop drawings. Knocked-down frames will **Not** be accepted. Finished work shall be strong, rigid, and neat in appearance, square, true and free of defects, warp or buckle. Molded members shall be clean cut, straight and of uniform profile throughout their lengths. Jamb depths, trim, profile and backbends shall be as shown on Drawings. Corner joints shall have contact edges closed tight, with trim faces mitered and continuously welded, and stops mitered. The use of gussets will not be permitted.
 - 1. Stops shall be 5/8 inch deep. Cut-off (sanitary or hospital type) stops, where scheduled, shall be capped at 45 degrees at heights shown on drawings, and all jamb joints below cut-off stops shall be ground and filed smooth, making them imperceptible. Do not cut off stops on frames for soundproof, lightproof or lead-lined doors.
 - 2. When shipping limitations so dictate, frames for large openings shall be designed and fabricated for field splicing by others.
 - 3. Frames for multiple or special openings shall have mullion and / or rail members which are closed tubular shapes having no visible seams or joints. All joints between faces of abutting members shall be securely welded and finished smooth.
 - 4. Hardware reinforcements: Frames shall be mortised, reinforced, drilled and tapped at the factory for fully templated mortised hardware only, in accordance with approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware is to be applied, frames shall have reinforcing plates. Frames shall be reinforced for closers. Minimum thickness of hardware reinforcing plates shall be as follows:
 - a. Hinge and pivot reinforcements - 7 gage, 1 1/4 inches by 10 inches minimum.
 - b. Strike reinforcements - 12 gage.
 - c. Flush bolt reinforcements - 12 gage.
 - d. Closer reinforcements - 12 gage.
 - e. Reinforcements for surface-mounted hardware - 12 gage.
 - 5. Floor anchors: Floor anchors shall be securely welded inside jambs for floor anchorage. Where required, provide adjustable floor anchors, providing not less than 2 inches height adjustment. Floor anchors shall be 14-gage minimum.

- C. Finish: After fabrication, tool marks and surface imperfections shall be removed, and exposed faces of welded joints shall be dressed smooth. Frames shall be chemically treated to insure maximum paint adhesion and coated on accessible surfaces with rust-inhibitive primer complying with FS-TT-P-57 (Type II) or FS-TT-P-659 with 2.0 mils minimum thickness. Fully cure before shipment.

2.04 HOLLOW METAL DOORS

- A. Doors shall be made of commercially quality, level, cold rolled steel conforming to ASTM A366-68 and free of scale, pitting or other surface defects. Face sheets for interior doors shall be 18 gage minimum. Face sheets for exterior doors shall be 16-gage minimum with zinc coating conforming to ASTM A653, with a coating designation of A60 or G60 and a minimum coating thickness of 0.60 oz. per sq. ft. minimum
- B. Design and Construction: Doors shall be custom made, of the types and sizes shown on the approved shop drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Door thickness shall be 13/4 inches unless otherwise noted. Doors shall be strong, rigid and neat in appearance, free from warp or buckle. Corner bends shall be true, straight and of minimum radius for the gage of metal used.
- C. Stiffen face sheets with continuous vertical formed steel sections spanning the full thickness of the interior space between door faces. These stiffeners shall be 22 gage minimum, spaced 6 inches apart and securely attached to face sheets by spot welds 5 inches on center. Spaces between stiffeners shall be sound-deadened insulated full height of door with an inorganic non-combustible batt-type material.
- D. Join door faces at their vertical edges by a continuous weld extending full height of door. Welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
- E. Top and bottom edges of doors shall be closed with a continuous recessed 16 gage minimum steel channel, extending the full width of the door and spot welded to both faces. Exterior doors shall have additional flush closing channel at top edges and, where required for attachment of weather-stripping, a flush closure at bottom edges. Provide openings in bottom closure of exterior doors to permit escape of entrapped moisture.
- F. Edge profiles shall be provided on both vertical edges of doors as follows:
 - 1. Single-acting swing doors - beveled 1/8 inch in 2 inches.
 - 2. Double-acting swing doors - rounded on 2-1/8 inch radius.
- G. Hardware reinforcements: Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated hardware only, in accord with the approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware (or hardware, the interrelation of which is to be adjusted upon installation - such as top and bottom pivots, floor closures, etc.) is to be applied, doors shall have reinforcing plates. Minimum gages for hardware reinforcing plates shall be as follows:
 - 1. Hinge and pivot reinforcement - 7 gage.
 - 2. Reinforcement for lock face, flush bolts, concealed holders, concealed or surface-mounted closers - 12 gage.
 - 3. Reinforcements for all other surface mounted hardware - 16 gage.

H. Glass moldings and stops:

1. Where specified or scheduled, doors shall be provided with hollow metal moldings to secure glazing by others per glass opening sizes shown on Drawings. Fixed moldings shall be securely welded to door on security side.
 2. Loose stops shall be 20-gage steel, with mitered corner joints, secured to the framed opening by cadmium or zinc-coated countersunk screws spaced 8 inches on center. Snap-On attachments will not be permitted. Stops shall be flush with face of door.
- I. Louvers shall be 16-gage sheet steel, stationary type, closely spaced inverted "V" blade design, flush with face sheets of door, integral with and welded to door. 50 percent free area, unless indicated otherwise on Drawings. Doors with fire-resistive rating, make louvers automatically self-closing with concealed fusible link, lead weight, lever mechanism and other work parts in metal housing.
- J. Finish: After fabrication, tool marks and surface imperfections shall be dressed, filled and sanded as required to make all faces and vertical edges smooth, level and free of all irregularities. Doors shall be chemically treated to ensure maximum paint adhesion and shall be coated, on all exposed surfaces, with manufacturer's standard rust-inhibitive primer. Fully cure before shipment.
- K. Flatness: Doors shall maintain a flatness tolerance of 1/16 inch maximum in any direction, including a diagonal direction.

2.05 HOLLOW METAL PANELS

- A. Hollow metal panels shall be made of the same materials and constructed and finished in the same way as specified for hollow metal doors.

2.06 LABELED DOORS & FRAMES

- A. Labeled doors and frames shall be provided for those openings requiring fire protection ratings, and as scheduled on Drawings. Such doors and frames shall be Underwriters' Laboratories, Inc. labeled or other nationally recognized agency having a factory inspection service.
- B. When door or frame specified to be fire-rated cannot qualify for appropriate labeling because of its design, size, hardware or any other reason, the Project Engineer / Architect shall be advised before fabricating work on that item is started.

2.07 HARDWARE LOCATIONS

A. Hinges:

1. Top – 5 inches from head of frame to top of hinge.
2. Bottom – 10 inches plus 1 inch from finished floor to bottom of hinge.
3. Intermediate, centered between top and bottom hinges.
4. on Dutch doors:
 - a. 5 inches from head of frame to top of hinge.
 - b. 10 inches from finished floor to bottom of bottom hinge.
 - c. 5 inches from split line to top and bottom respectively of lower and upper intermediate hinges.

- B. Unit and integral type locks and latches – 3'- 2" to centerline of knob.
- C. Deadlocks – 5'- 0" to centerline of cross bar.
- D. Panic hardware – 3'-1" to centerline of cross bar.
- E. Door pulls – 3'-6" to center of grip.
- F. Push-pull bars – 3'-1" to centerline of bar.
- G. Arm pulls – 3'-11" to centerline.
- H. Push plates – 4'- 0" to centerline of plate.
- I. Roller latches – 3'-9" to centerline.
- J. All of the above dimensions from paragraph 2.07(B) through 2.07(I) are from finished floor.

2.08 CLEARANCES

- A. Edge clearances:
 - 1. Between doors and frame, at head and jambs - 1/8 inch.
 - 2. At door sills: where no threshold is used - 1/4 inch maximum above finished floor; where threshold is used - 3/4 inch maximum above finished floor.
 - 3. Between meeting edges of pairs of doors - 1/8 inch.
- B. Finished floor is defined as top surface of floor, except when resilient tile or carpet is used, when it is top of concrete slab. Where carpet is more than 1/2 inch thick, allow 1/4 inch clearance.

2.09 PREPARATION FOR FINISH HARDWARE

- A. Hardware supplier shall furnish hollow metal manufacturer approved hardware schedule, hardware templates, and samples of physical hardware where necessary to ensure correct fitting and installation. Include preparation for mortise and concealed hardware.
- B. Provide reinforcements for both concealed and surface applied hardware. Drill and tap mortise reinforcements at factory, using templates. Install reinforcements with concealed connections designed to develop full strength of reinforcements.

- 2.10 REJECTION: Hollow metal frames or doors which are defective, have hardware cutouts of improper size or location, or which prevent proper installation of doors, hardware or work of other trades, shall be removed. Replace rejected materials.

PART 3 EXECUTION

- 3.01 INSPECTION: Examine areas and conditions where hollow metal Work is to be installed and notify Project Engineer of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install hollow metal units and accessories in accordance with approved Shop Drawings, manufacturer's data, and Specifications.
- B. Provide masonry anchorage devices where required for securing hollow metal frames to in-place concrete or masonry construction. Set anchorage devices opposite each anchor location, in accordance with details on final shop drawings and anchorage device manufacturer's instructions. Leave drilled holes rough, not reamed, and free from dust and debris.
- C. Placing frames: Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
 - 1. At wood stud partitions, attach wall anchors to studs with tapping screws. Place frames at fire-rated openings in accordance with NFPA Standard No. 80.
 - 2. Make field splices in frames as detailed on final Shop Drawings, welded and finished to match factory work.
 - 3. Remove spreader bars only after frames or bucks have been properly set and secured.
 - 4. Door installation: Fit hollow metal doors accurately in their respective frames, with the following clearances:
 - a. Jambs and head: 3/32 inch.
 - b. Meeting edges, pairs of doors: 1/8 inch.
 - c. Bottom: 1/4 inch, where no threshold or carpet.
 - d. Bottom: at threshold or carpet: 1/8 inch.
 - e. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.

END OF SECTION

SECTION 08210

WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Extent and location of each type of wood door is shown on the Drawings and in Schedules.
- B. Types of doors required include solid core flush wood doors with veneer faces.

1.02 RELATED SECTIONS

- A. Section 08800 – Glazing.
- B. Section 09050 – Color Design.

1.03 SUBMITTALS

- A. Product Data: Indicate door core material and construction; veneer species, type and characteristics.
- B. Shop drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, identify cutouts for glazing and louvers, and installation instructions. Indicate by transmittal form that copy of each instruction has been transmitted to the installer

1.04 QUALITY ASSURANCE

- A. Comply with the requirements of the following standards unless otherwise indicated.
- B. Non-Fire Rated Wood Doors: AWI “Architectural Flush Doors” of the Architectural Woodwork Institute.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING: Protect wood doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with the "On-Site Care" recommendations of AWI “Care & Instruction at Job Site” Section 1300, G-22.

1.06 WARRANTY: Manufacturer to provide a written warranty covering the life of the installation.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on products manufactured by Graham Manufacturing Corp., P.O. Box 1647, Mason City, IA. Tel. (641) 423-2444.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Algoma Hardwoods, Inc., Algoma, WI. Tel. (800) 678-8910.
 - 2. Marshfield Door Systems, Inc., Marshfield, WI. Tel. (800) 869-3667.

- C. Alternate manufacturers: Products produced by other manufacturers that fully meet or exceed the specified requirements may be considered under provisions of Section 01630-Product Options and Substitution Procedures.

2.02 MATERIALS AND COMPONENTS

- A. Wood Doors: Provide wood doors complying with the applicable requirements of AWI eighth Edition Version 1.0, 2003 for the kinds and types of doors indicated and as further specified. Provide manufacturer's standard 2 ply face panels complying with AWI PC-5 ME, unless otherwise specified. Provide same exposed surface material on both faces of each door, unless otherwise indicated.

2.03 GENERAL FABRICATION REQUIREMENTS

- A. Wood Doors: Cut and trim openings through doors and panels. Comply with applicable requirements of referenced standards.
- B. Light Openings: Factory cut openings. Trim openings for non-fire rated doors with solid wood moldings of profile shown.

2.04 INTERIOR FLUSH WOOD DOORS

- A. Core Construction: Solid core construction shall be solid wood block, wood particleboard, or mineral with wood lock blocks. Doors shall be Type II water resistant BCNO. Provide manufacturer's standard 2 face panels
- B. Exposed Surfaces for Transparent Finish: Where solid core interior wood doors are shown or scheduled to receive a transparent finish, provide manufacturer's standard thickness face veneers complying with AWI 8th Edition Version 1.0, 2003 of the following quality:
 - 1. Custom Grade "A" face veneers of Plain Sliced Select White Birch.
 - 2. Sharp contrast of shades shall **Not** be permitted. Provide exposed edges and other exposed solid wood components of same species as face veneers.
- C. Factory Finished Doors: Reference AWI Section 1300, G-21 and Section 09050 Color Schedule.

- 2.05 PREFITTING AND PREPARATION FOR HARDWARE: Comply with tolerance requirements of AWI for pre-fitting. Machine doors for hardware requiring cutting of doors. Comply with final hardware schedules and doorframe approved Shop Drawings and with hardware templates and other essential information required ensuring proper fit of doors and hardware. Take accurate field measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with machining.

PART 3 EXECUTION

- 3.01 EXAMINATION: Installer shall examine doorframes and verify that frames are correct type and have been installed for proper hanging of corresponding doors. Installer shall notify Contractor in writing of conditions detrimental to proper and timely installation of wood doors; do not proceed with installation until unsatisfactory conditions have been corrected.
- 3.02 PREPARATION: Condition doors to average prevailing humidity in installation area prior to hanging.

3.03 INSTALLATION

- A. Install wood doors in accordance with manufacturer's instructions and approved Shop Drawings. Fit doors to frame for proper fit and uniform clearance at each edge and machine for hardware. Seal cut surfaces after fitting and machining. Bevel non-fire rated doors 1/8 inch in 2 inches at lock and hinge edges. Bevel fire rated doors 1/16 inch in 2 inches at lock edge.
- B. Door Clearances: Fit to frames and machine for hardware for proper fit and uniform clearance at each edge. Provide following clearances:
 - 1. 1/8 inch at jambs and heads.
 - 2. 1/8 inch at meeting stiles for pairs of doors.
 - 3. 1/2 inch from bottom of door to top of decorative floor finish or covering, except where threshold is shown or scheduled provide 1/4 inch clearance from bottom of door to top of threshold.

3.04 ADJUSTING AND CLEANING

- A. Re-hang or replace doors that do not swing or operate freely. Refinish or replace doors damaged during installation.

3.05 PROTECTION OF COMPLETED WORK

- A. Installer shall advise Contractor of proper procedures required for protection of installed wood doors from damage or deterioration until acceptance of the Work. Doors damaged before acceptance of the Work shall be repaired or replaced.

END OF SECTION

SECTION 08230

FRP FLUSH DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. The extent and location of each type of FRP flush door is shown on the Drawings and Schedules.

1.02 RELATED SECTIONS

- A. Section 08100 – Metal Doors and Frames
- B. Section 08710 – Door Hardware
- C. Section 08800 – Glazing
- D. Section 09050 – Color Design

1.03 SYSTEM PERFORMANCE

- A. Provide door assemblies that have been designed and fabricated to comply with requirements for system performance characteristics listed below, as demonstrated by testing manufacturer's corresponding standard system according to test methods designated.
- B. Thermal Transmission (exterior doors): "U" value of not more than 0.09 (BTU/Hr. x SF x degrees F) in accordance with AAMA 1503.01.
- C. Flame Spread/Smoke Developed: Provide FRP doors and panels with the following ratings in accordance with ASTM E 84-79a:
 - 1. Flame Spread: 170 (Class C) maximum.
 - 2. Smoke Developed: 390 (Class C) maximum.
- D. Class "A" for flame spread and smoke developed rating on interior faces of exterior panels and both faces of interior panel as shown. Flame spread 15 maximum, smoke developed 310 maximum in accordance with ASTM E-84.
- E. Additional Criteria: Provide FRP doors and panels with the following performance:
 - 1. ASTM D 256 - nominal value OF 20.0
 - 2. ASTM D 570 - nominal value of 0.20 to 0.40 percent
 - 3. ASTM D 2583 - nominal value of 50
- F. Abrasion Resistance: Face sheet to have no greater than 0 .029 average weight loss percentage after Taber Abrasion Test - 25 cycles at 500 gram weight with F-18 wheel.
- G. Stain Resistance: Face sheet to be unaffected after 24 hours exposure to SVS-1 white spray enamel. Shall retain DE or 0.57 or less with MacBeth Colorimeter. Dark Brown (Bronze) FRP to be used as a basis.
- H. Chemical Resistance: Face sheet to be unaffected after 4 hours exposure to acetic acid (10 percent solution), acetone, sodium hypochlorite (5.25 percent solution) and hydrochloric acid (10 percent solution). No discoloration or panel damage will be allowed.

1.04 SUBMITTALS

- A. Product Data: Submit Manufacturer's product data, specifications and instructions for each type of door required in accordance with Section 01330 and the following:
 - 1. Include details of core, stile and rail construction, and trim for lites and all other components.
 - 2. Include details of finish hardware mounting.
 - 3. Include samples of each aluminum alloy to be used on this project. Where normal finish color and texture variations are expected, include two or more samples to show the range of such variations.
 - 4. Include one sample of typical fabricated section, showing joints, fastenings, quality of workmanship, hardware and accessory items before fabrication proceeds.
- B. Shop Drawings: Submit shop drawings for the fabrication and installation of the doors and frames and associated components. Details to be shown full-scale include glazing details and finish hardware schedule. Include elevations of each type door.

1.05 QUALITY ASSURANCE

- A. Standards: Comply with requirements and recommendations in applicable specification and standards by AAMA, except to the extent more stringent requirements are indicated.
- B. Performance: Ten years minimum record of production of frames, doors and panels and completion of similar projects in type and size.
- C. Instruction: The manufacturer or his representative will be available for consultation, including instruction to installation personnel.
- D. Field Measurement: Field verify information prior to fabrication and furnishing of materials.
- E. Regulation and Codes: Comply with current edition in force at project location of local, state and federal codes and regulations, including Americans with Disabilities Act of 1992.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site in their original unopened package with labels intact. Inspect materials for damage and advise manufacturer immediately of any unsatisfactory materials.
- B. Package door assemblies in individual corrugated cartons so no portion of the door has contact with the outer shell of the container. Package and ship frames pre-assembled to the greatest possible extent.

1.07 PRODUCT WARRANTY

- A. Provide a written warranty signed by manufacturer, installer and contractor, agreeing to replace any doors or factory hardware installation that fails in materials or workmanship, within the warranty period.
- B. Failure of materials or workmanship includes: excessive deflection, faulty operation of entrances, deterioration of finish or construction in excess of normal weathering and defects in hardware installation.
- C. The minimum time period of warranty is 10 years from "Final Acceptance".

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on model SL-17 with SpecLite3 as manufactured by Special-Lite, Inc., P.O. Box 6, Decatur, MI 49045. Tel. (616) 423-7068.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Corrim Company, Oshkosh, WI. Tel. (920) 231-2000.
 - 2. Warminster Fiberglass Co., Southampton, PA. Tel. (215) 953-1260
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 MATERIALS AND ACCESSORIES

- A. Aluminum Members: Alloy and temper as recommended by manufacturer for strength, corrosion resistant and application of required finish and control of color; ASTM B 221 for extrusions, ASTM B 209 for sheet/plate with aluminum wall thickness of 0.125 inch.
- B. Components: Furnish door and components from the same manufacturer. "Splitting" of door and components is **Not Permitted**.
- C. Fasteners: Aluminum, non-magnetic stainless steel or other non-corrosive metal fasteners, guaranteed by the manufacturer to be compatible with the doors, frames, stops, panels, hardware, finish matching the item to be fastened.
- D. Glazing gaskets: For glazing factory-installed glass and for gaskets which are factory-installed in "captive" assembly of glazing stops, manufacturer's standard stripping of molded neoprene, C 509 Grade 4.

2.03 FABRICATION

- A. Sizes and Profiles: The required sizes for door and frame units, and profile requirements are shown on the Drawings.
- B. Coordination of Fabrication: Field measure before fabrication, and show recorded measurements on final shop drawing.
- C. Complete the cutting, fitting, forming, drilling and grinding of all metal work prior to assembly. Remove burrs from cut edges, and ease edges and corners to a radius of approximately 1/64-inch.
- D. No welding of doors is acceptable.
- E. Maintain continuity of line and accurate relation of planes and angles. Secure attachments and support of mechanical joints, with hairline fit at contacting members.

2.04 FIBERGLASS REINFORCED POLYESTER FRP FLUSH DOORS

- A. Materials and Construction as follows:
 - 1. Extrude top and bottom rail legs for interlocking continuous rigidity weather bar. Lock face sheet material in place with extruded interlocking edges to be flush with aluminum stiles and rails.

2. Construct 1-3/4 inch thickness doors of 6063-T5-aluminum alloy stiles and rails minimum 2-5/16 inches depth. Construct with mitered corners and provide joinery of 3/8-inch diameter full width tie rods through extruded splines top and bottom as standard. 0.125 inch tubular shaped stiles and rails reinforced to accept hardware as specified. Provide hex type aircraft nuts for joinery without welds, glues or other methods for securing internal door extrusions. Furnish integral reglets to accept face sheet to permit a flush appearance. Rail caps or other face sheet capture methods are not acceptable.
3. Door Face Sheeting: 0.120-inch thickness fiberglass reinforced polyester. SL-17 doors with an abuse resistant engineered surface in a custom color as selected by the Project Engineer / MDOT Architect.
4. Core of Door Assembly: Minimum five pounds per cubic foot density poured-in-place polyurethane free of CFC. Minimum "R" value of 11. Meeting stiles on pairs of doors and bottom weather bars with nylon brush weather-stripping.
5. Manufacture doors with cutouts for vision lites as scheduled. Factory furnish and install all glass prior to shipment.
6. Pre-machine doors in accordance with templates from the specified hardware manufacturers and approved hardware schedule. Factory install hardware.

2.05 GLAZING

A. Design system for replacement of glass

1. Manufacturer's standard flush glazing system of recessed channels and captive glazing gaskets or applied stops as shown.
2. Allow for thermal expansion on exterior units.
3. Glass as shown and factory glazed into doors.

2.06 ALUMINUM FINISHES: Painted finish that matches panel color.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Comply with manufacturer's recommendations and Specifications for the installation of the doors and frames. **Factory Install Hardware and Glass in Doors.**
- B. Set units plumb, level and true to line, without warp or rack of doors. Anchor securely in place. Separate aluminum and other metal surfaces with bituminous coatings or other means as approved by Project Architect.
- C. Set thresholds in a bed of mastic and backseal.
- D. Clean surfaces promptly after installation of doors and frames, exercising care to avoid damage to the protective coatings.
- E. Ensure that the doors will be without damage or deterioration (other than normal weathering) at the time of acceptance.
- F. Provide Owner with all adjustment tools and instruction sheets. Arrange an in service session to Owner at owner's convenience. Any workmanship that is defective or deficient shall be replaced.

END OF SECTION

SECTION 08416

ALUMINUM STOREFRONTS

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Aluminum-framed storefront system includes tubular aluminum sections with supplementary internal support framing as required, fixed windows, shop fabricated, factory finished, glass and glazing, related flashing, anchorage and attachment devices.
- 1.02 RELATED SECTIONS
- A. Section 08800 - Glazing.
 - B. Section 09050 - Color Design.
 - C. Section 12495 - Window Blinds: Attachments to framing member.
- 1.03 SUBMITTALS
- A. Product Data: Submit component dimensions; describe components within assembly, anchorage, fasteners, and glass.
 - B. Shop Drawings: Submit Shop Drawings for fabrication and installation, including elevations, detail sections, anchorage, reinforcement, and glazing.
 - C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- 1.04 QUALITY ASSURANCE
- A. Perform Work in accordance with AAMA - Metal Curtain Wall, Window, storefront and Entrance Guide Specifications Manual.
 - B. Uniform Load Structural Test: Test unit in accordance with ASTM E 330 at a positive and negative static air pressure difference of 105 psf. There shall be no glass breakage or permanent damage.
 - C. Air Infiltration Test: The Storefront fixed windows shall be subjected to an air infiltration test in accordance with ASTM E 283 at a static air pressure difference of 6.24 psf. Air infiltration shall not exceed 0.1 cfm per square foot of crack.
 - D. Water Resistance Test: Test units in accordance with ASTM E 331 & ASTM E 547 at a static air pressure difference of 12 psf. There shall be no uncontrolled water leakage
 - E. Condensation Resistance Factor: The storefront fixed windows shall be tested in accordance with AAMA 1503-98 standards and tests of thermal performance and shall have a Condensation Resistance Factor (CRF) not be less than 64 frame and 56 glass.
 - F. Field Measurement: Wherever possible, take field measurements prior to preparation of Shop Drawings and fabrication, to ensure proper fitting of work. However, proceed with fabrication and coordinate installation tolerances as necessary when field measurements might delay the Work.

1.05 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing aluminum glazing systems with minimum five years experience.
- B. Design structural support framing components under direct supervision of a professional engineer experienced in design of this Work and licensed at the place where the Project is located.

1.06 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver, store, protect, and handle products to and on project site per manufacturer's instructions.
- B. Store products on minimum 4-inch high wood blocking and cover. Do not use non-vented plastic or canvas that could create a humidity chamber.

1.07 ENVIRONMENTAL REQUIREMENTS: Do not install sealant or glazing materials when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1.08 WARRANTY: Section 01770 - Closeout Procedures: Execution Requirements for Product warranties and bonds.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on products manufactured by Kawneer Co., Inc., 555 Guthridge Court, Norcross, GA 30092. Tel. (770) 449-5555.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Traco, Cranberry Township, PA. Tel. (724) 776-7000.
 - 2. Vistawall Architectural Products, Terrell, TX. Tel. (972) 551-6100.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 MATERIALS

- A. Storefront Framing: Kawneer Trifab VG 451 - 2 inches by 4 1/2 inches and 4 1/2 inches by 4 1/2 inches nominal dimensions; Screw Spline Fabrication.

2.03 COMPONENTS

- A. Extruded Aluminum: ASTM B221; 6063 alloy for extruded structural members.
- B. Glass: Specified in Section 08800.
- C. Glazing Materials: As specified in Section 08800.
- D. Flashing: Minimum 0.032-inch thick aluminum.

E. Sealant and Backing Materials:

1. Sealant used within system (Not Used for Glazing): Manufacturer's standard materials to achieve weather, moisture, and air infiltration requirements.
2. Perimeter Sealant: Specified in Section 07920.

2.04 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to conceal from view.
- E. Reinforce interior horizontal head rail to receive blind track brackets and attachments.
- F. Prepare components with internal reinforcement for door hardware.
- G. Reinforce framing members for imposed loads.

2.05 SHOP FINISHING

- A. Fluoropon (70% PVDF), AAMA 605.2, Fluoropolymer Coating, color selected by MDOT Architect from manufacturer's standard colors.
- B. Extent of Finish:
 1. Apply factory coating to all surfaces exposed at completed assemblies.
 2. Apply finish to surface cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 3. Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other Work.
- B. Verify wall openings and adjoining air and vapor seal materials are ready to receive Work of this Section.

3.02 INSTALLATION

- A. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- B. Provide alignment attachments and shims to permanently fasten system to building structure.

- C. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent Work
- D. Provide thermal isolation where components penetrate or disrupt building insulation.
- E. Install sill flashing. Turn up ends and edges; seal to adjacent Work to form water tight dam.
- F. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- G. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- H. Install integral flashing and integral joint sealers.
- I. Coordinate installation of glass with Section 08800; separate glass from metal surfaces.
- J. Coordinate installation of perimeter sealants with Section 07920.

3.03 CLEANING

- A. Section 01740 - Execution Requirements: Final cleaning.
- B. Remove protective material from pre-finished aluminum surfaces.
- C. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- D. Remove excess sealant by method acceptable to sealant manufacturer.

3.04 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect finished Work from damage.

END OF SECTION

SECTION 08710

DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES: Hardware as shown on the Drawings and in Schedules. Door hardware is hereby defined to include all items known commercially as builders hardware, as required for swing doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.

A. The required types of hardware include (but are not limited to) the following:

1. Butts and hinges
2. Lock cylinders and keys
3. Lock and latch sets
4. Bolts
5. Panic exit devices
6. Push/pull units
7. Closers
8. Door trim units
9. Stripping and seals
10. Thresholds

B. Items of hardware not definitely specified, but required for the completion and proper operation of the doors, shall be suitable in type, comparable to the type specified for similar openings. Labeled doors shall be fitted with labeled hardware.

C. All modifications of hardware required by reason of construction characteristics shall be such as to provide the proper operation or functional features. Contractor shall be fully responsible for checking all details, such as wall trim clearance, bevels, backsets, proper type strike plates, length of spindles, hands of locks, etc., in order that all items of hardware shall fit properly. Hardware for application to metal shall be made to standard templates. Template information shall be furnished to door and frame fabricators and all other trades requiring same, in order that they may cut, reinforce or otherwise prepare in the shop, materials for reception of hardware.

D. Hardware shall be free from defects affecting appearance and serviceability. Working parts shall be well fitted and smooth working without unnecessary play. All items of hardware shall be delivered to the building site in sufficient time in advance of its requirement for use for inspection prior to installation.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's product data, roughing-in diagrams, and Installation instructions for each type of hardware. Include operating instructions, maintenance information and spare part sources.

B. Contractor's Hardware Schedule: After all samples have been approved but prior to delivery of hardware, Contractor shall prepare and submit to the MDOT Architect a complete schedule of all finish hardware required. Schedule shall follow requirements of Specifications and shall indicate type, manufacturer's name and number, location and finish of each item required. Approval of schedule will not relieve Contractor of responsibility for furnishing all necessary hardware.

C. Submit such samples as required by the MDOT Architect for approval. Do not deliver hardware until approval is obtained.

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with the following requirements:
 - 1. ANSI A117.1 – Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
 - 2. NFPA 101.
- B. Hardware Supplier: Company specializing in supplying commercial door hardware with five years documented experience and approved by manufacturer.
- C. Hardware supplier shall have in his employment, an Architectural Hardware Consultant (AHC) in good standing as certified by the Society of Hardware Consultants Council. The Architectural Hardware Consultant shall assist the Contractor in installation and verify that hardware has been furnished and installed in accordance with manufacturer's instructions and as specified herein.
- D. Templates: The hardware supplier shall provide templates and / or physical hardware to trades as required and in sufficient time to prevent delay in the execution of the Work.

- 1.04 PACKING AND MARKING: Package each item of hardware and lockset separately in individual containers, complete with screws, keys, instructions and installation template for spotting mortising tools. Mark each container with item number corresponding to number shown on Contractor's hardware schedule.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Equivalent products by the following manufacturers are acceptable:
 - 1. Best Access Sys. Indianapolis, IN. Tel: (800) 311-1705.
 - 2. Corbin Russwin Arch't. Hardware. Berlin, CT. Tel: (800) 543-3658.
 - 3. Dorma Door Controls, Inc. Reamstown, PA. Tel: (800) 523-8483.
 - 4. Hager Companies. Saint Louis, MO. Tel: (800) 325-9995.
 - 5. LCN. Princeton, IL. Tel: (800) 526-2400.
 - 6. McKinney Hinge. Scranton, PA. Tel: (800) 346-7707.
 - 7. Pemko. Ventura, CA. Tel: (800) 283-9988.
 - 8. Rockwood Manufacturing Co. Rockwood, PA. Tel: (800) 458-2424.
 - 9. Schlage Lock Co. Colorado Springs, CO. Tel: (800) 847-1864.
 - 10. Stanley Hardware. New Britain, CT. Tel: (800) 337-4393.
 - 11. Trimco/BBW/Quality. Los Angeles, CA. Tel: (323) 262-4191.
- B. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 KEYING / CYLINDERS

- A. All cylinders and locksets shall be set to the existing masterkey system. Furnish all cylinders & locksets with removable type cores. The removable core system shall be one that uses either temporary construction cores or construction keyed cores operated by a construction key until such time the construction key is rendered inactive by the change key or retractor key.

- B. All cylinders shall be keyed in sets as directed by the MDOT Architect. Furnish 3 change keys per lock and 6 master-keys per set.
- 2.03 MATERIALS: See Hardware Schedule at end of this Section. Products listed set standard.

PART 3 EXECUTION

- 3.01 INSTALLATION: Mount hardware units at heights recommended in "Recommended Locations for Builders' Hardware" NBHA, except as other wise specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by the Project Architect.
- A. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, re-install each item. Do not install surface-mounted items until finishes have been completed on the substrate.
 - B. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
 - C. Cut and fit threshold and floor covers to profile of door frames, with mitered corners and hairline joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for spindles, bolts and similar items, if any.
 - D. Screw thresholds to substrate with No. 10 or larger screws, of the proper type for permanent anchorage and of bronze or stainless steel that will not corrode in contact with the threshold metal.
 - 1. At exterior doors, and elsewhere as indicated, set thresholds in a bed of either butyl rubber sealant or polyisobutylene mastic sealant to completely fill concealed voids and exclude moisture from every source.
 - 2. Do not plug drainage holes or block weeps. Remove excess sealant.
- 3.02 ADJUSTING AND CLEANING: Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite-type if no other recommended). Replace units that cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.

3.03 SCHEDULE:

-HW1- @ DR. # 1

EACH OPENING SHALL HAVE:

3-EACH HINGES	HAGER	BB1279 4.5 X 4.5 NRP 652
1-EXIT DEVICE	PRECISION	2108X 4908A 626
1-CLOSER	LCN	P1460/1460 AL X TBGN
1-KICKPLATE	ROCKWOOD	8X2 LDW 0.050 X 630 (MOUNTED PUSH SIDE)
1-THRESHOLD	PEMKO	2005AV
1-W/STRIP	PEMKO	303AV
1-DOOR BOTTOM	PEMKO	2211AV (for hollow metal doors)
1-STOP	ROCKWOOD	440 626
3-SILENCERS		
1-CYLINDER		AS REQUIRED

-HW2- @ DR. # 4

EACH OPENING SHALL HAVE:

3-EACH HINGES	HAGER	BB1279 4.5 X 4.5 652
1 LOCKSET	SCHLAGE	D50RD RHODES X 626
1-CYLINDER	BEST	AS REQUIRED
1-CLOSER	LCN	1460 AL X TBGN @ RATED WALLS AS INDICATED
1-KICKPLATE	ROCKWOOD	8 X 2 LDW 0.050 X 630 (MOUNTED PUSH SIDE)
1-MOP PLATE	ROCKWOOD	6 X 1 LDW 0.050 X 630 (MOUNTED PUSH SIDE)
1-STOP	ROCKWOOD	440 X 626
3-SILENCERS		

-HW3-@DR # 11

EACH OPENING SHALL HAVE:

1-SET SPRING HINGES	HAGER	1256 4.5 X 4.5 652
1-LOCKSET	SCHLAGE	D80RD RHODES X 626
1-CYLINDER	BEST	AS REQUIRED
1-STOP	ROCKWOOD	440 X 626
3-SILENCERS		

-HW4-@ DRS # 3 & 5

EACH OPENING SHALL HAVE:

3-EACH HINGES	HAGER	BB1279 4.5 X 4.5 652
1-LOCKSET	SCHLAGE	D50RD RHODES X 626
1-CYLINDER	BEST	AS REQUIRED
1-STOP	ROCKWOOD	440 X 626
3-SILENCERS		

-HW5- @ DR. # 6

EACH OPENING SHALL HAVE:

4-EACH HINGES	HAGER	BB1168 4.5 X 4.5 652
1-LOCKSET	SCHLAGE	L9080 L/L X 06 626
1-CYLINDER	BEST	AS REQUIRED
1-CLOSER	LCN	P1460 AL
1-KICKPLATE	ROCKWOOD	8 X 2 LDW 0.050 X 630 (MOUNTED PUSH SIDE)
1-STOP	ROCKWOOD	440 X 626
3-SILENCERS		

-HW6- @ DR # 10

EACH OPENING SHALL HAVE:

6-EA HINGES	HAGER	BB1279 4.5 X 4.5 NRP 652
1-LOCKSET	SCHLAGE	D80RD RHODES X 626
1-CYLINDER	BEST	AS REQUIRED
2-FLUSHBOLTS	ROCKWOOD	555-12" X 626
1-CLOSER	LCN	P1460 AL X TBGN (MOUNTED ACTIVE LEAF)
2-KICKPLATE	ROCKWOOD	8 X 2 LDE 0.050 X 630 (MOUNTED PUSH SIDE)
1-THRESHOLD	PEMKO	2005AV X REQUIRED LENGTH
1-W/STRIP	PEMKO	303AV
2-DOOR BOTTOM	PEMKO	2211AV(for hollow metal doors)
2-SILENCERS		

-HW7- # DR # 2 & 9

EACH OPENING SHALL HAVE:

6-EACH HINGES	HAGER	BB1279 4.5 X 4.5 652
1-LOCKSET	SCHLAGE	D50RD RHODES X 626
1-CYLINDER	BEST	AS REQUIRED
2-FLUSHBOLTS	ROCKWOOD	555-12" 626
1-STOP	ROCKWOOD	440 X 626
2-SILENCERS		

-HW8- @ DR # 7 & 8

EACH OPENING SHALL HAVE:

3 EA HINGES	HAGER	BB1279 4.5 X 4.5 641
1-CLOSER	LCN	1461 X TBGN X 695
1-PUSH PLATE	ROCKWOOD	70 (4 X 16) X 630
1-PULL	ROCKWOOD	70 (4 X 16) X 630
1-KICKPLATE	ROCKWOOD	8 X 2 LDW 0.050 X 630
1-STOP	ROCKWOOD	440 X 626
3-SILENCERS		

END OF SECTION

SECTION 08800

GLAZING

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Glass and glazing for doors, storefront fixed windows, unframed mirrors and other glazed openings, interior and exterior locations.
- 1.02 RELATED SECTIONS
 - A. Section 08100-Metal Doors and Frames.
 - B. Section 08210-Wood Doors.
 - C. Section 08230-FRP Flush Doors.
 - D. Section 08415-Aluminum Storefronts.
 - E. Section 10810-Toilet Accessories.
- 1.03 QUALITY ASSURANCE: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.
 - A. Prime Glass Standard: FS DD-G-45I.
 - B. Heat-Treated Glass Standard: FS DD-G-I403.
 - C. Safety Glass Standard: CPSC I6 CFR I20I.
- 1.04 DELIVERY, STORAGE, AND HANDLING: Protect glass during transit, storage and handling to prevent scratching or breakage of glass. Replace all broken or damaged glass at no additional cost to Owner.
- 1.05 PROJECT CONDITIONS: Meet with Glazier and other trades affected by glass installation, prior to beginning of installation. Do not perform work under adverse weather or job conditions. Install liquid sealant when temperatures are within lower or middle third of temperature range recommended by manufacturer.

PART 2 PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS
 - A. Equivalent products by the following prime glass manufacturers are acceptable:
 - 1. AFGD, Inc., Atlanta, GA. Tel. (800) 766-2343.
 - 2. Guardian Industries Corp., Carleton, MI. Tel. (800) 521-9040.
 - 3. Pilkington Libbey-Owens-Ford, Toledo, OH. Tel. (419) 246-6078.
 - 4. PPG Industries, Inc., Pittsburgh, PA. Tel. (800) 377-5267.
 - 5. Visteon Float Glass Operations, Allen Park, MI. Tel. (800) 521-6345.
 - B. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures

2.02 INSULATING GLASS

- A. Material: Shall consist of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space and complying with ASTM E 774 for performance classification indicated. Unless shown otherwise on Drawings, use this type glass for all exterior applications.
- B. Characteristics: Other requirements specified for glass characteristics, air space, sealing system, sealant spacer material, corner design and desiccant are as follows:
 - 1. Thickness of Each Pane: 1/4 - inch.
 - 2. Airspace Thickness: 1/2 – inch.
 - 3. Sealing System: Manufacturer's standard 1 inch sealing system.
 - 4. Spacer Material: Manufacturer's standard metal.
 - 5. Desiccant: Manufacturer's standard, either molecular sieve or silica gel.
 - 6. Corner Construction: Manufacturer's standard.
 - 7. Exterior Pane: Gray tinted.
 - 8. Interior Pane: Clear.

2.03 LAMINATED CLEAR SAFETY GLASS: Two layers of 1/8 inch glass Type 1 (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select) with a 0.030 polyvinyl butyryl interlayer. Total thickness, 1/4 inch (plus). Unless shown otherwise on Drawings, use this type glass for all interior applications.

2.04 TEMPERED SAFETY GLASS

- A. Provide prime glass of color and type indicated, which has been heat treated to strengthen glass in bending to not less than 4.5 times annealed strength. Provide tempered glass produced by manufacturer's special process which eliminates tong marks and complies with ANSI Z97.1 and ASTM C 1048.
- B. Provide clear 1/4 inch thick glass in doors and interior windows where not required to be fire rated.

2.05 UNFRAMED MIRRORS

- A. Number 1 quality, 1/4 inch thick, select float glass mirror electrolytically copper-plated surface, guaranteed against silver spoilage for 10 years. Size as shown on the Drawings. Mirror edges shall be eased. Mounting clips shall be bright polished chrome corrosion resistant metal.

2.06 SETTING MATERIALS: Provide all necessary primers, sealants, channels, setting blocks, etc. with items to be glazed. Conform to requirements set forth in FGJA Glazing Manual.

PART 3 EXECUTION

3.01 GLAZING INSTALLATION

- A. Do not commence glazing Work until the required primers have been applied and have dried. Clean all surfaces to which setting materials are to be applied to assure that the materials properly adhere and seal.

- B. Experienced glaziers having highest quality workmanship shall perform all glazing. Glass shall be set without springing or forcing. Putty, glazing compound, stops and the like shall **Not** project above the sight line. Exposed surfaces of putty and glazing compound shall be left straight, flat and clean. Corners shall be well formed.
- C. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.
- D. Apply clear glazing compound around perimeter and at all glass-to-glass connections of butt-glazing system. Compound shall be the type recommended by the glass manufacturer for this particular installation.

3.02 STANDARDS AND PERFORMANCE

- A. Watertight and airtight installation of each glass product is required, except as otherwise shown. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors), without failure including loss or breakage of glass, failure of sealant or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the Work.
- B. Protect glass from edge damage during handling and installation, and subsequent operation of glazed components of the Work. During installation, discard units with significant edge damage or other imperfections.
- C. Glazing channel dimensions where shown are intended to provide for necessary bite on glass, minimum edge clearance, and adequate sealant thickness, with reasonable tolerances. Adjust as required by job conditions at time of installation.
- D. Comply with combined recommendations and technical reports by manufacturers of glass and glazing products as used in each glazing channel, and with recommendations of Flat Glass Marketing Association "Glazing Manual," except where more stringent requirements are indicated.

3.03 PREPARATION FOR GLAZING

- A. Clean glazing channel and other framing members to receive glass, immediately before glazing. Remove coatings that are not firmly bonded to substrate. Remove lacquer from metal surfaces where elastomeric sealants are used.
- B. Apply primer or sealant to joint surfaces where recommended by sealant manufacturer.

3.04 GLAZING

- A. Install setting blocks of proper size in sill rabbet, located 1/4 of glass width from each corner. Set blocks in thin course of heel-bead compound, if any.
- B. Provide spacers inside and out, of proper size and spacing, for glass sizes larger than 50 united inches, except where gaskets or pre-shimmed tapes are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- C. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- D. Force sealant into channel to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.

- E. Tool exposed surfaces of glazing liquids and compounds to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.
- F. Clean and trim excess glazing materials from glass and stops or frames promptly after installation, and eliminate stains and discoloration.
- G. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement. Anchor gasket to stop with matching ribs, or by proven adhesives, including embedment of gasket tail in cured heel-bead.

3.05 MIRRORS

- A. Install unframed mirrors with a combination of metal clips and construction adhesive securely attached to the wall and/or concealed blocking.

3.06 CURE AND PROTECTION

- A. Protect glass from breakage immediately upon installation, by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces. Cure sealant for high early strength and durability.
- B. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.

3.07 CLEANING

- A. Wash and polish glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Comply with glass product manufacturer's recommendations for final cleaning.
- B. The Contractor shall be responsible for removal of protective materials and cleaning with plain water, or water with soap or household detergent as approved by the glass manufacturer. The Contractor shall be held responsible for damages resulting from the use of other cleaning material.

END OF SECTION

SECTION 09050

COLOR DESIGN

PART 1 GENERAL

- 1.01 SECTION INCLUDES: A coordinated comprehensive Color System in which requirements for materials specified in other Sections of this Specification and / or shown on the Drawings are identified for quality, color, finish, texture and pattern.
- 1.02 MANUFACTURER'S TRADE NAMES: Manufacture's trade names and number designations used herein identify colors, finishes, textures and patterns for materials and products specified in the technical sections of the Specifications. Wherever such products are referred for selection or approval in other sections, such products shall be understood to be referenced to this Section. If no selection is listed herein for products, the Project Architect shall be contacted for a color selection. Subject to approval of the Project Architect, products of other manufacturers will be considered, provided they are equivalent to the quality, colors, finishes, textures and patterns listed and meet the requirements of the Specifications and Drawings.
- 1.03 RELATED SECTIONS: Section 01330 – Submittal Procedures.
- 1.04 SAMPLES: Samples shall be submitted for approval prior to applying or installing any finishes or items that are not included in this Section. See appropriate technical Sections for submittal requirements. Upon receipt of samples, the Project Architect may make revisions to the Color schedule.

PART 2 PRODUCTS

- 2.01 MATERIALS: Materials are specified in other Sections of the Specifications. Any reference by trade name or manufacturer shall be considered as establishing a standard of quality and shall in no way limit competition.
- 2.02 MANUFACTURERS: The following manufacturers were used in preparing the Color Schedule:

SECTION / MATERIAL	MANUFACTURER / NUMBER & COLOR NAME	COLOR DESCRIPTION
• 04200 - Brick	Match Existing Blonde & Brown	
• 04200 - Mortar	Match Existing	
• 05500 - Miscellaneous Steel	S/W #6089 Grounded	(brown)
• 06400 - Arch. Woodwork(painted)	S/W #6087 Trusty Tan	(dark tan)
• 06400 - Arch. Woodwork (stained)	S/W #3120-B Walnut Wainscot	(brown)
• 06400 - Plastic Lam Countertop	Formica #7267-58 - Concrete Stone	(tan)
• 07612 - Metal Roofing	Match ABC – Seal Brown	(brown)
• 07612 - Met Trim, Gutters & DS	Match ABC – Seal Brown	(brown)
• 07612 - Soffit Panels	Match Petersen Sandstone	(tan)
• 07612 - Met Wall Panels	Match Petersen Sandstone	(tan)
• 07920 - Joint Sealants	Pecora (match adjacent lighter color)	

• 08100 - Metal Dr Frames	S/W #6089 Grounded	(brown)
• 08210 - Wood Doors (refinish)	S/W #3114-P Warm Chestnut	(brown)
• 08415 - Alum Storefront (windows)	Kawneer-Medium Bronze	(brown)
• 08710 - Door Hardware	Chrome	(silver)
• 09250 - Gypsum (Walls)	S/W #6085 Simplify Beige	(tan)
• 09250 - Gypsum (Ceilings)	S/W #7010 White Duck	(white)
• 09650 - Resilient Floor 'A'	Mannington #659 Sable	(brown)
• 09650 - Resilient Floor 'B'	Mannington #637 Tweed	(dark tan)
• 09650 - Resilient Floor 'C'	Mannington #627 Peanut	(tan)
• 09650 - Rubber Base	Johnsonite #47 Brown	(brown)
• 09680 - Carpet	Mannington Challenge (CHAL)	(brown w/ colors)
• 09725 - Vinyl Wall Cover(vwc#1)	Radiance Type I-Camel T1-EV-77	(tan)
• 09725 - Vinyl Wall Cover(vwc#2)	Cambre Type II-Parchment T2-CE-22	(tan)
• 10100 - Tackboards	Claridge-#1110 Fawn	(tan)
• 10100 - Markerboards	Claridge-# 32 White	(white)
• 10200 - Louvers	Match All-Lite-Sage Brown #397F240	(dark brown)
• 10260 - Corner Guards	Match Arden - #13 Silk	(light tan)
• 10400 - Specialty Signs (Int-border)	Mohawk-105 Black	(black)
• 10400 - Specialty Signs (Int-background)	Mohawk-108 Cocoa	(tan)
• 10400 - Specialty Signs (Int-copy)	Mohawk-105 Black	(black)
• 10400 - Specialty Signs (Exterior)	Metal Arts-Deep Brown	(brown)
• 12485 - Floor Mats (Carpet)	C/S - # 7304 Sandstone	(light brown)
• 12485 - Floor Mats (Rails)	C/S - Bronze	(brown)
• 12485 - Floor Mats (Vinyl Frame)	C/S - Bronze	(brown)
• 12495 - Window Blinds	Hunter Douglas #C270-Linen	(off white)

PART 3 EXECUTION

- 3.01 EXECUTION: Refer to execution requirements specified in other Sections of this Specification for the specific products listed. Any remaining colors, finishes, textures or patterns not included in this Color Design will be selected by the Project Architect upon written notification and subsequent submittals by the Contractor.

END OF SECTION

SECTION 09250

GYPSUM BOARD

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Gypsum board work with a tape-and-compound joint treatment system known as "drywall finishing" work. The types of work required include the following:
- A. Gypsum board including screw-type metal support system.
 - B. Gypsum board applied to metal and wood framing and furring.
 - C. Gypsum backing boards for application of other finishes.
 - D. Drywall finishing (joint tape-and-compound treatment).
- 1.02 RELATED SECTIONS
- A. Section 06100 – Rough Carpentry for plywood sheathing.
- 1.02 SUBMITTALS
- A. Submit manufacturers technical product data, installation instructions and recommendations for products specified.
- 1.03 QUALITY ASSURANCE: Where work is indicated for fire resistance ratings, including those required to comply with governing regulations, provide materials and installations identical with applicable assemblies which have been tested and listed by recognized authorities, including UL and A.I.A.
- A. Industry Standard: Comply with applicable requirements of GA-216 "Application and Finishing of Gypsum Board" by the Gypsum Association, except where more detailed or more stringent requirements are indicated including the recommendations of the manufacturer.
 - B. Allowable Tolerances: 1/8 inch offsets between planes of board faces, and 1/4 inch in 8 ft. for plumb, level, warp and bow.
 - C. Manufacturer: Obtain gypsum boards, framing and fasteners, trim accessories, adhesives and joint treatment products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.
- 1.04 PRODUCT HANDLING: Deliver gypsum drywall materials in sealed containers and bundles, fully identified with manufacturer's name, brand, type and grade; store in a dry, well ventilated space, protected from the weather, under cover and off the ground.
- 1.05 PROJECT CONDITIONS
- A. Installer must examine the substrates and the spaces to receive gypsum drywall, and the conditions under which gypsum drywall is to be installed; and shall notify the Contractor, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

- B. Maintain ambient temperatures at not less than 55 degrees F., for the period of 24 hours before drywall finishing, during installation and until compounds are dry.

PART 2 PRODUCTS

2.01 METAL SUPPORT MATERIALS: To the extent not otherwise indicated, comply with Gypsum Association Specification GA-203 "Installation of Screw-Type Steel Framing Members to Receive Gypsum board" (as specified and recommended) for metal system supporting gypsum drywall work.

- A. Interior Studs: ASTM C 645; 25 gage by 3-5/8 inches deep, except as otherwise indicated or specified herein. Provide stud manufacturer's standard accessories such as clips, shoes, ties, reinforcements, fasteners and other accessories as needed for a complete stud system. Runners shall match studs; type recommended by stud manufacturer for floor and ceiling support of studs, and for vertical abutment of drywall work at other work. Provide double 20 gage studs at all openings and doorjamb and at door and opening headers.
- B. Furring Members: ASTM C 645; 25 gage, hat-shaped. Where shown as "Resilient", provide manufacturer's special type designed to reduce sound transmission.
- C. Fasteners: Type and size recommended by furring manufacturer for the substrate and application indicated.

2.02 GYPSUM BOARD PRODUCTS: To the extent not otherwise indicated, comply with GA-216, as specified and recommended. Exposed gypsum board shall be Type X, fire rated type with tapered long edges and as follows:

- A. Edge Profile: Special rounded or beveled edge.
- B. Sheet Size: Maximum length available, which will minimize end joints.
- C. Thickness: 5/8 inch, except where otherwise indicated.
- D. Water-resistant Type (WR-1): Provide where indicated; 5/8 inch thick, except where otherwise indicated.
- E. Cement Board: Provide water-resistant cement based backer board, 5/8 inch thick Durock, as a base for ceramic tile.

2.03 TRIM ACCESSORIES

- A. Manufacturer's standard galvanized steel beaded units with flanges for concealment in joint compound including corner beads, edge trim and control joints; except provide semi-finishing type (flange not concealed) where indicated.
- B. Where metal moldings are specifically called out on the drawings, provide the appropriate item from below:
 - 1. Edge Trim - USG No. 200-A.
 - 2. Control Joint - USG No. 093.

- 2.04 JOINT TREATMENT MATERIALS: General: ASTM C 475; type recommended by the manufacturer for the application indicated, except as otherwise indicated.
 - A. Joint Tape: Perforated type.
 - B. Joint Compound: On interior work provide chemical hardening type for bedding and filling, ready-mixed vinyl-type or non-casein-type for topping. On exterior work provide water- resistant type.
- 2.05 MISCELLANEOUS MATERIALS: Provide auxiliary materials for gypsum drywall work of the type and grade recommended by the manufacturer of the gypsum board. Gypsum board fasteners shall comply with GA-216. Provide anti-corrosive type at exterior applications.

PART 3 EXECUTION

- 3.01 INSTALLATION OF METAL SUPPORT SYSTEMS: To the extent not otherwise indicated, comply with GA-203, and manufacturer's instructions. Furnish concrete inserts, steel deck hanger clips, and similar devices to other trades for installation well in advance of time needed for coordination with other work. Isolate stud system from transfer to structural loading to system, both horizontally and vertically. Provide slip or cushioned type joints to attain lateral support and avoid axial loading. Install runner tracks at floors, ceiling and structural walls and columns where gypsum drywall stud system abuts other work. Terminate partition stud systems one foot above finished ceiling, braced each side at 45 degrees at 4 feet on center, except where indicated to be extended to structural support or substrate above. Space studs 16 inches on center except as otherwise indicated.
 - A. Door Frames: Install additional jamb studs at door frames as indicated, but not less than 2 studs (minimum 20 gage) at each jamb. Space jack studs over doorframes at same spacing as partition studs, with bottom runner secured to doorframe.
 - B. Install supplementary framing, runners, furring, blocking and bracing at opening and terminations in the work, and at locations required to support fixtures, equipment, services, heavy trim, furnishings and similar work which cannot be adequately supported directly on gypsum board alone.
- 3.02 GENERAL GYPSUM BOARD INSTALLATION REQUIREMENTS: Meet at the project site with the installers of related work and review the coordination and sequencing of work to ensure that everything to be concealed by gypsum drywall has been accomplished, and that chases, access panels, openings, supplementary framing and blocking and similar provisions have been completed. In addition to compliance with GA-216, comply with manufacturer's instructions and requirements for fire resistance ratings (if any), whichever is most stringent.
 - A. Install sound attenuation blankets and insulation as indicated, prior to gypsum board unless readily installed after board has been installed.
 - B. Install wall/partition boards vertically to avoid end- butt joints wherever possible. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs. Form control joints and expansion joints with space between edges of boards, prepared to receive trim accessories.

- C. Cover both faces of steel studs with gypsum board in concealed spaces (above ceilings, etc.), except in chase walls that are properly braced internally. Except where concealed application is required for sound, fire, air or smoke ratings, coverage may be accomplished with scraps of not less than eight (8) square foot area, and may be limited to not less than 75 percent of full coverage.
- D. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4 inch to 1/2 inch space and trim edge with J-type semi-finishing edge trim. Seal joints with acoustical sealant. Do not fasten drywall directly to stud system runner tracks.
- E. Floating construction: Where feasible, including where recommended by manufacturer, install gypsum board with "floating" internal corner construction, unless isolation of the intersecting boards is indicated or unless control or expansion joints are indicated.
- F. Space fasteners in gypsum boards in accordance with GA-216 and manufacturer's recommendations, except as otherwise indicated.

3.03 SPECIAL GYPSUM BOARD APPLICATIONS

- A. Install exposed gypsum board by fastening with screws.
- B. Wall Tile Base: Where drywall is base for thin set ceramic tile and similar rigid applied wall finishes, install cement based backing board. At toilets, showers, labs, janitor closets, and similar "wet" areas, install water-resistant gypsum board. Apply with uncut long edge at bottom of work, and space 1/4 inch above fixture lips. Seal ends, cut-edges and penetrations of each piece with water-resistant sealant before installation.

3.04 INSTALLATION OF DRYWALL TRIM ACCESSORIES: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges by nailing or stapling in accordance with manufacturer's instructions and recommendations.

- A. Install metal corner beads at external corners of drywall work.
- B. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed. Provide type with face flange to receive joint compound except where semi-finishing type is indicated. Install L-type trim where work is tightly abutted to other work, and install special kerf-type where other work is kerfed to receive long leg of L-type trim. Install U- type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints.) Install metal control joint (beaded type) where indicated or required for proper installation.

3.05 INSTALLATION OF DRYWALL FINISHING

- A. Apply treatment at gypsum board joints (both directions), flanges of trim accessories, penetrations, fasteners heads, surface defects and elsewhere as required to prepare work for decoration. Pre-fill open joints and rounded or beveled edges, using type of compound specified herein and recommended by manufacturer.
- B. Apply joint tape at joints between gypsum boards, except where a trim accessory is indicated.

- C. Apply joint compound in 3 coats (not including pre-fill of openings in base), and sand between last 2 coats and after last coat.
- D. Base for Ceramic Tile: Do not install drywall finishing where ceramic tile and similar rigid applied finishes are indicated.
- E. Unless otherwise indicated, install drywall finishing at all gypsum board exposed to view and to receive finishes, and where not exposed to view and above ceilings install at all fire rated and smoke, sound, air, conference, exam, toilet, private office, mechanical and electrical room walls.
- F. Finishing Gypsum Board Assemblies: Level 4 finish, unless otherwise indicated; Level 1 finish for concealed areas, unless a higher level of finish is required for fire-resistance-rated assemblies and Level 2 finish where panels form substrates for tile, Level 5 finish is required in areas with a gloss or epoxy finished coating.

3.06 PROTECTION OF WORK

- A. Installer shall advise Contractor of required procedures for protection of the gypsum drywall Work from damage and deterioration during the remainder of the construction period.

END OF SECTION

SECTION 09310

CERAMIC TILE

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Thin set ceramic floor tile, glazed cove base, glazed wall tile, mosaic wall tile and accessories.
- 1.02 RELATED SECTIONS
- A. Section 07260 – Vapor Retarders (Floor protection paper).
 - B. Section 09050 – Color Design.
- 1.03 SUBMITTALS
- A. Submit manufacturer's product data and written instructions for recommended installation and maintenance practices for each product specified.
 - B. Submit 2 samples of types and colors of tile and grout required in similar pattern of tile shown on Drawings, mounted on not less than 12 inches square plywood or hardboard and grouted as required.
 - C. Submit one full size sample of each tile accessory and marble threshold. Submit samples of trim and other units if requested by the MDOT Architect. Review will be for color, pattern and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
- 1.04 QUALITY ASSURANCE
- A. Furnish tile conforming to the Standard Grade Requirements of ANSI A137.1.
 - B. When using setting and grouting materials manufactured under TCA license, include identification, and formula number on each container. Provide materials obtained from only one source for each type of tile, grout and color to minimize variations in appearance and quality.
 - C. Install ceramic tile in accordance with manufacturers instructions and applicable installation specifications of the Tile Council of America's "Handbook for Ceramic Tile Installation", latest edition.
- 1.05 PRODUCT DELIVERY, STORAGE AND HANDLING: Deliver packaged materials and store in original containers with seals unbroken and labels intact until time of use, in accordance with manufacturer's directions.
- 1.06 PROJECT CONDITIONS: Continuously heat areas to receive tile to 50 degrees F. for at least 48 hours prior to installation, when project conditions are such that heating is required. Maintain 50 degrees F. temperature continuously during and after installation as recommended by tile manufacturer but not less than 7 days. Maintain a minimum lighting level of 50 fc during installation.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Equivalent products by the following manufacturers are acceptable:

1. American Olean Tile Company, Lansdale, Pennsylvania
2. Dal-Tile Corporation, Dallas, Texas
3. Floor Gres Ceramiche, Italy
4. Florida Tile Industries, Lakeland, Florida.
5. Lone Star Porcelain Mosaic Tile, Dallas, Texas
6. United States Ceramic Tile Co., East Spatra, Ohio

B. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 CERAMIC FLOOR TILE: 8 inches by 8 inches by 5/16 inch, cushioned edge, unglazed, color to be selected from standard colors available.

2.03 CERAMIC BASE TILE: 4-1/4 inches by 4-1/4 inches by 5/16 inch, cushioned edge, bright glaze, cove base round top, color to be selected from standard colors available.

2.04 GLAZED WALL TILE: Size 4-1/4 inches by 4-1/4 inches by 5/16 inch, cushioned edge, bright glaze, colors to be selected from standard colors available.

2.05 TRIM AND SPECIAL SHAPES

A. Provide necessary units with rounded internal and external corners, and rounded internal and external corner units of same material and finish as field tile, and as follows:

1. Base: Sanitary cove units.
2. External Corners: Bullnose shapes, with a radius of not less than 3/4 inch, unless otherwise shown.
3. Internal Corners: Field-buttet square, except use square corner, combination angle and stretcher type cap.

2.07 MARBLE THRESHOLDS: Provide sound Group "A" marble with an abrasive hardness of not less than 10.0, when tested in accordance with ASTM C 241. Color of marble threshold to be selected by the MDOT Architect from manufacturer's full range of standard colors.

2.08 ADHESIVE: ANSI A136.1 and ANSI A118.4 when mixed with additive, with Tile Contractor's Association or Adhesive and Sealant Council certification of conformance, for base and wall tile set on each type of substrate. Provide primer-sealer as recommended by adhesive manufacturer. Equal to Laticrete Type 272 Premium or 317 Floor 'N Wall Thin-Set with 333 Super Flex Additive. Equivalent products by Mapei and Bostik are acceptable.

2.09 GROUT: ANSI A 118.3, with Tile Contractor's Association certification of conformance. Equal to Laticrete Type SpectraLOCK Pro Grout. Equivalent products by Mapei and Bostik are acceptable. Color of grout to be selected by the MDOT Architect from manufacturer's full range of standard colors.

PART 3 EXECUTION

- 3.01 INSPECTION: Installer must examine the substrate and the conditions under which ceramic tile is to be installed and notify the contractor in writing of any conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- 3.02 INSTALLATION
- A. Comply with the applicable parts of ANSI 108 Series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile", and the tile and grout manufacturer's printed instructions, and applicable installation specifications of the Tile Council of America's "Handbook for Ceramic Tile Installation", latest edition.
 - B. Handle, store, mix and apply proprietary setting and grouting materials in compliance with the manufacturer's instructions.
 - C. Extend tile Work into recesses and under equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate Work neatly at obstructions, edges and corners without disruption of pattern or joint alignment.
 - D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight, aligned joints. Fit tile closely to electrical outlets, piping, and fixtures so that plates, collars, or covers overlap tile.
- 3.03 JOINTING PATTERN: Unless otherwise shown, lay tile in grid pattern. Align joints where adjoining tiles on floor, base, walls and trim are the same size. Layout tile Work and center tile fields both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise shown.
- 3.04 COLOR PATTERN: A simple color pattern shall be provided with approved color chart and sample submittal to Contractor using 3 or less colors on walls and floors.
- 3.05 CLEANING AND PROTECTION
- A. Cleaning: Clean grout and setting materials from face of tile while materials are workable. Leave tiles face clean and free of all foreign matter. Unglazed tile may be cleaned with acid solutions only when permitted by the tile and grout manufacturer's printed instructions, but not sooner than 14 days after installation. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of acid cleaning. Flush the surface with clean water before and after cleaning.
 - B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile Work.
 - C. Protection: When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile Work by covering with floor protection paper during the construction period to prevent damage and wear. Prohibit all foot and wheel traffic from using tiled floors for 7 days after installation. Before final inspection, remove protective covering and rinse neutral cleaner from all tile surfaces.

END OF SECTION

SECTION 09510

ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Lay-in acoustical panels (2'-0" by 2'-0" Grids) for metal ceiling suspension systems.
- B. Suspended metal grid system complete with wall trim.

1.02 RELATED SECTIONS

- A. Section 07210 – Building Insulation.
- B. Section 09250 – Gypsum Board.
- C. Section 15010 – Mechanical General.
- D. Section 16010 – Basic Electrical Requirements.

1.03 SUBMITTALS

- A. Manufacturer's product specifications, samples, and installation instructions for each acoustical ceiling material required, and for each suspension system, including certified laboratory test reports and other data as required to show compliance with these specifications. Include manufacturer's recommendations for cleaning and refinishing acoustical units, including precautions against materials and methods that may be detrimental to finishes and acoustical performances.

1.04 QUALITY ASSURANCE: Installer shall be a company with not less than 3 years of documented successful experience in installation of acoustical ceilings similar to requirements for this Project and acceptable to manufacturer of acoustical units, as shown by current written statement from manufacturer (required for approval).

1.05 PROJECT CONDITIONS

- A. Do not install interior acoustical ceilings until the following conditions are met:
 - 1. Space is enclosed and weatherproof.
 - 2. Wet work in space completed and nominally dry.
 - 3. Work above ceilings is completed.
 - 4. Ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.
- B. Maintain a light level of a minimum of 50 fc during entire installation.

1.06 PROJECT COORDINATION: It shall be this contractor's responsibility to coordinate with mechanical and electrical trades with respect to their requirements for additional suspension system components. Any additional components required shall be furnished and installed by this contractor.

- 1.07 MAINTENANCE STOCK: At time of completing installation, deliver stock of maintenance material to Owner. Furnish full size units matching units installed, packaged with protective covering for storage, and identified with appropriate labels. Furnish amount equal to 2 percent of acoustical units and exposed suspension installed.

PART 2 PRODUCTS

2.01 ACOUSTICAL PANELS

- A. Provide manufacturer's standard lay-in panels of type recommended by manufacturer for application indicated. Provide sizes shown by reflected ceiling plans or, if not otherwise indicated, 2'-0" by 2'-0" grid-size panels, with white washable finish.
- B. Mineral Fiber Acoustical Tile: Provide units with Intersept Antimicrobial solution (**Mold And Mildew Guard**) not less than 5/8-inch thick and of density not less than 10 pounds per cubic foot, medium-coarse non-directional texture, NRC 0.50 to 0.60, CAC 25 to 33, light reflectance over 75 percent. Products offered by manufacturers to comply with requirements include the following:
1. No. 770 Cortega Square Edge; Armstrong World Industries, Inc.
 2. Van-157 Vantage 10 Trim Edge ; BPB Celotex
 3. No. 560 Fissured Square Edge; U.S. Gypsum Co.

2.02 CEILING SUSPENSION MATERIALS

- A. Comply with ASTM C 635, as applicable to type of suspension system required for type of ceiling units indicated. Coordinate with other work supported by or penetrating through ceilings, including light fixtures, HVAC equipment, and partition system (if any). Structural Class of the system shall be intermediate-duty.
- B. Attachment Devices: Size for 5 times design load indicated in ASTM C 635, Table I, Direct Hung.
1. Hanger Wires: Galvanized carbon steel, ASTM A 641, soft temper pre-stretched, yield-stress load of at least 3 times design load, but not less than 12 gage (0.106 inch).
 2. Type of System: Either direct or indirect-hung suspension system, at Contractor's option.
 3. System Manufacturer: Same as acoustical unit manufacturer or one of the following:
 - a. Chicago Metallic Corp. Donn Corp.
 - b. W. J. Haertel Div.; Leslie-Locke.
 - c. National Rolling Mills Co. Roblin Building Products Roper.
 - d. Eastern Building Systems.
- C. Edge Moldings: Manufacturer's standard channel molding for edges and penetrations of ceiling, with single flange of molding exposed, white baked enamel finish unless otherwise indicated.

- D. Exposed Suspension System: Manufacturer's standard exposed runners, cross-runners and accessories, or types and profiles indicated, with exposed cross runners coped to lay flush with main runners. Provide uniform factory-applied finish on exposed surfaces of ceiling suspension system, including moldings, trim, and accessories. Use manufacturer's standard baked enamel finish, white unless otherwise selected by MDOT Architect.

2.03 MISCELLANEOUS MATERIALS

- A. Edge Trim Molding: Metal or extruded PVC plastic, of types and profiles indicated, white finish unless otherwise indicated.
- B. Hold-Down Clips: Where required for wind uplift resistance or fire-resistance rating, provide standard spring steel clips, except provide accessible type at locations indicated on drawings.

PART 3 EXECUTION

- 3.01 COORDINATION: Mechanical and electrical work above suspended ceiling shall be strictly coordinated with the work in this Section.
- 3.02 EXAMINATION: Installer must examine conditions under which acoustical ceiling work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.
- 3.03 PREPARATION: Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of acoustical ceilings. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans wherever possible.
- 3.04 INSTALLATION
 - A. Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations, fire resistance rating requirements as indicated, and industry standards applicable to the Work.
 - B. Install suspension systems to comply with ASTM C 636, with hangers supported only from building structural members. Locate hangers near each end and spaced 4 feet along each carrying channel or direct-hung runner, unless otherwise indicated, leveling to tolerance of 1/8 inch in 12 feet. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures.
 - C. Install edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units. Screw-attach moldings to substrate at intervals not over 16 inches on center and not more than 3 inches from ends, leveling with ceiling suspension system to tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.

- D. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations. Install hold-down clips in areas indicated, and in areas where required by governing regulations or for fire- resistance ratings; space as recommended by panel manufacturer, unless otherwise indicated or required.

3.05 ADJUSTING AND CLEANING

- A. Adjust sags or twists which develop in the ceiling system and replace parts that are damaged or faulty.
- B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09650

RESILIENT FLOORING

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Vinyl Composition Tile (V.C.T.) Flooring, Vinyl Base, and Accessories.
- 1.02 RELATED SECTIONS
 - A. Section 07260 – Vapor Retarders (Floor protection paper).
 - B. Section 09050 – Color Design.
- 1.03 SUBMITTALS
 - A. Submit manufacturer's product data and written instructions for recommended installation and maintenance practices for each type of resilient flooring and accessories.
 - B. Submit complete line of color samples for selection.
- 1.04 QUALITY ASSURANCE
 - A. Wherever possible, provide resilient flooring, adhesives, cleaners, polishes and accessories produced by a single manufacturer.
 - B. Secure the service of an experienced, professional floor service to provide necessary equipment and manpower to complete the Work.
- 1.05 PROJECT CONDITIONS: Continuously heat areas to receive flooring to 70 degrees F. for at least 48 hours prior to installation, when project conditions are such that heating is required. Maintain 70 degrees F. temperature continuously during and after installation as recommended by flooring manufacturer but not less than 48 hours. Maintain a minimum lighting level of 50 fc during installation.

PART 2 PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS
 - A. Drawings and specifications are based on products manufactured by Mannington Commercial, P.O. Box 12281, Calhoun, GA 30701, Tel. No. (800) 241-2262.
 - B. Equivalent products by the following manufacturers are acceptable:
 - 1. Armstrong Commercial Flooring, Lancaster, PA. Tel. No. (800) 292-6308.
 - 2. Azrock Commercial Flooring, Florence, AL. Tel. No. (800) 558-2240.
 - C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.
- 2.02 TILE FLOORING
 - A. Vinyl Composition Tile: ASTM F 1066: Composition 1, Class 2, Premium Visual Tile, Colorpoint as manufactured by Mannington Commercial.

- B. Size: 12 inches by 12 inches.
- C. Thickness: 1/8- inch gage.
- D. Color: Color to be selected by MDOT Architect from manufacturer's full range of Premium colors. Refer to Section 09050 – Color Design.

2.03 ACCESSORIES

- A. Provide rubber base complying with ASTM F-1861, Type TP, Group 1 (solid) Standard Specification for Resilient Wall Base, with matching end stops and preformed or molded corner units. Base shall be 4 inches high, 0.125-inch gage, length 120 feet, standard top-set cove.
- B. Resilient Edge Strips: 1/8-inch thick, homogenous vinyl of rubber composition, tapered or bullnose edge, color to match flooring, or as selected by MDOT Architect from standard colors available; not less than 1 inch wide.
- C. Adhesives (Cements): As recommended by flooring manufacturer to suit material and substrate conditions.
- D. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.

PART 3 EXECUTION

- 3.01 EXAMINATION: Installer shall examine the areas and conditions under which resilient flooring and accessories are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 PREPARATION

- A. Acclimate tile and base to job site conditions for at least 48 hours prior to installation. Prior to laying flooring, broom clean or vacuum surfaces to be covered and inspect subfloor. Start of flooring installation indicates acceptance of subfloor conditions and full responsibility for completed Work.
- B. Use leveling compound as recommended by flooring manufacturer for filling small cracks and depressions in subfloors.
- C. Perform moisture tests on concrete slabs to determine that concrete surfaces are sufficiently cured and ready to receive flooring. Apply concrete slab primer, if recommended by flooring manufacturer, prior to application of adhesive.

3.03 INSTALLATION

- A. Install flooring after finishing operations, including painting, have been completed and permanent-heating system is operating. Moisture content of concrete slabs, building air temperature and relative humidity must be within limits recommended by flooring manufacturer.

- B. Place flooring with adhesive cement in strict compliance with manufacturer's recommendations. Butt tightly to vertical surfaces, thresholds, nosings and edgings. Scribe around obstructions to produce neat joints, laid tight, even, and straight. Extend flooring into toe spaces, door reveals, and into closets and similar openings.
 - C. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent marking device.
 - 1. Install flooring on covers for telephone and electrical ducts, and other such items as occur within finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed in these covers.
 - 2. Tightly cement edges to perimeter of floor around corners and to corners. Tightly cement flooring to subbase without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections.
 - D. Tile Flooring: Lay tile from center marks established with principal walls, discounting minor off-sets, so that tile at opposite edges of the room are of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise shown. Match tiles for color and pattern by using tile from cartons in the same sequence as manufactured and packaged. Cut tile neatly to and around all fixtures. Broken, cracked, chipped or deformed tiles are not acceptable.
 - 1. Tightly cement tile to subbase without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks through tile, or other surface imperfections.
 - 2. **Lay Tile With Grain In All Tiles Running In The Same Direction.**
 - E. Accessories: Apply resilient base to walls, columns, pilaster, casework and other permanent fixtures in rooms or areas where base is required. Install base in as long lengths as practicable (continuous between openings and wall to wall), with preformed corner units. Tightly bond base to backing throughout the length of each piece, with continuous contact at horizontal and vertical surfaces. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at all unprotected edges of flooring, unless otherwise shown.
- 3.04 PATTERN: A simple color pattern shall be provided to Contractor with approved color chart and sample submittal using 3 or less colors.
- 3.05 CLEANING AND PROTECTION
- A. Initial Cleaning: Remove excess adhesive or other surface blemishes, using neutral type cleaners as recommended by flooring manufacturer.
 - B. Maintenance Immediately After Installation:
 - 1. Do not wash or scrub the floor for 5 days after installation to allow the floor tiles to bond to the underlayment / subfloor.
 - 2. Keep heavy furniture and equipment off the floor at least 48 hours to allow the adhesive to set.
 - 3. Sweep or vacuum thoroughly, and remove residual adhesive with a clean white cloth dampened with cleaners as recommended by flooring manufacturer.
 - 4. Apply 3 coats of manufacturers recommended high-quality cross-linked acrylic floor polish, allowing 60 minutes drying time between applications.
 - C. Protection: Protect installed flooring from damage by covering with floor protection paper.

- D. Finishing: After completion of project and just prior to final inspection of Work, scrub the floor using a good quality non-alkaline cleaner and a floor machine of 170-250 rpm equipped with a green or blue scrubbing pad.
1. Thoroughly rinse the floor (avoid flooding the floor) and allow the floor to dry completely.
 2. Apply 3 coats of manufacturers recommended high-quality, cross-linked acrylic floor polish, allowing 60 minutes between applications.
 3. After polish is completely dry, spray buff using a diluted (7 - 8 percent solids) floor polish. Before the liquid is dry, buff with a floor machine equipped with a white or tan buffing pad or a soft brush at 170-700 rpm. Buff until the liquid is dry and a thin glossy film remains.
 4. Protect completed Work from traffic and damage until acceptance by the Owner.

END OF SECTION

SECTION 09680

CARPET

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Broadloom carpet of Cut and Loop construction, tufted.
- B. Related Sections include the following:
 - 1. Division 9 Section "Color Design" for color selection.
 - 2. Division 9 Section "Resilient Flooring" for resilient wall base and accessories installed with carpet.

1.02 SUBMITTALS

- A. Samples:
 - 1. Submit two samples, 12 inches x 12 inches in size illustrating color and pattern for each carpet material specified.
 - 2. Samples: Submit finish and color samples of contour edge transition materials.
- B. Manufacturers Installation Instructions: Indicate special procedures.
- C. Maintenance Data: Include maintenance procedures; recommend maintenance material and suggested schedule for cleaning.
- D. Qualification Data: For Installer.

1.03 EXTRA MATERIALS

- A. Provide Owner with overage stock of 10% of Carpets.

PART 2 - PRODUCTS

2.01 CARPET

- A. Products: Subject to compliance with requirements, provide the following:

- 1. Manufacturer: Mannington

Style Name& Color:	R & D II Challenge (CHAL)
Pile Construction:	Textured Pattern Loop
Face Yarn:	63% Solution Dyed Nylon / 37% Yarn Dyed Nylon
Tufted Yarn Weight:	26 Ounces
Pile Thickness:	.155 inches
Gauge:	1/12
Stitched Per Inch:	11.33
Primary Backing:	100% Woven Synthetic
Secondary Backing	Integra HP With recycled content
Width:	12 ft.
Density:	6,038
Flammability:	Passes Methenamine Pill Test (ASTM-D-2859)
Flooring Radiant panel:	Meets NFPA Class 1 under ASTM-E-648

- B. Source: Mannington Commercial, 1844 US Highway 41 SE, Calhoun, GA 30701. Tel. (800) 241-2262.
- C. Equivalent products by the following manufacturers are acceptable:
 - 1. Bentley Prince Interface, Inc. City of Industry, CA. Tel. (800) 423-4709.
 - 2. Patcraft Commercial Carpet, Dalton, GA. Tel. (800) 241-4014.
- D. Alternate manufacturers: Materials produced by other manufacturers that fully meet or exceed the specified requirements may be considered under the provisions of Section 01630-Product Substitution Procedures

2.02 ACCESSORIES

- A. Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or as recommended by carpet manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet and carpet cushion manufacturers.
- C. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.
- D. Contact Adhesive: Compatible with carpet material; resealable type. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are smooth and flat with maximum variation not exceeding 1/4 inch in 10 feet and area ready to receive work.
- B. Examine substrate for moisture content and other conditions under which carpeting is to be installed, and notify the Contractor in writing of conditions detrimental to proper completion of the work.
- C. Verify that floor mounted utilities are in correct location.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless manufacturer requires more stringent requirements in their written instructions.

- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet manufacturer.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet.
- E. Sequence carpeting with other Work so as to minimize the possibility of damage and soiling of carpet during the remainder of the construction period.

3.03 INSTALLATION

- A. Comply with CRI 104 and carpet manufacturers' written installation instructions for the following:
 - 1. Direct-Glue-Down Installation: Comply with CRI 104, Section 9, and "Direct Glue-Down Installation."
- B. Double cut carpet to allow intended seam and pattern match. Make cuts straight and free of gaps.
- C. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- D. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device
- F. Cut and fit carpet tight to interruptions. Terminate carpet with edge strips at dissimilar materials.

3.04 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing carpet:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
 - 2. Remove excess adhesive from floor, base and wall surfaces without damage, using cleaning recommended by carpet manufacturer.
 - 3. Remove yarns that protrude from carpet surface.
 - 4. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 16, and "Protection of Indoor Installations."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer and carpet cushion and adhesive manufacturers.

3.05 Schedule: Refer to Drawings for extent of work in this Section.

END OF SECTION

SECTION 09725

VINYL WALL COVERING

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Vinyl coated fabric wallcovering as shown on the Drawings and Schedules. Provide type as selected by the Project Engineer / MDOT Architect. Types to be located as shown on the Drawings or as directed by the Project Engineer.
- 1.02 RELATED SECTIONS
 - A. Section 09250 – Gypsum Board.
 - B. Section 09050 – Color Design.
- 1.03 SUBMITTALS
 - A. Product Data: Submit manufacturer's technical data and installation instructions for each type of wallcovering and installation materials including adhesives. Transmit additional copy of each instruction to the installer.
 - B. Certifications: Test data certifying that the products meet the flame spread ratings and smoke development values specified herein in accordance with ASTM E – 84 TUNNEL TEST. (Surface burning characteristics of building materials) CLASS "A" FIRE RATED: Flame Spread 0-25 inclusive; Smoke Developed 0-50 inclusive.
 - C. Samples: Submit samples of each type of wallcovering to illustrate the range of color and pattern variation. Review of samples will be for design, color, texture and pattern only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
 - D. Maintenance Instructions: Submit wallcovering manufacturer's printed instructions for maintenance of the installed work. Include name of manufacturer, material brand name, color and texture designation, and precautions for the use of cleaning materials and methods that could damage the wallcovering.
- 1.04 QUALITY ASSURANCE
 - A. Installer Qualifications: Engage an experienced installer, with 5 years minimum experience, who has completed work similar to that indicated for this project and with a record of successful in- service performance.
 - B. Interface with Other Sub-Systems: Coordinate all components with adjacent or pertinent components of other systems to assure workable details, connections, clearances and tolerances. Before starting the Work and from time to time as Work progresses, examine shop drawings and installation of others insofar as it applies to work in this section. Notify the Project Engineer/Architect immediately in writing if any conditions exist which will prevent satisfactory results of the installation. Should Work start without such notification, it shall be construed as acceptance by the Contractor of all claims or questions as to the suitability of others to receive the Work.
- 1.05 PROJECT CONDITIONS: Maintain a constant minimum temperature of 60 degrees F. at areas of installation for a minimum of 72 hours before, and 48 hours after the application of wallcovering.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Comply with the manufacturer's instructions and recommendations and as herein specified. Deliver materials to the project site in original packages or containers clearly labeled to identify manufacturer, brand name, quality or grade, and fire hazard classification. Store materials in original undamaged packages or containers. Do not store wallcovering in an upright position.
- B. Store in an approved cool, dry location. Maintain temperature above 40 degrees F.

1.07 REPLACEMENT MATERIALS AND EXTRA STOCK: After completion of work, deliver to the project site not less than 5 lineal yards of each type, color and pattern of wallcovering installed. Furnish replacement materials from the same manufactured sequence as the material installed.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and Specifications are based on products manufactured by Eykon, Jackson, MS. Local Supplier is Eykon. Tel. (800) 222-7866.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. LEN – TEX Corporation, North Walpole, NH. 03609.
 - 2. VERSA Wallcovering, P.O. 32159, Louisville, Ky. 40232.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 MATERIALS

- A. Provide materials bearing the UL label and markings; with Class "A" Fire Rating.
- B. Comply with GSA Federal Specifications CCC-W408A&C for the type and class required. Comply with CFFA-W-101A&B Quality Standard for Vinyl Coated Fabric Wallcovering. Comply with the requirements of ASTM D 1308 b for determining stain resistance.
- C. Wallcovering color, pattern and texture as selected by the Project Engineer/Architect from Type I, Light Duty or Type II, Medium Duty. Refer to Room Finish Schedule on the Drawing for types required. Three or less patterns shall be selected from the same manufacturer.

2.03 ADHESIVE: Provide manufacturer's recommended strippable type adhesive, primer and sealer, manufactured expressly for use with the selected wallcovering. Materials shall be mildew resistant and nonstaining. Adhesive shall permit removal of wallcovering from gypsum drywall surfaces without damage to paper facing,

2.04 DATA SHEETS/SCHEDULE: Each type of vinyl wallcovering is specified by wallcovering data sheets as follows:

A. VWC #1

Manufacturer: Illusion Wall-covering
 Style: 2VIL-04 Linen
 Weight: 20 oz.
 Width: 53/54 inches
 Ratings: Class "A"

This vinyl wall-covering is for walls in Lobby #101

B. VWC #2

Manufacturer: Excursions Wall-covering
 Style: 2RO164 Misty Stripe
 Weight: 20 oz.
 Width: 54 inches
 Rating: Class "A"

This vinyl wall-covering is for walls in interior Corridors #102, 116A and 116B.

PART 3 EXECUTION

3.01 EXAMINATION: Installer shall examine the areas and conditions under which wallcovering is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer. Install specified materials only when normal temperature and humidity conditions approximate the interior conditions that will exist when building is occupied.

3.02 PREPARATION: Remove wallcovering materials from its packaging and allow to acclimatize to the area of installation 24 hours before application. Remove switch plates, wall plates, and surface mounted fixtures, where wallcovering is to be applied. Prime and seal substrates in accordance with the wallcovering manufacturer's recommendations for the type of substrate material to be covered.

3.03 INSTALLATION

A. Place wallcovering panels consecutively in order they are cut from rolls, including filling of spaces above or below openings. Hang by reversing alternative strips except on match patterns.

B. Apply adhesive to back of wallcovering and place in accordance with manufacturer's instructions. Install seams vertically and plumb, and at least 6" away from any corner, horizontal seams will not be permitted. Place wallcovering continuously over internal and external corners. Overlap seams and double cut to assure tight closure. Do not use double cut method if manufacturer recommends another type method of installation. Roll, brush, or use broad knife to remove air bubbles, wrinkles, blisters and other defects. Cut wallcovering evenly to the edges of outlet boxes or supports

C. Trim selvages as required to assure color uniformity and pattern match at seams. Remove excess adhesive along finished seams using manufacturer's recommended methods. Install wallcovering with an intimate substrate bond, smooth, clean, without wrinkles, gaps and overlaps. Install removed plates and fixtures to assure cut edges of wallcovering are completely concealed.

3.04 CLEANUP

- A. Clean up all adhesive, finger marks, and dirt off exposed surfaces wherever it occurs. Absolutely no loose wallcovering with glue on face will be permitted.
- B. Upon completion of work, remove surplus materials, rubbish and debris resulting from wallcovering installation and leave areas of work in a neat, clean condition.

END OF SECTION

SECTION 09900

PAINTS AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Painting and finishing of exterior and interior exposed items and surfaces throughout the project, except as otherwise indicated. Surface preparation, priming and finish coats specified in this Section are in addition to shop priming and surface treatment specified under other Sections of the Work.
- B. The Work includes field painting of exposed bare and covered pipes and ducts (including color coding), and of hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under the mechanical and electrical Work, except as otherwise indicated.
- C. "Paint" means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
- D. Paint all exposed surfaces whether or not colors are designated in "schedules", except where the natural finish of the material is specifically noted as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas. If color or finish is not designated, the Project Engineer / MDOT Architect will select these from standard colors available for the materials system specified.

1.02 PAINTING NOT INCLUDED: The following categories of Work are not included as parts of the field-applied finish Work, or are included in other Sections of these Specifications.

- A. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under the various Sections for structural steel, miscellaneous metal, hollow metal work, and similar items. Also, for fabricated or factory-built mechanical and electrical equipment or accessories.
- B. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer finishing is specified for such items as (but not limited to) plastic toilet enclosures, prefabricated partition systems, acoustic materials, architectural woodwork and casework, finished mechanical and electrical equipment including light fixture, switch-gear and distribution cabinets, elevator entrance frames, door and equipment.
- C. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundations spaced, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.
- D. Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting, unless otherwise indicated.
- E. Operating Parts and Labels: Moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting, unless otherwise indicated. Do not paint over any code-required labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

- 1.03 RELATED SECTIONS: Section 09050 – Color Design.
- 1.04 SUBMITTALS
- A. Product Data: Submit manufacturer's technical information including basic materials analysis and application instructions for each coating material specified.
 - B. Paint Systems: Comply with Article 2.04 indicating each type of primer and top coat required for each substrate by product name and number.
 - C. Samples: Submit color samples for selection by Project Engineer / MDOT Architect from manufacturer's full range of colors. Indicate submitted manufacturer's closest **Standard** colors that match colors specified in Section 09050.
- 1.05 QUALITY ASSURANCE: On actual wall surfaces and other exterior and interior building components, duplicate painted finishes as specified. On at least 100 square feet of surface as directed, provide full-coat finish samples until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in-place Work.
- 1.06 DELIVERY, STORAGE AND HANDLING
- A. Deliver all materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label, and the following information:
 - 1. Name or title of material.
 - 2. Fed. Spec. Number, if applicable.
 - 3. Manufacturer's stock number and date of manufacturer.
 - 4. Manufacturer's name.
 - 5. Contents by volume, for major pigment and vehicle constituents.
 - 6. Thinning instructions.
 - 7. Application instructions.
 - 8. Color name and number.
 - B. Store materials under cover, protected from inclement weather and adverse temperature extremes, in original containers or unopened packages, in accordance with manufacturer's instructions.
- 1.07 PROJECT CONDITIONS
- A. Apply water-base paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F. and 90 degrees F. unless otherwise permitted by the paint manufacturer's printed instructions.
 - B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 degrees F. and 95 degrees F. unless otherwise permitted by the paint manufacturer's printed instructions.
 - C. Do not apply paint in snow, rain, fog or mist; or when the relative humidity exceeds 85 percent; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instruction. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and Specifications are based on products manufactured by the Sherwin-Williams Company, 101 Prospect Avenue NW, Cleveland, OH 44115. Tel. (800) 321-8194.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Devoe Cleveland, OH. Tel. (888) 265-6753.
 - 2. Benjamin Moore & Company, Montvale, NJ. Tel. (800) 344-0400.
 - 3. Farrell-Calhoun Paint, Memphis, TN. Tel. (901) 526-2211.
 - 4. ICI Dulux Paints, Cleveland, OH. Tel. (800) 984-5444.
 - 5. PPG Architectural Finishes, Inc., Pittsburgh, PA. Tel. (800) 441-9695.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures

2.02 COLORS AND FINISHES

- A. Paint colors, surface treatments, and finishes will be selected from color chips submitted by contractor. Prior to beginning Work, the Project Engineer / MDOT Architect will select color chips for surfaces to be painted. Use representative colors when preparing samples for review. Final acceptance of colors will be from samples.
- B. Color Pigments: Pure, non-fading, applicable types to suit the substrates and service indicated. Lead content in the pigment, if any, is limited to contain not more than 0.5 percent lead, as lead metal based on the total non-volatile (dry-film) of the paint by weight.
- C. Paint Coordination: Provide finish coats which are compatible with prime paints used. Review other sections of these Specifications in which prime paints are to be provided to ensure compatibility of total coats system for various substrates. Upon request from other trades, furnish information on characteristics of finish materials provided for use, to ensure compatible prime coats are used. Provide barrier coats over incompatible primer or remove and reprime as required. Notify the Project Engineer / MDOT Architect in writing of any anticipated problems using specified coating systems with substrates primed by others.

2.03 MATERIAL QUALITY

- A. Provide the best quality grade of the various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying the manufacturer's identification as a standard, best grade product will **Not** be acceptable. Proprietary names used to designate colors or materials are not intended to imply that products of the named manufacturers are required to the exclusion of equivalent products of other manufacturers.
- B. Provide undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only within recommended limits.

2.04 PAINT SYSTEMS: Provide the following paint systems for the various substrates, as indicated.

A. Exterior Paint Systems are as follows:

1. Ferrous and Zinc Coated Metal
 - 1st Coat – S-W DTM Acrylic Primer/Finish, B66W1
(6 mils wet, 3 mils dry)
 - 2nd Coat – S-W DTM Acrylic Semi-Gloss Coating, B66-200 Series
 - 3rd Coat – S-W DTM Acrylic Semi-Gloss Coating, B66-200 Series
(2-4 mils dry per coat)
 - (First coat may not be required on items that are shop primed.)
 - Not less than 9.0 mils dry film thickness.
2. Concrete Walls:
 - 1st Coat – S-W Loxon® Exterior Acrylic Masonry Primer, A24W300
(8 mils wet, 3.2 mils dry)
 - 2nd Coat – S-W A-100® Exterior Latex Flat, A6 Series
 - 3rd Coat – S-W A-100® Exterior Latex Flat, A6 Series
(4 mils wet, 1.4 mils dry per coat)

B. Interior Paint Systems are as follows:

1. Gypsum Drywall
 - 1st Coat – S-W PrepRite® 200 Latex Primer, B28W200
(4 mils wet, 1.2 mils dry)
 - 2nd Coat – S-W ProMar® 200 Alkyd Semi-Gloss, B34W200 Series
 - 3rd Coat – S-W ProMar® 200 Alkyd Semi-Gloss, B34W200 Series
(4 mils wet, 1.7 mils dry per coat)
 - Not less than 4.6 mils dry film thickness.
2. Gypsum Drywall (in wet areas)
 - 1st Coat – S-W PrepRite® 200 Latex Primer, B28W200
(4 mils wet, 1.2 mils dry)
 - 2nd Coat – S-W Tile-Clad® HS Epoxy, B62WZ100 Series
 - 3rd Coat – S-W Tile-Clad® HS Epoxy, B62WZ100 Series
(2.5-4 mils dry per coat)
 - Not less than 6.5 mils dry film thickness.
3. Concrete Masonry Units (Typical except for Laboratory applications)
 - 1st Coat – S-W Heavy Duty Block Filler, B42W46
(50 - 80 sq ft/gal)
 - 2nd Coat – S-W ProMar® 200 Alkyd Semi-Gloss, B34W200 Series
 - 3rd Coat – S-W ProMar® 200 Alkyd Semi-Gloss, B34W200 Series
(4 mils wet, 1.7 mils dry per coat)
 - Apply filler coat at a rate to ensure complete coverage with all pores filled. Not less than 3.5 mils dry film thickness, excluding first coat.
4. Concrete Masonry Units (Epoxy at **Laboratory** Applications)
 - 1st Coat – S-W PrepRite® Masonry Primer, B28W300
(7 mils wet, 3 mils dry)
 - 2nd Coat – S-W MacroPox 646 Fast Cure Epoxy, B58-600 / B58V600
 - 3rd Coat – S-W MacroPox 646 Fast Cure Epoxy, B58-600 / B58V600
(5.0 – 10.0 mils dry per coat)

5. Ferrous and Zinc Coated Metal (Typical except for Laboratory applications)
 - 1st Coat – S-W DTM Acrylic Primer/Finish, B66W1
(6 mils wet, 3 mils dry)
 - 2nd Coat – S-W DTM Acrylic Semi-Gloss Coating, B66-200 Series
 - 3rd Coat – S-W DTM Acrylic Semi-Gloss Coating, B66-200 Series
(2-4 mils dry per coat)
 - Not less than 8.0 mils dry film thickness.
6. Ferrous and Zinc Coated Metal: (**Laboratory** applications)
 - 1st Coat – S-W DuraPlate 235 Epoxy Coating, B67-235 / B67V235
(2.0 - 4.0 mils dry per coat)
 - 2nd Coat – S-W MacroPoxy 646 Fast Cure Epoxy, B58-600 / B58V600
 - 3rd Coat – S-W MacroPoxy 646 Fast Cure Epoxy, B58-600 / B58V600
(5.0 – 10.0 mils dry per coat)
 - Not less than 12.0 mils dry film thickness total coverage.
7. Painted Woodwork (Typical except for Laboratory applications)
 - 1st Coat – S-W PrepRite® Wall & Wood Oil Primer/Undercoater, B49
(4 mils wet, 2 mils dry)
 - 2nd Coat – S-W ProMar® 200 Alkyd Semi-Gloss, B34W200 Series
 - 3rd Coat – S-W ProMar® 200 Alkyd Semi-Gloss, B34W200 Series
(4 mils wet, 1.7 mils dry per coat)
 - Not less than 5.5 mils dry film thickness.
8. Painted Woodwork: (**Laboratory** applications)
 - 1st Coat – S-W PrepRite® Classic Primer, B28W101
(4 mils wet, 1.6 mils dry)
 - 2nd Coat – S-W MacroPoxy 646 Fast Cure Epoxy, B58-600 / B58V600
 - 3rd Coat – S-W MacroPoxy 646 Fast Cure Epoxy, B58-600 / B58V600
(5.0 – 10.0 mils dry per coat)
 - Not less than 12.0 mils dry film thickness total coverage.
9. Stained Woodwork
 - 1st Coat – S-W Wood Classics Oil Stain, A49 Series
(450-500 sq ft/gal)
 - 2nd Coat – S-W Wood Classics Polyurethane Varnish, A67 Series
 - 3rd Coat – S-W Wood Classics Polyurethane Varnish, A67 Series
(350-400 sq ft/gal)

PART 3 EXECUTION

3.01 EXAMINATION

- A. Applicator must examine the areas and conditions under which painting Work is to be applied and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Applicator. Starting of painting Work will be construed as the Applicator's acceptance of the surfaces and conditions within any particular area.
- B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to the formation of a durable paint film.

3.02 SURFACE PREPARATION: Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for the complete painting of the items and adjacent surfaces. Following completion of painting of each space or area, re-install the removed items by workmen skilled in the trades involved. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Schedule the cleaning and painting so that contaminants from the cleaning process with not fall onto wet, newly painted surfaces.

A. Ferrous Metals:

1. Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
2. Touch-up shop-applied prime coats wherever damaged or bare. Where required by other Sections of these Specifications, clean and touch-up with the same type shop primer.

B. Galvanized Surfaces: Clean free of oil and surface contaminants with acceptable non-petroleum based solvent.

C. Wood: Clean wood surfaces to be painted of all dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer before application of the priming coat.

1. Prime, stain, or seal wood required being job-painted, immediately upon delivery to job. Prime edges, ends, faces, under sides, and backsides of such wood, including cabinets, counters, cases, paneling, etc. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dry.
2. When transparent finish is required, use spar varnish for backpriming. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or equivalent sealer immediately upon delivery to project.

3.03 MATERIALS PREPARATION: Mix and prepare painting materials in accordance with manufacturer's directions. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue. Stir materials before application to produce a mixture of uniform density, and stir as required during the application of the materials. Do not stir surface film into the material. Remove the film and if necessary, strain the material before using.

3.04 APPLICATION

- A. Apply paint in accordance with the manufacturer's directions. Use applicators and techniques best suited for the substrate and type of material being applied. Apply additional coats when undercoats, stains or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. Give special attention to insure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

- B. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint. Paint the back- sides of access panels, and removable or hinged covers to match the exposed surfaces.
- C. Finish exterior doors on tops, bottoms and side edges the same as the exterior faces, unless otherwise indicated.
- D. Sand lightly between each succeeding enamel or varnish coat.
- E. Omit the first coat (primer) on metal surfaces that have been shop-primed and touch-up painted, unless otherwise indicated or barrier coat is required for compatibility.
- F. Scheduling Painting: Apply the first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration. Allow sufficient time between successive coatings to permit proper drying. Do not re-coat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- G. Minimum Coating Thickness: Apply each material at not less than the manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.
- H. Mechanical and Electrical Work: Painting of mechanical and electrical Work is limited to those items exposed in mechanical equipment rooms and in occupied spaces.
 - 1. Mechanical items to be painted include, but are not limited to, the following:
 - a. Piping, pipe hangers, and supports.
 - b. Heat exchangers.
 - c. Tanks.
 - d. Ductwork.
 - e. Motor, mechanical equipment and supports.
 - f. Accessory items.
 - 2. Electrical items to be painted include, but are not limited to, the following;
 - a. Conduit and fittings.
 - b. Switchgear.
- I. Prime Coats: Apply a prime coat of material which is required to be painted or finished, and which has not been prime coated by others. Re-coat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
- J. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, or other surface imperfections will not be acceptable.
- K. Transparent (Clear) Finishes: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections. Provide satin finish for final coats, unless otherwise indicated.

- L. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint Work not in compliance with specified requirements.

3.05 CLEANING AND PROTECTION

- A. Cleaning: During the progress of the Work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each workday. Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- B. Protection: Protect Work of other trades, whether to be painted or not, against damage by painting and finishing Work. Correct any damage by others for protection of their Work, after completion of painting operations. At the completion of Work of other trades, touch-up and restore all damaged or defaced painted surfaces.

END OF SECTION

SECTION 09964

HIGH-PERFORMANCE FLOOR COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES: A trowel-applied, multi-colored epoxy surfacer designed to be a decorative and protective overlay for concrete floors including seal coats and cove base.

1.02 RELATED SECTIONS: Section 09050 – Color Design.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information including basic materials analysis, performance properties, and application instructions for each coating material specified and maintenance instructions.
- B. Samples: Provide samples of each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate. Resubmit samples as requested until the required sheen, color and texture is achieved.

1.04 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide primers and undercoat material produced by the same manufacturer as the finish coats. Use only thinners recommended by the manufacturer, and only within recommended limits.
- B. Coordination of Work: Review sections in which other coatings are provided to ensure compatibility of the total systems for various substrates. Upon request, furnish information on characteristics of specified finish materials, to ensure that compatible prime coats are used. Notify the Project Architect of problems anticipated using the coatings systems specified.
- C. Field Samples:
 - 1. On actual floor surfaces, duplicate coating finishes of prepared samples. Provide full-coat finish samples on at least 20 square feet of surface, until required sheen, color, and texture are obtained; simulate finished lighting conditions for review of in-place Work. Final acceptance of colors will be from job applied samples.
 - 2. The Project Architect will select one area or surface to represent surfaces and conditions for each type of coating and substrate to be coated. Apply coatings in this area or surface in accordance with the schedule, or as specified. After finishes are accepted, this room, area or surface will be used for evaluation of coating systems of a similar nature.
- D. Applicator: Work shall be performed by a firm with not less than 5 years successful experience in special coating applications employing personnel skilled in the application processes and operation indicated. The firm is to be licensed by the State of Mississippi as a special coatings contractor. The applicator shall be certified by the manufacturer as qualified to install the manufacturer's product.
- E. Manufacturer Qualifications: A firm with not less than ten years successful experience in producing chemically resistant coating materials.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the job site in the manufacturer's original, new, unopened packages and containers bearing manufacturer's name and label and the following information:

1. Name or title of material.
2. Federal Specification number, if applicable.
3. Manufacturer's name, stock numbers and dates of manufacture.
4. Contents by volume, for major pigment and vehicle constituents.
5. Thinning and application instructions.
6. Color name and number.
7. Handling instructions and precautions.

- B. Store materials not in actual use in tightly covered containers maintained between 60 to 85 degrees F. Maintain containers used in storage of coatings in a dry, clean condition, free of foreign materials and residue. Protect from freezing and moisture. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary precautionary measures to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of coatings.

- 1.06 PROJECT CONDITIONS: Apply coatings only when the temperature of surfaces to be coated and surrounding air temperatures are above 60 degrees F, unless otherwise permitted by manufacturer's printed instructions. Do not apply coatings in snow, rain, fog or mist, or when the relative humidity exceeds 50 percent, or to damp or wet surfaces unless otherwise permitted by manufacturer's printed instructions. Allow wet surfaces to dry thoroughly and attain the temperature and conditions specified before proceeding with or continuing the coating operation. Prior to application concrete substrate shall have cured 30 days and pass ASTM-D 4263 moisture test. Concrete substrate shall contain no curing compounds or accelerators. Concrete shall have a light broom finish, and be free of grease or laitance.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and Specifications are based on MasterQuartz DQS Decorative Quartz Surfacing as manufactured by Polymerica, Inc., 609 Fertilla Street, Carrollton, GA 30117. Tel. (800) 762-1678.

- B. Equivalent products by the following manufacturers are acceptable:

1. International Coatings, Inc., Franklin Park, IL. Tel. (800) 624-8919.
2. Valspar-Federal Flooring, Chicago, IL. Tel. (800) 637-7793.

- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures

- 2.02 COATING MATERIALS: MasterQuartz DQS is installed at a nominal 3/16 inch to 1/4 inch thickness consisting of the following:

- A. MasterShield IEP 100 percent solids penetrating primer.
- B. MasterQuartz DQS trowel applied epoxy/quartz surfacer.

- C. MasterShield CRB-OP seal coat.
 - D. MasterShield CRB-OP final coat for a clear, chemically resistant, orange peel finish.
- 2.03 CONTROL JOINT MATERIAL: JointMaster CJC semi-rigid, stress-relieving epoxy joint filler.
- 2.04 WATERPROOFING: MasterProof EWM liquid applied, 100 percent solids elastomeric compound.

PART 3 EXECUTION

- 3.01 EXAMINATION: Installer must examine areas and conditions under which this Work is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- 3.02 PREPARATION: Provide surface-applied protection to walls prior to surface preparation and coating.
- A. Clean surfaces before applying coatings or surface treatments. Schedule cleaning and coating application so dust and other contaminants will not fall on wet, newly coated surfaces.
 - B. Surface Preparation: Perform surface preparation and cleaning in compliance with the manufacturer's instructions for the particular substrate conditions, and as specified. No sandblasting will be allowed. Notify the Project Architect in writing of anticipated problems using coatings specified with substrates primed or finished by others.
 - C. Clean all surfaces, remove oil, grease, dirt, loose mill scale, bitumen, and other foreign substances.
- 3.03 MATERIAL PREPARATION: Carefully mix and prepare materials in compliance with the coating manufacturer's directions. Do not exceed recommended pot life depending on temperature and humidity.
- 3.04 APPLICATION: Apply coatings in accordance with manufacturer's directions. Use applicators best suited for the material being applied. Provide finish coats compatible with the primers used.
- A. The number of coats and film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer.
 - B. Coat surfaces under movable equipment and furniture the same as similar exposed surfaces.
 - C. Minimum Coating Thickness: Apply each material at not thinner than the manufacturers recommended minimum wet mil thickness and spreading rate. Provide total dry film thickness of the entire system.

- D. Waterproofing: Concrete floors on or below grade shall be adequately waterproofed beneath and at the perimeter of the slab. Apply 2 coats at a minimum of 25 mils DFT in compliance with manufacturer's directions.
- E. Primer: Components shall be squeegee-applied, then back-rolled with a short nap roller.
- F. Surfer: Components shall be mixed and screeded to a uniform thickness, then finished by hand or power trowel in strict accordance with manufacturer's instructions.
- G. Seal Coat: Components shall be mixed and squeegee-applied, then back-rolled with a short nap roller. Application rate shall be 100-125 square feet per gallon.
- H. Final Coat: Components shall be mixed and squeegee-applied, then back-rolled to achieve an orange peel finish. Application rate shall be 175-200 square feet per gallon.
- I. Integral Cove Base: Cove base shall be installed integral with the floor in 4-inch height.
- J. Control Joints: Where the overlayment covers control joints in the substrate, a joint shall be saw cut into the finished cured floor, and filled JointMaster CJC in accordance with manufacturer's instructions.
- K. Chasing: All areas in which the installed overlayment does not abut against a vertical surface shall be chased. The chase shall be 3/4-inch wide with the outside edge chiseled to a straight saw cut with a minimum depth of 1/2-inch. Prime and trowel surfer into chase along with rest of floor in accordance with manufacturer's instructions.
- L. Cracks: All cracks shall be routed out to 1/4-inch minimum width and depth and filled with JointMaster EJC elastomeric joint compound in accordance with manufacturer's instructions.
- M. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or recoat work not in compliance with specified requirements.

3.05 FIELD QUALITY CONTROL

- A. The Project Engineer reserves the right to invoke the following test procedure at any time, and as often as he deems necessary, during the period when coating operations are being conducted. The Engineer will engage the services of an independent testing laboratory to sample the coating being used. Samples of material delivered to project site will be taken, identified and sealed, and certified in the presence of the Contractor.
- B. The independent testing laboratory will perform appropriate tests for the following characteristics as required by the Owner:
 - 1. Quantitative materials analysis.
 - 2. Absorption.
 - 2. Accelerated weathering and Color retention.
 - 4. Alkali and mildew resistance.
 - 5. Abrasion resistance.
 - 6. Apparent reflectivity.
 - 6. Washability.
 - 8. Re-coating.
 - 9. Skinning.

- C. If the results show materials being used do not comply with requirements, the Contractor may be directed to stop Work. One or more of the following shall then be done:
 - 1. Remove non-complying materials.
 - 2. Pay for testing.
 - 3. Re-coat surfaces coated with rejected materials.
 - 4. Remove rejected materials from previously coated surfaces if, upon re-coating with specified materials, the two coatings are not compatible.

3.06 CLEANING

- A. At the end of each workday, remove rubbish, empty cans, rags and other discarded materials from the site.
- B. Upon completion of work, clean walls and spattered surfaces. Remove spattered coatings by washing, scraping or other proper methods, using care not to scratch or damage adjacent finished surfaces.

3.07 PROTECTION

- A. Protect work of other trades, whether to be coated or not, against damage from coating. Provide protection of existing buildings and equipment, landscaping, site improvements, vehicles, and other personal property in the area of construction. Correct damage by cleaning, repairing, replacing, and re-coating as acceptable to the Project Architect. Leave in an undamaged condition.
- B. Provide "Wet Paint" signs to protect newly coated finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of coating operations.
- C. At completion of construction activities of other trades, touch-up and restore damaged or defaced coated surfaces.

END OF SECTION

SECTION 10100

VISUAL DISPLAY BOARDS

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Visual display boards as described in this section. Types specified in this section include Tackboards and Markerboards.
- 1.02 RELATED SECTIONS: Section 09050 – Color Design.
- 1.03 SUBMITTALS: Submit manufacturer's technical data and installation instructions for each material and component part, including data substantiating materials comply with requirements.
- A. Samples: Submit full range of color samples for each type of visual display board, surface, trim and accessories required. Provide 12-inch square samples of sheet materials and 12-inch lengths of trim members for color verification after selections have been made.
 - B. Shop Drawings: Submit for each type of visual display board. Include sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcement, accessories, and installation details.
 - C. Certification: Submit manufacturer's certification that all materials furnished for Project complies with requirements specified herein.
- 1.04 QUALITY ASSURANCE: Unless otherwise acceptable to MDOT Architect, furnish all visual display boards by one manufacturer for entire project.
- A. Fire Hazard Classification: Provide tackboard surfaces which have been tested in accordance with ASTM E-84 and have been certified as complying with the following fire hazard classifications: Flame spread not more than 25. Fuel contributed not more than 25. Smoke developed not more than 25.
 - B. Field Measurements: Take field measurements prior to preparation of Shop Drawings and fabrication where possible, to ensure proper fitting of Work. However, allow for trimming and fitting wherever taking of field measurements before fabrication might delay Work.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on products manufactured by Claridge Products and Equipment, Inc., P.O. Box 910, Harrison, AR 72602. Tel. (870) 743-2200.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Draper, Inc., Spiceland, IN. Tel. (765) 987-7999.
 - 2. March Industries, Inc., Dover, OH. Tel. (330) 343-8825.
 - 3. NACO, Corona, CA. Tel. (909) 340-2800.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures

2.02 MATERIALS

- A. Tackboard: Equal to Claridge Series # 1 type "CO" factory built tackboard. Tackboard is Claridge 1/4-inch Cork on 1/4 inch Hardboard, color as selected by MDOT Architect from manufacturer's standards. Size to be 4 feet by 6 feet. Two units required unless additional units are indicated on the Drawings.
- B. Marker Board: Equal to Claridge Series #LCS-2000-R type "A" factory built marker board with map rail with tan cork insert, jamb trim, and chalk trough with end closures. LCS = porcelain enamel liquid chalk surface on Duracore with 0.002 aluminum foil back approx. 1/2 inch thick overall, color # 32 white. Extruded aluminum trim to have anodized satin finish. Include standard eraser and assorted LCS markers. Size to be 4 feet by 6 feet. Four units required unless additional units are indicated on the Drawings.

PART 3 EXECUTION

- 3.01 EXAMINATION: Installer shall examine areas and conditions under which units are to be installed and notify Contractor in writing of conditions detrimental to proper and timely completion of Work. Do not proceed with Work until unsatisfactory conditions have been corrected in manner acceptable to Installer.
- 3.02 INSTALLATION: Deliver factory-built units completely assembled in one piece without joints, whenever possible. Where dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to MDOT Architect. When overall dimensions require delivery in separate units, pre-fit at factory, disassemble for delivery, and make final joints at site. Use splines at joints to maintain surface alignment.
 - A. Install units in locations and mounting heights as shown on Drawings and in accordance with manufacturer's instructions, keeping perimeter lines straight, plumb, and level. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories for complete installation. If units are not shown on Drawings, install units in locations as directed by Project Engineer.
 - B. Coordinate job-assembled units with grounds, trim, and accessories. Join all parts with neat, precision fit.
- 3.03 ADJUSTING AND CLEANING
 - A. Verify accessories required for units are properly installed.
 - B. Clean units in accordance with manufacturer's instructions, breaking in only as recommended.

END OF SECTION

SECTION 10170

SOLID PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Solid plastic, floor-mounted, overhead braced toilet compartments and wall-hung urinal screens.
- 1.02 RELATED SECTIONS: Section 09050 – Color Design.
- 1.03 SUBMITTALS
 - A. Product Data: Submit manufacturer's sample warranty, color charts and detailed technical data for materials, fabrication, and installation, including catalog cuts of anchors, hardware, fastenings, and accessories.
 - B. Shop Drawings: Submit job-specific shop drawings for fabrication and erection of toilet compartment assemblies not fully described by product drawings, templates, and instructions for installation of anchorage devices built into other Work.
- 1.04 QUALITY ASSURANCE
 - A. Field Measurements: Take field measurements prior to preparation of Shop Drawings and fabrication where possible, to ensure proper fitting of Work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.
 - B. Coordination: Furnish inserts and anchorage, which must be built into other work for installation of toilet partitions and related work; coordinate delivery with other work to avoid delay.
- 1.05 DELIVERY, STORAGE AND HANDLING: Upon receipt of toilet partitions and other materials, installer shall examine the shipment for damage and completeness. Materials shall be stored in a clean, dry place. Stack all materials to prevent damage.
- 1.06 WARRANTY: Manufacturer to supply a written warranty covering all plastic components against breakage, warping, corrosion and delamination for a period of 15 years.

PART 2 PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS
 - A. Drawings and Specifications are based on products manufactured by Comtec Industries, 801 Corey Street, Moosic, PA, 18507. Tel. (800) 445-5148.
 - B. Equivalent products by the following manufacturers are acceptable:
 - 1. General Partitions, Erie, PA. Tel. (814) 833-1154.
 - 2. Knickerbocker Partition Corp, Freeport, NY. Tel. (516) 546-0550.
 - 3. The Mills Company, Willoughby, OH. Tel. (440) 951-8877.
 - 4. Rockville Partitions, Pisgah, AL. Tel. (256) 451-1300.
 - 5. Santana Products Co., Inc., Scranton, PA. Tel (510) 343-7921.
 - C. Substitutions shall fully comply with specified requirements and Section 01630 - Product Options and Substitution Procedures.

2.02 MATERIALS

- A. General: Provide materials that have been selected for surface flatness and smoothness. Exposed surfaces that exhibit pitting, seam marks, roller marks, stains, discoloration, telegraphing of core material, or other imperfections on finished units are not acceptable.
- B. Doors, partitions, pilasters and urinal screens shall be fabricated from High Density Polyethylene (HDPE) material manufactured under high pressure forming a single component section which is waterproof, non- absorbent and has a self-lubricating surface that resists marring with pens, pencils or other writing utensils. All to arrive at job site with special protective plastic covering.
- C. Characteristics: Dual component compression molded High Density Polyethylene (HDPE) of solid virgin resin materials in colors that extend throughout the surface; doors, partitions and pilaster shall have (HDPE) as the core material).
 - 1. Doors, partitions, pilasters and urinal screens shall be a minimum of 1 inch thick and all edges machined to a radius of 0.250 inch and all exposed surfaces to be free of saw marks.
 - 2. Doors and dividing panels shall be 55 inches high and mounted 14 inches above the finish floor.
 - 3. Pilasters shall be 82 inches high and fastened into a 3-inch high stainless steel pilaster shoe with a stainless steel, torx head sex bolt.
 - 4. Urinal screens shall be 24 inches wide X 42 inches high with 41 inch continuous aluminum wall brackets.
 - 5. Finish shall be similar and equal to Comtec Designer Series D400. Color of doors and pilasters to be selected by the MDOT Architect from Manufacturer's full color range.
 - 6. Aluminum (heat sinc) edging strips to be fastened to the bottom edge of all doors and panels using vandal proof stainless steel fasteners.

2.03 HARDWARE

- A. Door hardware: Door hardware shall be as follows:
 - 1. Hinges shall be manufacturer's aluminum continuous for door height.
 - 2. Each door shall be supplied with one coat bumper / hook made of chrome plated zamak. Each handicapped door to include one door pull and one wall stop.
 - 3. Door strike and keeper shall be fabricated from heavy-duty aluminum extrusion (6463-T5 alloy) with clear anodized finish with wrap around flange surface mounted and through bolted to pilaster with one-way sex bolts. Size of strike shall be 6 inches in length.
 - 4. Door latch housing shall be fabricated from heavy-duty aluminum extrusion (6463-T5 alloy) with clear anodized finish; surface mounted and through bolted to door with one-way sex bolts. Slide bolt and button shall be heavy aluminum with a black anodized finish.
- B. Wall Brackets: Wall brackets shall be full-length continuous aluminum. Brackets shall be used for all pilasters to pilaster and pilasters to wall connections. Attach brackets to adjacent wall construction with No. 14 by 1-1/2 inch stainless steel Phillips head screws. Anchor screws directly behind the vertical edge of pilasters at 12-inch intervals along the full length of bracket and at each 12-inch interval alternately spaced between anchor connections.

- C. Headrail: Headrail shall be made of heavy-duty extruded aluminum (6463-T5 alloy) with anti-grip design. The headrail shall have a clear anodized finish and shall be fastened to the headrail bracket by a stainless steel, torx head sex bolt, and fastened to the tops of pilasters with stainless steel, tamper resistant torx screws.
- D. Headrail Brackets: Headrail brackets shall be 16-gage stainless steel with a satin finish, and secured to the wall with #14 stainless steel screws.
- E. Accessories: Furnish units with chromium-plated finish, unless otherwise indicated.

PART 3 EXECUTION

- 5.01 EXAMINATION: Installer shall examine the areas and conditions under which toilet partitions and related items are to be installed, including supporting anchors and supports installed by others, and must notify Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in manner acceptable to the Installer.
- 5.02 INSTALLATION: Comply with manufacturer's recommended procedure and installation sequence. Install partitions rigid, straight, plumb, and level. Secure partitions in position with manufacturer's recommended anchoring devices. Provide clearances of not more than 1/2 inch between pilasters and panels, and not more than one inch between panels and walls. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 1/4 inch.
- 5.03 ADJUSTING AND CLEANING
 - A. Adjusting: Adjust and lubricate hardware for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors (and entrance swing doors) to return to fully closed position.
 - B. Cleaning: Clean exposed surfaces of partition systems using materials and methods recommended by manufacturer, and provide protection as necessary to prevent damage during remainder of construction period.

END OF SECTION

SECTION 10200

LOUVERS AND VENTS

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Extruded aluminum louvers and vents with insect/bird screens as indicated on the Drawings including indications of sizes and locations.
- 1.02 RELATED SECTION
- A. Section 09050 – Color Design.
 - B. Division 15 and 16 for operable dampers behind louver where scheduled.
- 1.03 SUBMITTALS
- A. Product Data: Submit manufacturer's specifications; certified test data, where applicable; and installation instructions for required products, including finishes.
 - B. Shop Drawings: Submit Shop Drawings for the fabrication and erection of louver units and accessories. Include plans, elevations and details of sections and connections to adjoining Work. Indicate materials, finishes, fasteners, joinery and other information to determine compliance with specified requirements.
 - C. Samples: Submit 6-inch square samples of each required finish. Prepare samples on metal of same gage and alloy to be used in Work. Where normal color and texture variations are to be expected, include two or more units in each sample showing limits of such variations.
- 1.04 QUALITY ASSURANCE
- A. Performance Requirements: Where louvers are indicated to comply with specific performance requirements, provide units whose performance ratings have been determined in compliance with Air Movement and Control Association (AMCA) Standard 500.
 - B. SMACNA Recommendations: Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details and installation procedures, except as otherwise indicated.
 - C. Field Measurements: Verify size, location and placement of louver units prior to fabrication, wherever possible.
 - D. Shop Assembly: Coordinate field measurements and Shop Drawings with fabrication and shop assembly to minimize field adjustments, splicing, mechanical joints and field assembly of units. Pre-assemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.
- 1.05 DELIVERY, STORAGE, AND HANDLING: Deliver materials and products in labeled protective packages. Store and handle in strict compliance with manufacturers' instructions and recommendations. Protect from damage from weather, excessive temperatures and construction operations

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and Specifications are based on products manufactured by Construction Specialties, Inc., 49 Meeker Ave., Cranford, NJ 07016. Tel. (908) 272-5200
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. All-Lite Louvers, Mineral Wells, WV. Tel. (304) 489-8113.
 - 2. Ruskin Manufacturing, Kansas City, MO. Tel. (816) 761-7476.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures

2.02 WALL LOUVERS

- A. Drainable Blade Fixed Louver: 4 inch deep extruded aluminum louver equal to C/S Model A4097. Free area to be 50.44 percent minimum for 48 inches square. Pressure drop to be no more than 0.14-inch of water gage at 872 FPM in intake direction.
- B. Standard Brick Vent: 4 inch deep vent equal to C/S Model M23EX with aluminum through wall duct extension. Free area to be 60.20 Sq. inches. Fabricated from extruded aluminum alloy, minimum 0.125 inch thick, with 1/4-inch structural ribs. A die-formed 7 by 7 mesh, 0.028-inch diameter, wire insect screen is to be mechanically secured on interior face of vent. Size to be 15 5/8 inches wide by 8 1/16 inches high by 4 inches deep.

2.03 MATERIALS

- A. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming or as otherwise recommended by metal producer to provide required finish.
- B. Aluminum Extrusions: ASTM B 221, Alloy 6063-T52. Blade and frame thickness shall be 0.081 inch minimum.
- C. Fastenings: Use same material as items fastened, unless otherwise indicated. Fasteners for exterior applications may be hot-dip galvanized, stainless steel or aluminum. Provide types, gages, and lengths to suit unit installation conditions. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
- D. Anchors and Inserts: Use non-ferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.
- E. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

2.04 FABRICATION, GENERAL

- A. Provide louvers and accessories of design, materials, sizes, depth, arrangement, and metal thickness indicated, or if not indicated, as required for optimum performance with respect to airflow; water penetration; air leakage; strength; durability; and uniform appearance.
- B. Fabricate frames including integral sills to suit adjacent construction with tolerances for installation, including application of sealant in joints between louvers and adjoining Work.

- C. Include supports, anchorage, and accessories required for complete assembly.
- D. Provide hidden vertical mullions of type and at spacing indicated but not further apart than recommended by manufacturer or 72 inches on center, whichever is less. At horizontal joints between louver units provide horizontal mullions except where continuous vertical assemblies are indicated.
- E. Provide sill extensions and loose sills made of same material as louvers, where indicated, or required for drainage to exterior and to prevent water penetrating to interior. Setback dimension is 3-3/4 inches to 6 inches.
- F. Join frame members to one another and to stationary louver blades. Maintain equal blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.
- G. Finish: Kynar 500 (70% PVDF) finish to be selected by MDOT Architect from full range of standard and premium colors. Refer to Section 09050 for color.

2.05 LOUVER SCREENS

- A. Provide removable screens for exterior louvers. Fabricate screen frames of same metal and finish as louver units to which secured, unless otherwise indicated. Provide frames consisting of U-shaped metal for permanently securing screen mesh.
- B. Use insect screens of 18X14 aluminum mesh and additional 1/2-inch sq. mesh, 0.050-inch aluminum wire bird screen. Locate screens on inside face of louvers, unless otherwise indicated. Secure screens to louver frames with machine screws, spaced at each corner and at 12 inches on center between.
- C. Use bird screen only for louvers that are connected to duct work, operable dampers or fans.

PART 3 EXECUTION

- 3.01 PREPARATION: Coordinate setting drawings, diagrams, templates, instructions and directions for installation of anchorage. Coordinate delivery of such items to Project Site.

3.02 INSTALLATION

- A. Locate and place louver units plumb, level and in proper alignment with adjacent Work. Use concealed anchorage wherever possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weather-tight connection.
- B. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealant and joint fillers, as indicated.
- C. Repair finishes damaged by cutting, welding, soldering, and grinding operations required for fitting and jointing. Restore finishes so there is no evidence of corrective Work. Return items that cannot be refinished in field to shop, make required alterations and refinish entire unit, or provide new units, at Contractor's option.
- D. Protect galvanized and non-ferrous metal surfaces from corrosion or galvanic action by application of a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry or dissimilar metals.

END OF SECTION

SECTION 10260

WALL AND CORNER GUARDS

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Vinyl / Acrylic surfaced mounted Corner Guards.
- 1.02 RELATED SECTIONS: Section 09050 – Color Design.
- 1.03 SUBMITTALS
 - A. Product Data: Submit manufacturer's technical data and installation instructions for corner guards.
 - B. Samples: Submit samples of material finishes, profiles and colors for corner guards.

PART 2 PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS
 - A. Equivalent products by the following manufacturers are acceptable:
 - 1. Arden Architectural Specialties, Inc., Saint Paul, MN. Tel. (651) 631-1607.
 - 2. Construction Specialties, Inc., Muncy, PA. Tel. (570) 546-5941.
 - 3. Koroseal Wall Protection Systems, Inc. Fairlawn, OH. Tel. (330) 668-7600.
 - B. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures
- 2.02 CORNER GUARDS: Corner guards shall be installed full height, unless height indicated otherwise on the Drawings, at all outside corners in corridors and elsewhere as shown on the Drawings. Corner guards shall be equal to C/S Model SSM-20 series surface mounted corner guards with optional full height aluminum retainers, vinyl covers and matching top and bottom end caps. Color to be selected by MDOT Architect from full range of standard colors. Refer to Section 09050 for color(s).

PART 3 EXECUTION

- 3.01 INSTALLATION: Install units plumb and level, in locations as shown or described. Securely attach to supporting structure, in accordance with manufacturer's installation instructions.
- 3.02 CLEANING AND PROTECTION: At completion of installation, clean surfaces in accordance with manufacturer's instructions. Protect units from damage until acceptance by Owner.

END OF SECTION

SECTION 10400

IDENTIFICATION DEVICES

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Signage for room identification system, informational and directional signage, and exterior individual building signage and free standing, ground mounted sign.
- 1.02 RELATED SECTIONS: Section 09050 – Color Design.
- 1.03 SUBMITTALS: Submit manufacturer's technical data and installation instructions for each type of sign required.
 - A. Samples: Submit samples of each color and finish of exposed materials and accessories required for specialty signs. MDOT Architect's review of samples will be for color and texture only. When requested, furnish full-size samples of specialty sign materials.
 - B. Shop Drawings: Submit Shop Drawings for fabrication and erection of specialty signs. Include plans, elevations, and large-scale details of sign wording and lettering layout. Show anchorage and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.
- 1.04 QUALITY ASSURANCE: Provide each type of sign as a complete unit produced by a single manufacturer including necessary mounting accessories, fittings and fastenings.
- 1.05 DELIVERY, STORAGE, AND HANDLING: Deliver components correctly packed to prevent damage. Store in secure area out of weather. Handle per manufacturer's instructions.
- 1.06 WARRANTY: Provide manufacturer's standard one-year warranty covering manufacturing defects.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on products manufactured by ASI Sign Systems, Inc., 3890 W. NW Hwy, Suite 102, Dallas, TX 75220. Tel. (800) 274-7732.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Matthews International Corp., Pittsburgh, PA. Tel. (800) 628-8439.
 - 2. Metal Arts, Mandan, ND. Tel. (701) 663-6535.
 - 3. Mohawk Sign Systems, Inc., Schenectady, NY. Tel. (518) 370-3433.
 - 4. Scott Sign Systems, Inc., Sarasota, FL .Tel. (800) 237-9447.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures

2.02 SIGN SYSTEM

- A. Exterior signage: Wall mounted LC Series, Helvetica and Helvetica Medium styles, size as shown on Drawings.

- B. Interior signage: Wall or desktop mounted WS Series with rounded corners. Design so that paper insert can be installed from each end.

2.03 COMPONENTS – EXTERIOR SIGNAGE

- A. Material: Cast aluminum, projected mount with sleeve and stud.
- B. Finish: Baked enamel in manufacturer's standard color.

2.04 COMPONENTS – INTERIOR SIGNAGE

- A. Window Inserts: Laser printed paper insert with MDOT watermark. Text to be furnished by Owner.
- B. Sign Face: Clear Acrylic, 0.080-inch thick, matte first surface.
- C. Adhesive: Pressure sensitive, adhesive film on second surface.
- D. Insert Guide Rails: 0.040-inch thick vinyl tape.
- E. Tactile Laminate: Polyamid Resin.
- F. Laminating Base: Acrylic, 0.080-inch thick.
- G. Fasteners: 0.030- inch thick, double-face tape.
- H. Stand: Clear Acrylic, 0.080-inch thick.
- I. Sizes as follows:
 - 1. Type 1: 10 inches wide by 3 inches high.
 - 2. Type 2: 6 inches wide by 9 inches high.
 - 3. Type 3: 9 inches wide by 8 inches high.
 - 4. Type 4: 10 inches wide by 3 inches high.

- 2.05 BRAILLE AND TACTILE COPY: Comply with requirements of the Americans with Disabilities Act. Tactile copy to be raised 1/32-inch minimum from sign first surface by manufacturer's photomechanical stratification processes. Translation of copy into Braille shall be the responsibility of the manufacturer.

2.06 FINISHES – INTERIOR SIGNAGE

- A. Colors: Selected from manufacturer's standard.
- B. Surface Texture: Matte.

- 2.07 FONT: Shall be Helvetica Medium, unless noted otherwise.

PART 3 EXECUTION

- 3.01 EXAMINATION: Installer shall examine the substrates and conditions under which the specialty signs are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 INSTALLATION

- A. Install sign units and components at the locations shown or scheduled, securely mounted with concealed theft-resistant fasteners, unless otherwise indicated. Attach signs to substrates in accordance with the manufacturer's instructions, unless otherwise shown.
- B. Install level, plumb, and at the proper height. Cooperate with other trades for installation of sign units to finish surfaces. Repair or replace damaged units as directed by the Project Engineer.
- C. Position sign on wall surface 2 inches from strike side of doorframe and 60 inches high to center of sign from finish floor, typical unless indicated otherwise.

3.03 SCHEDULES

- A. Sign Type 1: Offices, single occupant
 Conference / Break
 Storage
 Mechanical
- B. Sign Type 2: Toilets
- C. Sign Type 3: Offices, multiple occupants
- D. Sign Type 4: Office (Desktop at Secretary / Receptionists)

END OF SECTION

SECTION 10525

FIRE EXTINGUISHERS

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Portable, multi-purpose, and dry-chemical fire extinguishers including cabinets, accessories and mounting brackets.
- 1.02 SUBMITTALS: Submit manufacturer's technical data and installation instructions for all portable fire extinguishers required.
- 1.03 QUALITY ASSURANCE: Provide new portable fire extinguishers which are UL listed and bear UL "Listing Mark" for each type, rating, and classification of extinguisher indicated.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on products manufactured by J.L. Industries, Inc., 4450 W. 78th Street Circle, Bloomington, MN 55435. Tel. (612) 835-6850.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Amerex Corp., Trussville, AL. Tel. (205) 655-3271.
 - 2. Larsen's Mfg. Co., Santa Ana, CA. Tel. (800) 366-3473.
- C. Substitutions shall fully comply with specified requirements and Section 01630 - Product Options and Substitution Procedures.

2.02 FIRE EXTINGUISHERS

- A. Provide fire extinguishers for each location indicated, in colors and finishes that comply with requirements of governing authorities.
- B. Multi-Purpose Dry Chemical for Cabinet Mounting: Equal to J.L. Industries Cosmic 10E, UL rated 4A-60BC, 10 lb. nominal capacity.

- 2.03 MOUNTING BRACKETS: Provide manufacturer's bracket designed to prevent accidental dislodgment of extinguisher, of proper size for type and capacity of extinguisher indicated, in manufacturer's standard plated finish.

PART 3 EXECUTION

- 3.01 INSTALLATION: Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.
 - A. Securely fasten mounting brackets to structure, square and plumb, to comply with manufacturer's instructions.
 - B. Fire Extinguisher units shall be mounted in exposed locations indicated, or if not indicated, in a manner such that no point in the building will be further than 75 feet from an extinguisher. Units shall be required in Break Area, each Laboratory Space, and within 20'-0" of all Mechanical Rooms and exits.

END OF SECTION

SECTION 10810

TOILET ACCESSORIES

PART 1 GENERAL

- 1.01 SECTION INCLUDES: The extent of each type of toilet accessory is shown on the Drawings and Schedules, unless otherwise indicated. The types of toilet accessories required include the following:
1. Mirrors (Refer to Section 08800 for unframed mirrors)
 2. Toilet Paper Dispenser
 3. Grab Bars
 4. Soap Dispensers
 5. Paper Towel Dispenser
 6. Clothes Hook
 7. Mop Holder
- 1.02 SUBMITTALS: Submit manufacturer's product and technical data indicating compliance with these specifications and Shop Drawings for the fabrication and installation of all toilet accessories. Show all anchorage and other necessary items including mounting heights.
- 1.03 QUALITY ASSURANCE: Provide products of the same manufacturer for each type of accessory unit and for units exposed in the same areas, unless otherwise acceptable to the MDOT Architect. Stamped names or labels on exposed faces of units will not be permitted, except where otherwise indicated.
- 1.04 DELIVERY, STORAGE AND HANDLING: Upon receipt of toilet accessories and other materials, installer shall examine the shipment for damage and completeness. Materials shall be stored in a clean, dry place. Stack all materials to prevent damage.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on products manufactured by Bradley Washroom Accessories Division, P.O. Box 309, Menomonee Falls, WI 53051. Tel. (414) 354-0100.
- B. Equivalent products by the following manufacturers are acceptable:
 1. A & J Washroom Accessories, New Windsor, NY. Tel. (845) 562-3332.
 2. Bobrick Washroom Equipment, Inc., Jackson, TN. Tel. (731) 424-7000.
 3. Plumberex Specialty Prod., Inc. Palm Springs, CA (800) 475-8629; (760) 343-7363.
 4. TCI Products. Hillsboro, OR (866) 533-4273; (503) 533-9223.
 5. Truebro, Inc. Ellington, CT (800) 340-5969; (860) 875-2868.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 ACCESSORIES

- A. Toilet Paper Dispenser: Provide surface mounted stainless steel multi-roll toilet tissue dispenser equal to Bradley model 5402. Locate at each toilet mounted in locations shown.

- B. Grab Bars: Provide 1-1/2 inches diameter horizontal 2 wall stainless steel grab bars with safety-grip non-slip finish and concealed mounting equal to Bradley model 8122-059, 36 inches by 52 inches standard dimensions. Locate at toilets where indicated at heights shown. Contractor has option to use one 36-inch grab bar and one 42-inch grab bar, but installation must meet all ADA requirements.
- C. Soap Dispensers: Provide surface mounted liquid type stainless steel soap dispenser units equal to Bradley model 6542 or 6562 as indicated on the Drawings. Locate at each lavatory at heights shown.
- D. Paper Towel Dispenser: Provide surface mounted stainless steel paper towel dispensers equal to Bradley model 250-15. Locate at each area with lavatory/sink where shown and at height shown.
- E. Clothes Hook: Provide surface mounted stainless steel hook equal to Bradley model 9135 at each Toilet Room, unless coat hooks are provided with toilet partition doors.
- F. Mop Holder: Provide surfaced mounted stainless steel mop and broom holder equal to Bradley model 9933. One piece construction with welded gusset and hooks. Holder consist of spring activated rubber cams on plated steel retainers. Unit measures 14 inches high by 34 inches long, with 4 hooks and 3 holders. Shelf projects 8 inches. Locate at each service sink where shown and at height shown or if not shown then per the Project Engineer's instructions.

PART 3 EXECUTION

5.01 EXAMINATION: Installer shall examine the areas and conditions under which toilet accessories are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

5.02 INSTALLATION

- A. Use concealed fastenings wherever possible. Provide anchors, bolts and other necessary anchorage, and attach accessories securely to walls and partitions in locations as shown or directed. Install concealed mounting devices and fasteners fabricated of the same material as the accessories, or of galvanized steel, as recommended by manufacturer.
- B. Install exposed mounting devices and fasteners finished to match the accessories. Provide theft-resistant fasteners for all accessory mountings. Secure toilet room accessories in accordance with the manufacturer's instructions for each item and each type of substrate construction.
- C. Installation shall meet all ADA requirements including proper mounting heights.

END OF SECTION

SECTION 10900

WARDROBE AND CLOSET SPECIALTIES

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Wall mounted tubular steel coat racks.
- 1.02 RELATED SECTIONS: Section 06100 – Rough Carpentry.
- 1.03 SUBMITTALS: Submit manufacturer's product data and installation instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Drawings and specifications are based on products manufactured by Raymond Engineering, Inc., 704 Vandalia Street, St. Paul, MN 55114. Tel. (800) 365-5770.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. A.J. Binns Ltd., South Burlington, VT. Tel: (802) 655-7502.
 - 2. Magnuson Group Inc., Woodridge, IL. Tel: (800) 342-5725.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 COAT RACK: Equal to Rigid – Rak Model 315.

2.03 MATERIALS

- A. Brackets (3 req'd per rack) are 1-1/8 inch sq. tubing with mitered angle and hidden weld.
- B. Shelf tubes (3 required per rack) are 3 /4 inch round steel tube.
- C. Accessories: Model 913 hooks (12 required per rack) mounted on alternate tubes.
- D. Finish: Bright commercial nickel chrome.
- E. Size: 5 feet long by 12 -1/4 inches deep.

PART 3 EXECUTION

- 3.01 INSTALLATION: Install units plumb and level, at locations shown on Drawings or if not shown, as directed by the Project Engineer. A minimum of four units are required, unless additional units are indicated on the Drawings. Securely attach to supporting structure, in accordance with manufacturer's installation instructions.
- 3.02 CLEANING AND PROTECTION: At completion of installation, clean surfaces in accordance with manufacturer's instructions. Protect units from damage.

END OF SECTION

SECTION 11133 PROJECTOR

PART 1 GENERAL

- 1.01 SECTION INCLUDES: LCD Projector, ceiling mounted with accessories as required for a complete system as shown on the Drawings and as specified herein.
- 1.02 SUBMITTALS: Submit manufacturer's brochures, technical data, installation, maintenance and operating instructions for each item and component part specified, including data substantiating that materials comply with requirements.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and Specifications are based on products manufactured by NEC, 1250 N. Arlington Heights Rd, Itasca, IL. 60143. Tel. (800) 836-0655.
- B. Equivalent products by the following manufacturers are acceptable:
1. Panasonic PT-LB60NTU.
 2. Sony VPL-CX86.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 PROJECTOR

- A. Equal to NEC model LT-380 as follows:
1. 3000 Lumens.
 2. 600:1 Contrast Ratio.
 3. 1024 x 768 Resolution.
 4. 4:3 Aspect Ratio.
 5. Wireless Networking

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install units plumb and level, in locations and with mountings as shown or as required. Securely attach to supporting structure with concealed fasteners, in accordance with manufacturer's installation instructions.
- B. Remove shipping packaging and install components as per manufacturer's instructions.
- C. Verify and provide all electrical hook-ups and electrical outlets required by the projector specified prior to rough-in.
- 3.02 CLEANING AND PROTECTION: At completion of installation, clean surfaces in accordance with manufacturer's instructions. Protect units from damage until acceptance by Owner.

END OF SECTION

SECTION 11455

RESIDENTIAL APPLIANCES AND EQUIPMENT

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Residential appliances as shown on the Drawings and as specified herein.
- 1.02 SUBMITTALS: Submit manufacturer's brochures, technical data, installation, maintenance and operating instructions for each item and component part specified, including data substantiating that materials comply with requirements.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Equivalent products by the following manufacturers are acceptable:
1. GE Appliances, Louisville, KY. Tel. (800) 626-2000. (Basis-of-design)
 2. Magic Chef Co., Cleveland, TN. Tel. (423) 472-3371.
 3. Sears Contract Sales, Hoffman Estates, IL. Tel. (847) 286-2994.
- B. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

- 2.02 ELECTRIC RANGE: 30 inch slide-in electric range equal to GE Model JSS28WKWW, with (if required) Optional Backguard JXS37WW and Body Sides JXS77WW, White.
- 2.03 REFRIGERATOR: 17.9 cu. ft. capacity equal to GE Model GTS18JCPWW with automatic icemaker, frost free freezer and reversible door, White.
- 2.04 MICROWAVE: 1.4 cu. ft. oven cavity, 950 watts, over-the-range vented type, equal to GE Model JVM 1441WD with Re-circulating Charcoal Filter Kit Model JX81A, White.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install units plumb and level, in locations and with mountings as shown. Securely attach to supporting structure with concealed fasteners, in accordance with manufacturer's installation instructions.
- B. Remove shipping packaging and install components as per manufacturer's instructions.
- C. Modify (if required) swing of refrigerator door to open toward adjacent base cabinets. Coordinate with cabinets for proper fit.
- D. Verify and provide all plumbing and electrical hook-ups and electrical outlets required by the appliances specified prior to rough-in.
- 3.02 CLEANING AND PROTECTION: At completion of installation, clean surfaces in accordance with manufacturer's instructions. Protect units from damage until acceptance by Owner.

END OF SECTION

SECTION 12485

FLOOR MATS

PART 1 GENERAL

- 1.01 SECTION INCLUDES: Metal-rails, tapered vinyl-frame, surfaced mounted, removable, carpeted floor mats for Building Entrances.
- 1.02 RELATED SECTIONS: Section 09050 – Color Design.
- 1.03 SUBMITTALS
 - A. Product Data: Submit manufacturers' product and technical data indicating compliance with these specifications and recommended maintenance practices.
 - B. Shop Drawings: Submit materials description, component dimensions and details. Show plan view that clearly indicates traffic direction and size of mat.
 - C. Colors: Submit samples of manufacturer's full range of available colors (minimum 20 for carpet) and finishes for materials exposed to view.
- 1.04 QUALITY ASSURANCE
 - A. Single Source: All floor mats required by this Section shall be products of only one manufacturer.
 - B. Manufacturer : Company regularly engaged in producing types of floor mats required by this Section and with minimum 10 years documented satisfactory experience

PART 2 PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS
 - A. Drawings and specifications are based on products manufactured by Construction Specialties, Inc. P.O. Box 380, Muncy, PA 17756. Tel. (888) 834-4455.
 - B. Other acceptable manufacturers offering equivalent products:
 - 1. Arden Architectural Specialties, Inc., Saint Paul, MN. Tel. (651) 631-1607.
 - 2. J.L. Industries, Inc., Bloomington, MN. Tel. (612) 835-6850.
 - 3. R. C. Musson Rubber Co., Akron, OH. Tel. (330) 773-7651.
 - C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.
- 2.02 FLOOR MATS:
 - A. Model: C/S "Pedimat" Surface-Mounted Floor Mat, Model M1-D-CP-SM.
 - B. Size: 6 feet wide by 4 feet deep (traffic direction) at double doors. Provide at entrance to Lobby 101.
 - C. Size: 4 feet wide by 4 feet deep (traffic direction) at single doors. Provide at entrances to Corridors 116B and 124.

- D. Carpet Color: As selected by MDOT Architect from full range of standard colors.
- E. Rails: Extruded aluminum 6063-T52 as selected by MDOT Architect from full range of standard colors
- F. Carpet tread: Colorfast, solution dyed 100% nylon tread, in color selected by MDOT Architect, fusion bonded to rigid two-ply backing. Carpet fiber shall contain an antimicrobial additive and "Scotchgard" soil reducing treatment.
- G. Frame: Tapered vinyl with mitered corners and color to match rails.

PART 3 EXECUTION

- 3.01 INSTALLATION: Install units level, in locations as shown or described. Install mats after Final Cleaning of Project Floor.
- 3.02 CLEANING AND PROTECTION: At completion of installation, clean surfaces in accordance with manufacturer's instructions. Protect units from damage until acceptance by Owner.

END OF SECTION

SECTION 12495

WINDOW BLINDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Horizontal blinds at exterior windows.

1.02 RELATED SECTIONS

- A. Section 09050 – Color Design.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications and installation instructions for each type of blind unit required. Include methods of installation for each type of opening and supporting structure. Transmit copy of instructions and recommendations to the installer.
- B. Samples: Submit samples of each exposed metal finish, cords, tapes and tassels required. Architect's review of samples will be for design, color, and finish only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

1.04 QUALITY ASSURANCE

- A. Provide each blind as a complete unit produced by one manufacturer, including hardware, accessory items, mounting brackets, and fastenings. Unless otherwise acceptable to the Project Engineer / MDOT Architect, furnish all blind units by one manufacturer for the entire project.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Drawings and Specifications are based on products manufactured by Hunter Douglas, Inc., 2 Park Way, Upper Saddle River, NJ 07458. Tel. (800) 727-8953.
- B. Other Acceptable manufacturers offering equivalent products:
 - 1. Levolor Home Fashions Contract Division, High Point, NC. Tel. (336) 812-8181.
 - 2. Springs Window Fashions Division, Inc., Montgomery, PA. Tel. (570) 547-6671.
- C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 PRODUCTS

- A. Hunter Douglas Commercial Lightlines Aluminum Blinds 1" de-Light Model DL88. Color to be selected by the Project Engineer / MDOT Architect from manufacturer's full line of standard colors.

2.03 MATERIALS AND COMPONENTS

- A. Manufacturer's standard head rail, channel-shaped section fabricated from minimum 0.040 inch thick aluminum. Increase metal thickness as recommended by the manufacturer for large blind units. Cross-brace for extra rigidity. Furnish complete with tilting mechanism, top and end brace, top cradle, cord lock, and accessory items required for the type of blind and installation indicated.
- B. Bottom Rail: Manufacturer's standard tubular steel bottom rail designed to withstand twisting or sagging. Contour top surface to match slat curvature, with flat or slightly curved bottom. Close ends with manufacturer's standard metal or plastic end caps of the same color as rail. Finish rails the same color as slats, unless otherwise indicated.
- C. Slats: Manufacturer's standard, spring tempered aluminum slats not less than 0.008 inches thick. Provide 1 inch narrow slats, with other components sized to suit.
- B. Braided Ladders: Manufacturer's standard polyester support cords with integrally braided ladder rungs. Provide cord size and rung spacing as required for each type of blind shown.
- C. Tilter: Manufacturer's standard enclosed, lubricated, tilting mechanism which will tilt and securely hold the tilting rod, slats and bottom rail at any set angle. Furnish wand (or rod) type tilter consisting of standard tilter mechanism adopted for rotating wand operation. Furnish manufacturer's standard plastic or aluminum rod of proper length to suit blind installation.
- D. Cords: Manufacturer's standard braided polyester cord, sized to suit blind type, equipped with soft-molded plastic rubber or composition tassels securely attached to each cord end.
 - 1. Cord Locks: Provide manufacturer's standard cord locks for each type of blind.
 - 2. Cord Equalizers: Nylon, self-aligning type, designed to maintain horizontal blind position.
- E. Hardware: Furnish manufacturer's standard brackets, supports and internal reinforcement as required to suit blind type and size. Finish exposed hardware and accessories to match rail color.
- F. Finish: Prime aluminum slats with chromate conversion coating, followed by manufacturer's standard glass-smooth, baked-on synthetic resin enamel finish.

2.04 FABRICATION AND OPERATION

- A. Prior to fabrication, verify actual opening dimensions by accurate site measurements. Adjust blind dimensions for proper fit in all openings. Fabricate components of blinds from non-corrosive, non-staining, non-fading materials which are completely compatible with each other, and which do not require lubrication during normal expected life.
- B. Fabricate blind units to completely fill the openings as indicated, from head to sill and jamb to jamb. Space supporting tapes or cords in accordance with manufacturer's standards, unless otherwise indicated. Space louver blades (slats) to provide overlap for light exclusion when in the fully closed position.

- C. Equip blind units, unless otherwise indicated, for the following operation:
1. Full-tilting operation with slats rotating approximately 180 degrees. Place tilt operation controls on left-hand side of blind units.
 2. Full-height raising, to manufacturer's minimum stacking dimension with lifting cord locks for stopping blinds at any point of ascending or descending travel. Place pull cords on right-hand side of blind units.

PART 3 EXECUTION

- 3.01 INSPECTION: Installer must examine the substrates and conditions under which the horizontal venetian blinds are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- 3.02 INSTALLATION: Install horizontal venetian blinds at each window and in accordance with the manufacturer's instructions unless noted otherwise. Provide intermediate supports at intervals to permit easy entrance and removal of head, and to ensure level head and slat position.

END OF SECTION

SECTION 13090

RADIATION PROTECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes sheet lead applied to gypsum board; lead lined doors and door frames.
- B. Related Sections
 - 1. Section 08100 – Metal Doors and Frames
 - 2. Section 08210 – Wood Doors.
 - 3. Section 08710 – Door Hardware.
 - 4. Section 09250 – Gypsum Board.

1.02 REFERENCES

- A. APA – The Engineered Wood Association:
 - 1. APA/EWA PS 2 – Voluntary Product Standard Performance Standard for Wood-Based Structural-Use Panels.
- B. ASTM International:
 - 1. ASTM B749 – Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products.
 - 2. ASTM C36 – Standard Specification for Gypsum Wallboard.
 - 3. ASTM C1036 – Standard Specification for Flat Glass.
 - 4. ASTM C1048 – Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
- C. National Council on Radiation Protection and Measurement
 - 1. NCRP 49 – Structural Shielding Design and Evaluation for Medical Use of X Rays and Gamma Rays of Energies up to 10 MeV.

1.03 PERFORMANCE REQUIREMENTS

- A. Conform to applicable health and occupation code for integrity of radiation protection and continuity of protected construction.

1.04 SUBMITTALS

- A. Section 01330 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate layout, details, dimensions, interface with adjoining work.
- C. Submit shop drawings for special components and installation conditions which are not fully dimensioned or detained in manufacturer's product data.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with NBS (NCRP Report) requirements.

1.06 FIELD QUALITY CONTROL

- A. Wherever lead protection is penetrated, cut, or punctured for any reason, assure continuity of shielding by use of sheet lead, lead plugs, or other approved method.

1.07 REGULATORY REQUIREMENTS

- A. National Bureau of Standards: Comply with requirements of National Council of Radiation Protection and Measurement (NCRP) Report No. 49, "Structural Shielding Design and Evaluation for Medical Use of X-Rays and Gamma Rays of Energies up to 10MeV," as applicable to this project.
- B. Local Regulations: Comply with requirements of local regulator agencies where standards and criteria exceed NCRP Report No. 49.

1.08 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.09 PRE-INSTALLATION MEETING

- A. Section 01315 – Project Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing Work of this section.

1.10 COORDINATION

- A. Section 01310 – Project Management and Coordination: Coordination and project conditions.
- B. Coordinate Work under provisions of Section 01310.
- C. Coordinate the Work with construction of partitions, placement of frames and doors.

PART 2 PRODUCTS

2.01 X-RAY RADIATION PROTECTION

- A. Manufacturers:
 - 1. A & L Shielding.
 - 2. Nuclear Associates.
 - 3. Radiation Protection Products, Inc.
- B. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures

2.02 COMPONENTS

- A. Sheet Lead: ASTM B749, Type .125 inch (3.125 mm) thick.

- B. Gypsum Board: ASTM C36, paper/paper faced, tapered edges and square ends; 48 x 96 inch (1 200 x 2 400 mm) size, 5 / 8 inch (16 mm) thick.
- C. Nails: Lead headed to twice thickness of sheet lead.
- D. Tie Wire: Lead steel, annealed.

2.03 FABRICATION

- A. Lead Laminated Gypsum Board: Fabricate with monolithic sheet lead bonded to one surface of board, extend lead sheet 1 inch (25 mm) beyond one side and one end of board.
- B. Lead-lined Wood Doors: Fabricate doors of solid core flush construction containing a continuous bottom and edge-to-edge. Lead lining may be provided to one sheet within core or in two sheets between core and cross banding, at manufacturer's option. Shield cutouts for locksets with sheet lead, lapping lead lining of locksets and door lining. Face veneers shall match doors as specified in Section 08210 Wood Doors.
- C. Lead Lined Frames: Fabricate with sheet lead formed to line frame provided by Section 08115; fit tight to internal frame profile, lap seams 2 inches (50 mm) minimum. Provide double thickness lead over hardware reinforcement plates to afford protection from protruding screw fasteners.
- D. Hardware: Specified in Section 08710. Line with lead as appropriate.

2.04 SHOP FINISHING

- A. Wood Veneered Doors: As specified
- B. Primed metal surfaces: As specified in Section 09900.

PART 3 EXECUTION

3.01 EXAMINATION:

- A. Section 01310 – Project Management and Coordination
- B. Verify existing surfaces are ready to receive work and opening dimensions are as indicated on shop drawings.
- C. Verify utility outlets and devices and items penetrating lead lining applied with gypsum or plywood are in place.

3.02 INSTALLATION

- A. Install materials and equipment in accordance with accepted shop drawings and manufacturer's recommendations, and as required by codes and governing agencies having jurisdiction.
- B. Install lead lined drywall vertically, with joints running from floor to ceiling as required by Standards.

- C. Joints: Where batten strips are used, where boards with different thickness of lead abut and where lead-lined board abuts unlined board, shim at studs necessary to provide a flush surface. Where batten strips are required for lead thickness over 1/8" (3.125 mm) install not less than 2 inch wide strips of lead over studs where vertical joints occur. Install strips of continuous lengths furnishing 1 inch overlap on each side of joint.
- D. Fastenings: Fasten boards to studs with screws spaced maximum of 8 inches on center at edges and maximum of 12 inches on center at intermediate studs. Cover screws with lead tab protection devices. Install fastenings in such manner that finish application of joint compound or plaster will completely cover the screws with their protection devices.
 - 1. Pre-drilling: Drill pilot holes as necessary to prevent deformation of fastener and distortion of board.
- E. Where build-in items penetrate lead linings, provide lead shields behind those cutouts as required to maintain continuity of radiation protection. Where outlet boxes, junction boxes, ducts, conduit, and similar items prevent use of shields, provide sheet lead sleeves or linings as required.
- F. Provide lead-lined gypsum board on one side only of control partitions and common partitions between two lead-lined spaces, unless otherwise indicated.
- G. Lead Lining of Frames: Line or cover hollow metal frames and stops for doors with sheet lead. Weld, glue, and clip into place. Install sheet lead free of waves, lumps, and wrinkles with as few joints as possible. Maintain continuity of radiation protection as joints in sheet lead. Finish joints smooth and neat. Metal door frames for lead-lined doors as specified under Section 08100, Metal Doors and Frames.
- H. Hardware for Lead-Lined Doors: Shield hardware cutouts and through bolts holes with same lead thickness as core of door.

3.03 FIELD QUALITY CONTROL

- A. Section 01455 – Testing Laboratory Services: Testing and Inspection Services.
- B. Inspection and testing will be performed by licensed radiologist technician in coordination with regulatory agency requirements, to ascertain conformance of installation regarding radiation passage or leakage.
- C. Cooperate and offer assistance in inspection and testing of the Work. Execute instructions given.

END OF SECTION

SECTION 13121

PRE-ENGINEERED BUILDINGS

PART 1 GENERAL

1.01 SUMMARY:

- A. Section Includes: Structural steel framing and related components and accessories for single story, single span, rigid frame-type, pre-engineered, shop fabricated metal building of the nominal lengths, widths, eave heights, roof pitches, metal wall and insulating sloped roof system including soffits, gutters and downspouts. Also exterior doors and associated flashings and trim.
- B. Related Sections
 - 1. Division 3 – Concrete footings, grade beams, and floor slab.
 - 2. Section 04200 – Masonry units.
 - 3. Section 06100 – Rough carpentry
 - 4. Section 07612 – Sheet metal roofing and wall panels
 - 5. Section 07920 – Joint Sealers.
 - 6. Section 08100 – Metal Doors and Frames.
 - 7. Section 09900 – Paints and Coatings.
 - 8. Division 15 – Mechanical rough-in utilities.
 - 9. Division 16 – Electrical rough-in utilities.

NOTE: "This list is not complete, General Contractor shall review and comply with all Drawings and all Specifications Sections which are related to Metal Building"

1.02 REFERENCES

- A. AAMA 605.2 – Specifications for high performance organic coatings on architectural extrusions and panels.
- B. AISC – Specifications for Structural Steel for Buildings – Allowable Stress Design and Plastic Design.
- C. AISC – Quality Certification Program, Category MB.
- D. ASTM A36 – Structural Steel.
- E. ASTM A123 – Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- F. ASTM A153 – Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- G. ASTM A307 – Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- H. ASTM A325 – High Strength Bolts for Structural Steel Joints.
- I. ASTM A446 – Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
- J. ASTM A490 – Heat Treated Steel Structural Bolts, Classes 150 ksi Tensile Strength.
- K. ASTM A500 – Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- L. ASTM A501 – Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

- M. ASTM A525 – Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
 - N. ASTM A529 – Structural Steel with 42 ksi Minimum Yield Point (1/2 in Maximum Thickness).
 - O. ASTM A572 – High-Strength Low-Alloy Columbian-Vanadium Steels of Structural Quality.
 - P. ASTM A792 – Steel Sheet, Aluminum-Zinc Alloy Coated by the Hot-Dip Process.
 - Q. ASTM C665 – Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - R. ASTM C1107 – Packaged, Dry, Hydraulic-Cement Grout (Non-shrink).
 - S. AWS A2.4 – Standard Symbols for welding, bracing and nondestructive examination.
 - T. AWS D1.1 – Structural Welding Code – Steel.
 - U. IBC 2003 – International Building Code
 - V. MBMA (Metal Building Manufacturers Association) – Metal Building Systems Manual.
 - W. SSPC (Steel Structures Painting Council) – Steel Structures Painting Manual.
 - X. SSPC – Paint 20 Zinc Rich Coating.
 - Y. UL – Building Materials Directory – Roof Deck Construction.
- 1.03 SYSTEM DESCRIPTION:
- A. Single span rigid frame. Framing and Roof System to withstand I-90 roof assembly rating.
 - B. Bay Spacing: See drawings.
 - C. Primary Framing: Rigid frame of rafter beams and columns, intermediate columns, braced end frames, lean-to-frames, end wall columns, and wind bracing.
 - D. Secondary Framing: Purlins, girts, eave struts, flange bracing, sill supports, clips, and other items detailed.
 - E. Roof System: Preformed metal panels of upslope profile, with sub-grit framing/anchorage assembly, insulation, liner sheets, and accessory components. Roof purlin spacing to be 5' on center maximum.
 - F. Roof Slope: See drawings.
- 1.04 DESIGN REQUIREMENTS:
- A. Thermal Resistance of Insulated Roof System: R value of 10.
 - B. Design members to withstand 20 psf dead load, 5 psf nominal snow loads, and design loads due to pressure and suction of wind calculated in accordance with IBC 2003, latest edition, and factory mutual criteria for I-90 roof assembly.

- C. Exterior wall and roof system shall withstand imposed loads with maximum allowable deflection of span: 1/240.
- D. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.
- E. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature of 120 degrees F.
- F. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

1.05 SYSTEM PERFORMANCE REQUIREMENTS:

- A. General: Engineer, design, fabricate and erect the pre-engineered metal building system to withstand loads of winds, gravity, structural movement, including movement thermally induced, and to resist in-service use conditions that building will experience, including exposure to weather, without failure.
 - 1. Design each member to withstand stresses resulting from combinations of loads that produce the maximum allowable stresses in that member as prescribes in MBMA's "Design Practices Manual".
- B. Design Loads: Basic design loads, as well as auxiliary and collateral loads, shall be in accordance with the IBC 2003.
 - 1. Basic design load includes live load, wind load, snow load and seismic load, in addition to dead load.
- C. Structural Framing, Roof and Wall Panels: Design Primary and Secondary structural members and exterior covering materials for applicable loads and combinations of loads in accordance with MBMA's "Design Practices Manual".
 - 1. Structural Steel: Comply with AISC's "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" for design requirements and allowable stresses.
 - 2. Light Gage Steel: Comply with AISC's "Specifications for the Design of Cold Formed Steel Structural Members" and "Design of Light Gage Steel Diaphragms" for design requirements and allowable stresses.
 - 3. Welding Connections: Comply with AWS's "Standard Code for Arc and Gas Welding in Building Construction" for welding procedures.

1.06 SUBMITTALS

- A. Section 01330 – Submittal Procedures.
- B. Submit manufacturer's product information, sample Weather Tightness Warranty, specifications, and installation instructions for building components and accessories. Submit design calculations for frame design and reactions, roof purlin design, and side wall purlin design.
- C. Shop Drawings:
 - 1. Submit complete erection drawings showing anchor bolts settings, sidewall, end wall, and roof framing, traverse cross sections, coverings and trim details, and accessory installation details to clearly indicate proper assembly of building components.

- D. Product Data: Provide data on profiles, component dimensions, fasteners, and thermal insulating properties.
- E. Samples: Submit two samples of pre-coated metal panels for each color selected, 12 x 12 inch in size illustrating color and texture of finish.
- F. Manufacturer's Instructions: Indicate preparation requirements, and anchor bolt placement.
- G. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.
- H. Submit written Certification prepared and signed by a Professional Engineer, registered to practice in Mississippi, verifying that building design meets indicated loading requirements and codes.

1.07 CLOSEOUT SUBMITTALS:

- A. Section 01770 – Closeout Procedures.
- B. Project Record Documents: Record actual locations of concealed components and utilities.

1.08 QUALITY ASSURANCE:

- A. Perform Work in accordance with AISC – Quality Certification Program Category MB. MBMA – Metal Building Systems Manual and MBMA – Low Rise Building Systems Manual.

1.09 QUALIFICATIONS:

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Erector Qualifications: Company specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.

1.10 DELIVERY, STORAGE, HANDLING

- A. Deliver, store, protect, and handle products to and on site so they will not be damaged or deformed.
- B. Protect members from distortion or damage by placement on suitable supports above ground. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weather tight ventilated covering. Store metal sheets or panels so that water accumulations will drain freely. Do not store sheets or panels in contact with other materials which might cause staining.

1.11 REGULATORY REQUIREMENTS

- A. Conform to IBC 2003 for submission of design calculations, reviewed shop and erection drawings, and any additional data as required for acquiring permits.
- C. Comply with the IBC 2003 and Factory Manual requirements.

1.12 PRE-INSTALLATION MEETING

- A. Section 01315 – Product meetings: Pre-installation meeting.
- B. Convene one week before starting work of this section.

1.13 WARRANTY

- A. Section 01770 – Closeout Procedures.
- B. Provide a twenty year warranty to include coverage for exterior pre-finished surfaces to cover pre-finished color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading. Include twenty year coverage for weather tightness of building enclosure elements after installation. Refer to Section 07612 for warranty requirements

PART 2 PRODUCTS

2.01 PRE-ENGINEERED BUILDING

- A. Manufacturers: Subject to compliance with specified requirements, manufacturers offering pre-engineered building systems which may be incorporated in the work include, but are not limited to the following:
Butler Manufacturing Co.
Englert, Inc.
Ceco Buildings Division
Gulf States Manufacturers, Inc.
Substitutions are permitted in accordance with Section 01630 – Product Options and Substitution Procedures.
- B. Design connections not detailed on the Drawings under direct supervision of a Professional Engineer experienced in design of this work and licensed in the State of Mississippi.

2.02 COMPONENTS – FRAMING

- A. Structural Steel Members: ASTM A36.
- B. Structural Tubing: ASTM A500, Grade B.
- C. Plate or Bar Stock: ASTM A529.
- D. Anchor Bolts: ASTM A307, unprimed.
- E. Bolts, Nuts, and Washers: ASTM A325.
- F. Welding Materials: AWS D1.1; type required for materials being welded.
- G. Primer: SSPC 20, Red Oxide
- H. Grout: ASTM C1107, Non-shrink type, premixed compound consisting of non-metallic aggregate, cement, water reducing, and plasticizing agents, capable of developing minimum compressive strength of 2400 psi in two days and 7000 psi in 28 days.
- I. Touch-up Primer for Galvanized Surfaces: SSPC Type I Inorganic.
- J. Cold-formed Members: Comply with requirements of ASTM A607, Grade 50.

- K. Galvanized Steel Sheet: Comply with the requirements of ASTM A446 with G90 coating. "Class" to suit building manufacturer's standards.
- L. Primer: Provide fast-curing lead-free, "universal" primer, as selected by the manufacturer for resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated and capability to provide a sound foundation for field-applied topcoats.

2.03 COMPONENTS – WALL ROOF SYSTEM

- A. Sheet Steel Stock: ASTM A446 Grade 50 galvanized to ASTM A525 G90 designations
- B. Roof Insulation: Specified in Section 07210 – Building Insulation.
- C. Joint Seal Gaskets: Manufacturer's standard type.
- D. Fasteners: Manufacturer's standard type, galvanized to ASTM A153 1.25 oz/sq ft, finish to match adjacent surfaces when exterior exposed.
- E. Bituminous Paint: Asphaltic type.
- F. Sealant: Manufacturer's standard type, non-staining, elastomeric, skinning.
- G. Metal Mesh: Galvanized steel wire, woven.
- H. Roof Curbs: Insulated metal same as roofing, designed for imposed equipment loads, anchor fasteners to equipment, counter flashed to metal roof system.
- I. Trim, Closure Pieces, Caps, Flashings, Gutters and Downspouts, Facias and Infills: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

2.04 COMPONENTS – METAL DOOR AND FRAME

- A. Doors and Frames: Specified in Section 08100 – Metal Doors and Frames.
- B. Hardware: Specified in Section 08710 – Door Hardware.

2.05 FABRICATION – FRAMING

- A. Fabricate members in accordance with AISC Specification for plate, bar, tube, or rolled structural shapes.
- B. Anchor Bolts: Formed with bent shank, assembled with template for casting into concrete.
- C. Provide framing for openings.
- D. Structural Framing: Rigid frames shall be fabricated from hot-rolled structural steel. Provide built-up "i-beam" shape rigid frames consisting of either tapered or parallel flange beams and tapered columns. Provide frames factory welded and shop painted. Furnish frames complete with attachment plates, bearing plates and splice members. Factory drill frames for bolted field assembly.
- E. End Wall Columns: Provide factory welded, shop painted end wall columns of not less than 14-ga. Built-up "I" shape or cold-formed sections.
- F. Wind Bracing: Provide adjustable wind bracing using not less than ½" diameter threaded steel rod.

- G. Secondary Framing: Provide not less than 16-ga. shop painted rolled formed section for the following secondary framing members:

1. Purlins.
2. Eave struts.
3. End wall beams.
4. Flange bracing.
5. Sag bracing.
6. Provide not less than 14-ga. cold-formed galvanized steel section for the following secondary framing members:
7. Base channels.
8. Sill angles.
9. End wall structural members (except columns and beams).
10. Purlin spacers.

2.06 FABRICATION – WALL AND ROOF SYSTEMS

- A. Roofing and wall panels: Specified in Section 07612 – Sheet Metal Roofing, and Wall Panels.
- B. Girts/Purlins: Rolled formed structural shape to receive siding, and roofing.
- C. Internal and External Corners: Same material thickness and finish as adjacent material, profile shop cut and factory mitered to required angles. Back brace mitered internal corners with 22 ga thick sheet.
- D. Flashings, Closure Pieces, Fascia, Infills and Caps: Same material and finish as adjacent material. Profile to suit system.
- E. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive finish.
- F. Wall Louvers: Type J blade design, same finish as adjacent material, with steel mesh bird/insect screen and frame, at unused portions.
- G. Flexible Closure Strips: Provide closed-cell, expanded cellular rubber, self-extinguishing flexible closure strips. Cut or premold to match corrugation configuration of roofing and siding sheets. Provide closure strips at joints to ensure weather tight construction.
- H. Sealing Tape: Provide pressure sensitive 100 percent solids grey polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, non-sag, non toxic, non staining tape not less than ½" wide and 1/8" thick.
- I. Joint Sealants: Provide one-part elastomeric polyurethane, polysulfide or silicone rubber sealant as recommended by the building manufacturer.

2.07 FABRICATION – GUTTERS AND DOWNSPOUTS

- A. Fabricate of same material and finish as roofing metal.
- B. Form gutters and downspouts to profile and size to collect and remove water. Fabricate with connection pieces.
- C. Form sections in maximum possible lengths. Hem exposed edges.
- D. Fabricate support straps of same material and finish as roofing metal, color as selected.

2.08 FACTORY FINISHES

- A. Framing Members: Clean, prepare, and shop prime. SSPC Manual requirements. Do not prime surfaces to be field welded.
- B. Exterior Surfaces of Roof Components and Accessories: Finish coatings shall conform to AAMA 605.2. Precoated enamel on steel finish color as selected from manufacturer's standard range.
- C. Interior Surfaces of Roof Components and Accessories: Precoated enamel on steel of fluoropolymer finish, color as selected from manufacturer's standard range.
- D. Vapor Retarder at Interior Face of Insulation: Sheet vinyl, 2 inches thick, white. Complete tape and seal all joints with tape to match vinyl vapor retarder.
- E. All exterior finish surfaces coatings must match in color, regardless of manufacturer, supplier or where specified in project manual.

PART 3 EXECUTION

3.01 EXAMINATION:

- A. Section 01310 – Project Management and Coordination
- B. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct positions.

3.02 ERECTION – FRAMING

- A. Erect framing in accordance with AISC Specification.
- B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.
- C. Set column base plates with non-shrink grout to achieve full plate bearing.
- D. Do not field cut or alter structural members without approval.
- E. After erection, prime welds, abrasions, and surfaces not shop primed.
- F. Framing: Erect structural framing true to line, level and plumb, rigid and secure. Level base plates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use a non-shrinking grout to obtain uniform bearing and to maintain a level base line elevation.
- G. Purlins and Girts: Provide rake or gable purlins with tight fitting closure channels and fascias. Locate and space wall girts to suit door and window arrangements and heights. Secure purlins and girts to structural framing and hold rigidly to a straight line by sag rods.
- H. Bracing: Provide diagonal rod or angle bracing in both roof and sidewalls as required.
- I. Framed Openings: Provide shapes of proper design and size to reinforce opening and to carry loads and vibrations imposed, including equipment furnished under mechanical or electrical work. Securely attach to building structural frame.

3.03 ERECTION – WALL AND ROOFING SYSTEMS

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

3.04 ERECTION – GUTTER AND DOWNSPOUT

- A. Rigidly support and secure components. Joint lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.
- B. Apply bituminous paint on surfaces in contact with cementitious materials.
- H. Slope gutters minimum 1/4 inch/ ft.
- I. Install splash pads under each downspout that does not spill onto concrete paving.

3.05 INSTALLATION – ACCESSORIES

- A. Install door frame, door, overhead door, windows and glass, louver and hardware in accordance with manufacturer's instructions.
- B. Seal wall and roof accessories watertight and weather tight with manufacturer's recommended sealant.

3.06 ERECTION TOLERANCES

- A. Section 01400 – Quality Requirements: Tolerances.
- B. Framing Members: 1/4 inch from level; 1/8 inch from plumb.
- C. Siding and Roofing: 1/8 inch from true position.

END OF SECTION

SECTION 15010

GENERAL PROVISIONS

PART 1 GENERAL

1.01 SCOPE

- A. Provide all material, equipment and labor, etc., required to complete installation specified herein and/or shown or scheduled on Plans.

1.02 INSTRUCTIONS

- A. The General Conditions, Information to Bidders, Special Conditions, and other pertinent documents issued are a part of these specifications and shall be complied with in every respect.
- B. This Contractor shall examine the General Construction Plans, the Structural Plans and the Electrical Plans and lay out his work accordingly to avoid conflict.
- C. This Contractor shall visit the site in order to familiarize himself with existing working conditions. Failure to do so shall not relieve Contractor of responsibility of making changes required by conditions encountered on site.
- D. This Contractor shall conform to standards prescribed by City, County and State regulations or ordinances having jurisdiction. Any changes that may be necessary to conform to such regulations or ordinances shall be made by this Contractor without extra cost to the Owner.
- E. This Contractor shall provide all items, articles, materials, operations or methods listed, mentioned, or scheduled on the drawings and/or herein including all labor, materials, equipment and incidentals necessary, required or implied, for the completion of the various systems.
- F. Permits required for the installation of the work, as well as all authorized code inspections, including all fees, meters, and assessments, shall be borne by and arranged for by the Contractor.

1.03 DRAWINGS

- A. The drawings indicate the extent and general arrangement of the various systems. If any departure from these drawings is necessary, descriptions of these departures and a statement of the reasons therefore shall be submitted to the Engineer for approval.
- B. These Plans and Specifications shall be considered a part of this Contract. Should an error or omission occur in either the plans or the specifications, or conflict between the two, the Contractor shall not avail himself of such unintentional error, omission or conflict, but shall request same be explained to him and adjusted **Before** signing the Contract or proceeding with the work. After that time the Engineer's resolution of the conflict shall be considered final. The Engineer extends no warranty on the documents to any person or entity other than the Owner identified in the Owner-Contractor agreement.

- C. Heating, plumbing, piping, and wiring plans being necessarily drawn to scale are diagrammatic only. They are intended to indicate capacity or size where stipulated, approximate location, direction and general arrangement of one phase to the other or to the general construction, but not the exact details or arrangement of construction. If, before installation of portions of any or all construction phases, it is found that a more suitable, more workable or more convenient arrangement of any or all phases of the project would result by varying or altering the arrangement from that indicated on the drawings, it shall be done without additional cost to the Owner. Such re-arrangement shall be in accordance with directions from the Engineer or his representative.
- D. Concerning discrepancies discovered after certain portions of any contract have been installed, the Engineer reserves the right to require any or all Contractors to make minor changes in pipe, ducts, fixture or equipment locations or arrangements to avoid conflicts with other work at no additional cost to the Owner.
- E. Because the drawings are to a relatively small scale to show as large a portion as is practical, the fact that only certain features of the system are indicated does not mean that other similar features or details will not be required. Contractors shall furnish all incidental labor, material or equipment for the systems in their control so that each system is a complete and operating one unless otherwise specifically stipulated in the detailed body of the specifications.

1.04 LIST OF MATERIALS, FIXTURES AND EQUIPMENT

- A. Within thirty (30) days after award of Contract, submit a complete list of materials, fixtures and equipment to the Engineer for approval. There shall be seven (7) copies of data on each item and they shall be complete with names and addresses of manufacturers, catalog and model numbers, trade names, any options, capacities, and the Engineer's mark or symbol for that item all clearly marked on each data sheet. Approval shall be based on manufacturer's published ratings only. Materials or equipment rejected shall be revised and re-submitted within thirty (30) days. Failure to comply with the above mentioned deadlines shall disallow any substitutions of materials or equipment. After two rejections of any item, the Contractor will be required to submit on that item exactly as specified.
- B. Submittals shall be bound in a **Three Ring Binder**. There shall be an index clearly identifying each item being submitted. Each section shall be clearly tagged such that it corresponds to the index.
- C. Contractor shall not delegate the authority to material supply houses to present data for approval. This shall be done by the Contractor.
- D. Partial submittals will **Not Be Accepted**. HVAC, Plumbing, and Fire Protection can be submitted separately as a complete submittal.

1.05 SUBSTITUTIONS OF MATERIALS

- A. Where a definite material is specified, it is not the intent to discriminate against any product of another manufacturer. It is the intent to set a definite standard.
- B. Open competition is expected, but in all cases, complete data must be submitted on all proposed substitutions and samples shall be submitted for comparison and test when requested by the Engineer.

- C. Where three or more manufacturers or suppliers are listed for any given material, equipment, or service the Engineer reserves the right to require the Contractor to provide material, equipment, or service from one of the named manufacturers or suppliers. Reference to a brand name, however, will not excuse that or any brand from compliance with all specified requirements. The Engineer expressly reserves the right to reject the use of unnamed material, equipment or services.
- D. The words "or equal", "equal to", etc, signify that the written approval of the Engineer must be obtained before any substitutions may be made for the items specified well in advance of the time when such items are needed. The Engineer's approval will not relieve the Contractor of responsibility for material, equipment or work later found to be defective or otherwise unsuitable for the work. The Engineer will not approve equipment prior to submittals submission after job is bid.
- E. It shall be the responsibility of this Contractor to ascertain if the substitute items will fit into the space allotted as conveniently as the items specified. Any changes to the building system or electrical design necessary shall be arranged for in writing before material is ordered. All costs involved in making such changes shall be borne by the Contractor. If such changes are deemed inadvisable by the Engineer, the Contractor shall install items specified even though substitute item had been previously approved. Engineer's approval of a substitute is for performance and/or design only.

1.06 STARTING AND INSTRUCTIONS

- A. All equipment and systems shall be tested as hereinafter specified or directed by the Engineer.
- B. Furnish a competent mechanic to supervise the starting, adjusting and testing of all equipment and to train the operator in the operation of the system. Where specified, certain major items of equipment shall be installed under the supervision of and tested by a specialist furnished by the manufacturer of the equipment. Such specialist shall train the operator in the use of his equipment.
- C. Furnish manufacturer's printed operating and maintenance instructions for equipment and systems. Mount operating instructions in approved frame with glass cover and locate where directed.

1.07 PROTECTION OF EQUIPMENT AND MATERIALS

- A. Responsibility for care and protection of equipment and materials under this Contract rests with this Contractor until equipment or materials have been tested and accepted.
- B. All pipe ends, valves, and parts of equipment left unconnected, permanently or temporary, shall be capped, plugged or properly protected to prevent entry of foreign matter.

1.08 SERVICE AVAILABILITY

- A. The availability of service is of prime importance to the Owner and was a major consideration in selecting items as a basis for this specification. The Contractor is advised, therefore, to exercise caution in accepting prices in the "or equal" clause in this specification. The service agency, as a representative of this manufacturer, must have been in continuous operation in this area sufficient time to indicate a degree of permanence as required by the Engineer.

1.09 CODES AND STANDARDS

A. Applicable Codes

1. All work performed and all materials used shall conform to the standards as set up by the following codes:
 - a. National Electrical Code
 - b. International Plumbing Code
 - c. International Building Code
 - d. National Fire Codes - NFPA
 - e. ASHRAE Guide
 - f. SMACNA, Duct Construction Standards
 - g. Local City, County and State codes

1.10 ELECTRICAL REQUIREMENTS

A. General

1. All mechanical work performed under this Contract shall be in accordance with Division 16, Electrical Construction.
2. All motors under this Contract shall have thermal overload protection.
3. Motor starters required for manual or automatic control other than those shown in a motor control center or motor starter panel shall be furnished by mechanical contractor and installed by electrical contractor as directed. Manually controlled motors shall be provided with hand-off-automatic switches integral with the starter. All magnetic starters shall be provided with red running pilot light in cover and three-phase overload protection. Motor starters shall be Square D or approved equal.
4. Motor starters shall be furnished specifically for the following:
 - a. All three-phase motors.
 - b. All single-phase motors rated over 120 volts.
 - c. All single-phase motors rated 120 volts where interlocked with other motors or controlled devices.
5. Starters shall be enclosed in NEMA 1 enclosures when located indoors, NEMA 3R enclosures when located outdoors, and when located in hazardous or classified locations shall be enclosed in an enclosure rated for the specific type atmosphere expected to be present.
6. Power Connections (Line Voltage): For controlled circuits shall be furnished and installed from distribution or power panel to disconnect (safety) switch, starter and final connection to motor by Electrical Contractor.
7. Control circuit wiring required for interlocking starters and remote control of controlled devices, including conduit, wiring, boxes and final connections shall be the sole responsibility of the Mechanical Contractor. Where controlled interlocking of motor is required, all starters shall be furnished with two (2) normally open and one (1) normally closed auxiliary contacts. This shall include connections to Energy Management Panel.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 WORKMANSHIP, MATERIALS AND EQUIPMENT

- A. All work shall be performed in a workmanlike manner and shall present a neat and mechanical appearance when completed. All materials shall be of type, quality and minimum rating prescribed therein or indicated on the Plans.

3.02 PROTECTION OF WORK

- A. This CONTRACTOR shall protect his work at all times from danger by freezing, breakage, dirt, foreign materials, etc., and shall replace all work so damaged. The CONTRACTOR shall use every precaution to protect the work of others, and he will be held responsible for all damage to other work caused by his work or through the neglect of his workmen.

END OF SECTION

SECTION 15020

BASIC MECHANICAL REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE

- A. Provide all material, equipment and labor, etc., required to complete installation specified herein and/or shown or scheduled on Plans.

1.02 GENERAL PIPING INSTALLATIONS

- A. Arrange and install piping approximately as indicated, straight, plumb and as direct as possible; form right angles or parallel lines with building walls. Keep pipes close to walls, partitions, ceilings, offset only where necessary to follow walls as directed. Locate groups of pipes parallel to each other; space them at distance to permit applying full insulation and to permit access for servicing valves. The Engineer reserves the right to require this Contractor to make minor changes in pipe locations where conflicts occur with other trades or equipment. Such changes shall be made without extra cost to the Owner.
- B. Install horizontal piping as high as possible without sags or humps. Grade drainage piping at uniform slope of 1/4 inch per foot minimum. Where this is impossible, maintain slope as directed, but in no case less than 1/8 inch per foot.
- C. Locate valves for easy access and operation. Where concealed, provide access doors. Do not locate any valves with stems below horizontal.
- D. Provide water supply, drain, vent and gas connections to equipment specified in other Sections, requiring such services. Indicated locations and sizes of piping, valves, shall conform to approved shop drawings and printed installation directions furnished by equipment manufacturer. Connection sizes shall not be smaller than equipment outlets for same.
- E. Provide flanges or unions as applicable at all equipment connections. For steel and wrought iron pipe, use malleable iron unions 150 psi for standard pipe and 250 psi for extra heavy, with bronze to iron ground joints; cast iron flanged unions to be gasket type.
- F. Sufficient space shall be allowed in erecting piping for proper application of thermal insulations including fittings. In no case shall any insulation be cut or reduced in thickness because of inadequate space.
- G. If any piping is found installed without being reamed, cleaned, deburred, etc. or in any way contrary to above, it shall be sufficient reason for related erected piping to be removed, inspected by the Engineer, corrected and reinstalled, all at contractor's expense.
- H. **All Piping** to be of domestic (United States) manufacture and so certified by the Contractor.
- I. In the installation of all pipe runs where shown or where necessary, install expansion joints as specified or as necessary to allow for expansion. Broken pipe or fittings due to rigid connections must be removed and replaced at no additional cost to the Owner.
- J. All lines shall be securely anchored where required. Where such anchors occur, they shall be securely fastened to the structure of the building in a manner approved by the Engineer. Drawings shall be submitted before installation.

- K. Exposed piping passing through walls, floors and ceilings, shall be fitted with escutcheons. Inside diameter shall fit around insulation or around pipe when not insulated; outside diameter shall cover sleeve.

1.03 FLASHING

- A. Vent pipes passing through roof shall be flashed with 4 pounds lead sheet, at least 20 inches square shall be extended up and turned down inside pipe with pipe at least 12 inches above roof at center line. Vents shall off-set in roof joist area if necessary so that no vent shall be closer than 4 feet from outside wall line.

PART 2 PRODUCTS

Not applicable

PART 3 EXECUTION

3.01 WORKMANSHIP, MATERIALS AND EQUIPMENT

- A. All work shall be performed in a workmanlike manner and shall present a neat and mechanical appearance when completed. All materials shall be of type, quality and minimum rating prescribed therein or indicated on the Plans.

3.02 PROTECTION OF WORK

- A. This CONTRACTOR shall protect his work at all times from danger by freezing, breakage, dirt, foreign materials, etc., and shall replace all work so damaged. The CONTRACTOR shall use every precaution to protect the work of others, and he will be held responsible for all damage to other work caused by his work or through the neglect of his workmen.

END OF SECTION

SECTION 15050

PIPE AND FITTINGS

PART 1 GENERAL

1.01 SCOPE

- A. Provide all material, equipment and labor, etc., required to complete installation specified and/or shown or scheduled on plans.
- B. Piping shall be in accordance with the following standards:
 - 1. ANSI B16.18 Cast Copper Alloy Solder Joint Pressure Fitting
 - 2. ANSI B16.22 Wrought Copper and Copper Alloy Solder Joint Pressure Fitting
 - 3. ANSI B16.24 Cast Copper Alloy Pipe Flanges and Flanged Fittings
 - 4. ANSI B31.5 Refrigeration Piping Errata
 - 5. ASME/ANSI B16.5 Pipe Fitting and Pipe Flanges
 - 6. ASME/ANSI B16.26 Cast Copper Alloy Fittings for Flared Copper Tubes
 - 7. ASTM B 32 Solder Metal
 - 8. ASTM B 42 Seamless Copper Pipe, Standard Sizes
 - 9. ASTM B 88 Seamless Copper Water Tube
 - 10. ASTM B 306 Copper Drainage Tube (DWV)
 - 11. ASTM D1784 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
 - 12. ASTM D2665 Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
 - 13. ANSI A13.1 Scheme for the Identification of Piping Systems
 - 14. International Plumbing Code

1.02 WORK INCLUDED

- A. Pipes, fittings, unions, couplings, flanges, gaskets, and other materials and instructions for the following piping systems:
 - 1. Sanitary waste and vent piping.
 - 2. Domestic water piping.

1.03 SUBMITTALS

- A. Provide submittal data showing product is in compliance with these specifications and the referenced industry standards.

1.04 QUALITY ASSURANCE

- A. All piping installed on this project shall be new and of full weight and size shown and of proper specification for service intended. Only domestic pipe may be used. When piping is cut, it shall be reamed with pipe reamer and all burrs, scale, trash and foreign matter removed. Where non-ferrous piping connects to ferrous piping, install EPCO dielectric couplings.
- B. Where piping is threaded, dies shall be clean and sharp and joint compound shall be applied to male end only. All joints shall be made up tight. The caulking of these joints will not be tolerated. Pipe joint compound must be approved by the Engineer. Copper tubing may be cut with a tubing cutter or hacksaw with guide.

PART 2 PRODUCTS

2.01 Provide the specified materials for the following piping systems:

- A. Sanitary Waste and Vent Piping inside building:
 - 1. Sanitary waste and vent piping two inches (2") in diameter or greater below slab on grade inside of building and to 5'0" outside of building shall be standard weight hub type cast iron in accordance with ASTM A74. Either lead or neoprene or rubber gaskets in accordance with ASTM C 564 or CISPI HSN shall be utilized for all joints.
 - 2. Sanitary waste and vent piping two inches (2") in diameter or greater within the building shall be hubless in accordance with CIPSI 301 with CIPSI 310 couplings.
 - 3. Condensate, waste and vent piping less than 2 inches (2") in diameter inside of building and above slab on grade shall be Schedule 40 galvanized steel in accordance with ASTM A53.
- B. Sanitary sewers outside of building shall be PVC: PVC pipe shall be SDR 35. Jointing shall be accomplished by means of elastomeric gasket joints conforming to ASTM D 3212. Gasket materials shall be suitable for use with domestic sewage and shall conform to ASTM F 477. Pipe shall be installed in accordance with ASTM D 2321.
- C. Domestic water piping system outside building: Domestic water piping below grade and outside of building shall be Type "K" copper in accordance with ASTM B88. Fittings shall be ANSI B16.18 or ANSI B16.22 soldered joint in accordance with SBCCI 97.
- D. Domestic Water Piping System Inside Building: Domestic water piping within the building shall be Type "L" copper in accordance with ASTM B88 with ANSI B16.18 or ANSI B16.22 soldered joint fittings or with ASME/ANSI B16.26 flared joint fittings. Provide ASTM B42 copper pipe nipples with threaded end connections. Provide ASTM B32, 95-5 tin-antimony solder, or provide Plumbing Code approved lead-free solder.
- E. Equipment Drain Piping: Equipment condensate drain shall be either Type "L" or Schedule 40 galvanized steel.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All piping installed on this project shall be new and of full weight and size shown and of proper specification for service intended. Only domestic pipe may be used. When piping is cut, it shall be reamed with pipe reamer and all burrs, scale, trash and foreign matter removed. Where non-ferrous piping connects to ferrous piping, install EPCO dielectric couplings.
- B. Where piping is threaded, dies shall be clean and sharp and joint compound shall be applied to male end only. All joints shall be made up tight. The caulking of these joints will not be tolerated. Pipe joint compound must be approved by the Engineer. Copper tubing may be cut with a tubing cutter or hacksaw with guide.
- C. Copper tubing shall be thoroughly reamed, cleaned with steel wool or emery cloth, and a non-corrosive flux used before soldering or brazing. Where soldered joints in domestic water piping are specified, only **Antimony And Lead Free** solder shall be used. Where brazed joints are specified, only copper-phosphorous alloys shall be used. Where unavoidable soldered joints occur below slab on grade, silver solder with minimum 5% silver content shall be used.

- D. Mechanically formed tee connections may be utilized on copper piping systems. Systems shall be in accordance with ASME B31, ANSI B31.5, National Plumbing Code Section 4.2.8.2 and Standard Plumbing Code Section 604.8. System shall utilize brazed connections, rather than soldered. Brazed connections shall be in accordance with Copper Development Association recommendations.
- E. Where welding is specified or done, it shall be by electric arc by mechanics skilled in operation and holding a test certificate acceptable to the Engineer. All scale and flux shall be removed from piping after welding.

3.02 STENCILING ON PIPING

- A. All piping exposed or concealed shall have the following symbols stenciled on pipe in a visible location. Stencil shall be attached to pipe every twenty feet (20').
- B. Stencil shall be installed after piping has been painted and/or insulated. Stencil legend shall be as follows:

Service:

Sanitary waste and vent
Domestic cold water
Domestic hot water

Symbol:

San W.
DCW
DHW

- C. Install "Direction of Flow" arrow at each stencil.

3.03 PAINTING OF PIPING AND/OR PIPE INSULATION

- A. After insulation and before stenciling, piping in the following locations shall be painted by the General Contractor with appropriate direction from the Mechanical Contractor:
 - 1. All piping in equipment rooms.
 - 2. All other exposed piping indoors.

END OF SECTION

SECTION 15060

VALVES

PART 1 GENERAL

1.01 SCOPE

- A. Provide all material, equipment and labor, etc., required to complete installation as specified herein and/or shown or scheduled on plans.
- B. This section includes the installation of all valves.
- C. Valves shall be in accordance with the following industry standards:
 - 1. MSS SP-67 Butterfly Valves
 - 2. MSS SP-69 Pipe Hangers and Supports - Selection and Application
 - 3. MSS SP-70 Cast Iron Gate Valves, Flanged and Threaded Ends
 - 4. MSS SP-72 Ball Valves with Flanged or Butt-Welding Ends for General Service
 - 5. MSS SP-80 Bronze Gate, Globe, Angle and Check Valves
 - 6. MSS SP-85 Cast Iron Globe & Angle Valves, Flanged and Threaded Ends
- D. Submittals:
 - 1. Provide submittal data showing product is in compliance with these specifications and the referenced industry standards.
 - 2. Valves shall have name or trademark of manufacturer and working pressure cast or stamped on valve body.

PART 2 PRODUCTS

2.01 BALL VALVES

- A. Domestic water
 - 1. Ball valves, 3 inch diameter or less: Combroco 32-200 125 psi

2.02 CHECK VALVES

- A. Domestic water
 - 1. Swing check type, 2 inch diameter or less:
 - a. Valves shall be bronze, swing type in accordance with MIL-V-18436.
 - b. Valves shall be rated for 125# SWP.
 - c. Valves shall be:
 - d.
 - 1) Nibco S-413-Bq
 - 2) Stockham B-309
 - 3) Milwaukee 1509
 - 4) Crane 1342

2.03 MISCELLANEOUS

- A. Gage Cock: Crane No. 744
- B. Drain Valves: Gate valves conforming to MSS SP-80, manually operated 3/4-inch pipe size and above, with threaded ends. Provide hose nipple adapters for connecting a hose to lead to a convenient floor drain. Provide frost-free valves for installations exposed to weather.

2.03 COPPER PIPE

- A. Models indicated in this Section are for steel pipe. Since copper service is indicated, Contractor shall supply a valve of the same type specified, but for copper pipe.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Valves shall be installed in accordance with manufacturer's recommendations.
- B. Install at equipment and as indicated on drawings to allow maintenance or isolation, and to establish proper and sequential operation of complete system. Shell and tube liquid coolers shall have fluid valves installed so that tubes are accessible for cleaning or replacing. Provide globe valves or plug cocks where required to regulate flow to obtain equal distribution of gas or fluid handled. Remove valve bonnets, where valve construction permits removal, when connecting valves by brazing to copper tubing. Install globe and angle valves with stems horizontal where necessary to avoid trapping of fluid.

END OF SECTION

SECTION 15080

MECHANICAL SUPPORTING DEVICES

PART 1 GENERAL

1.01 SCOPE

- A. Provide supporting devices for mechanical systems as described herein.
- B. Isolators shall be in accordance with the following industry standards:
 - 1. ASTM D 2240 Rubber Property - Durometer Hardness
 - 2. ARI 370 Sound Rating of Large Outdoor Refrigerating and Air Conditioning Equipment
 - 3. ARI 575 Measuring Machinery Sound Within an Equipment Space

1.02 SUBMITTALS

- A. Provide submittal data showing product is in compliance with these specifications and the referenced industry standards.

1.02 PIPE HANGERS

- A. All horizontal pipe are to be supported by adjustable hangers supported below structure. Use Fee and Mason 239, Grinnell, or Midland-Ross. Use Fee and Mason Figure 81, Grinnell or Midland-Ross protectors on all insulated pipe and install hangers on outside of insulation.
- B. Where piping is grouped in parallel horizontal runs at same elevation, or as otherwise noted on plans, bar-type supports may be used using Fee and Mason Figure 8005, Grinnell, or Midland-Ross hangers or Unistrut channels.
- C. All vertical risers shall be supported at the floor by Fee and Mason Figure 241, Grinnell, or Midland-Ross riser clamps in addition to adequate base supports.
- D. Hangers are to be installed not more than ten feet (10') apart on 1-1/2 inch and larger pipe and not more than eight feet (8') apart on pipe smaller than 1-1/2 inches.

1.03 FOUNDATIONS AND EQUIPMENT SUPPORTS

- A. This Contractor shall provide suitable foundations and supports, as indicated on drawings, specified herein, or as required to make a neat, substantial and workmanlike job. All foundations, supports, stands, etc., shall be approved by the Engineer prior to construction.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 INSTALLATION

- A. Support equipment as specified herein.
- B. Provide isolators for equipment and piping systems as specified herein.
- C. Install isolators, materials and equipment as per manufacturer's directions.

END OF SECTION

SECTION 15160

MECHANICAL SYSTEMS INSULATION

PART 1 GENERAL

1.01 SCOPE

- A. Provide all material, equipment and labor, etc., required to complete installation specified herein and/or shown or scheduled on Plans.
- B. Field applied insulation for thermal efficiency and condensation control for HVAC piping, ductwork and equipment.
- C. Industry Standards
- D. Insulation systems shall be in accordance with the following industry standards:
 - 1. ASTM C 195 Mineral Fiber Thermal Insulating Cement
 - 2. ASTM C 534 Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form
 - 3. ASTM C 547 Mineral Fiber Preformed Pipe Insulation
 - 4. ASTM C 552 Cellular Glass Thermal Insulation
 - 5. ASTM C 553 Mineral Fiber Blanket and Felt Insulation (Industrial Type)
 - 6. ASTM C 612 Mineral Fiber Block and Board Thermal Insulation
 - 7. ASTM C 916 Adhesives for Duct Thermal Insulation
 - 8. ASTM C 1136 Flexible, Low Permeance Vapor Retarders for Thermal Insulation
 - 9. ASTM D 828 Tensile Breaking Strength of Paper and Paperboard
 - 10. ASTM E 84 Surface Burning Characteristics of Building Materials
 - 11. ASTM E 96 Water Vapor Transmission of Materials
 - 12. NFPA 90A Standard for the Installation of Air Conditioning and Ventilation Systems
 - 13. NFPA 255 Surface Burning Characteristics of Building Materials
 - 14. IBC International Building Code
 - 15. UL 723 Surface Burning Characteristics of Building Materials
- E. Submittals: Provide submittal data showing product is in compliance with these specifications and the referenced industry standards.

1.02 GENERAL

- A. Insulation shall include all insulating materials, their application, recanvassing after finish, bands, tie wire, and weather protection for all pipe fittings, valve and equipment as indicated and as specified herein.
- B. Insulation and insulation assemblies shall meet the requirements of Section 719, International Building Code (IBC), 2003 Edition as amended, unless more stringent requirements are listed herein.
- C. Concealed insulation shall have a flame spread of 0-75 and a smoke developed of 0-450.
- D. Exposed insulation shall have a flame spread of 0-50 and a smoke developed of 0-450.

- E. Scope of Insulation: All new piping as indicated below, or where indicated on plans, details or schematics. All piping components exposed and subject to freezing shall be insulated. This includes valves, expansion joints, orifices, etc. Where gauge cocks, orifice ports and other similar devices require access, such devices shall have extensions beyond insulation provided by mechanical contractor.
- F. If a material specified herein becomes unavailable, or if there is a question regarding the required insulating material on this job, insulator shall advise engineer **Before** job bids for resolution of the question.
- G. PVC jackets for insulation shall be in accordance with UL 723 and pertinent flame spread and smoke developed ratings.

PART 2 PRODUCTS

2.01 PIPE INSULATION

A. Domestic Water Piping:

- 1. All above grade domestic cold and hot water piping shall be insulated, except that domestic cold water piping in chases with no exterior wall exposure shall not require insulation. Piping shall be insulated with the following type of insulation:
 - a. Half inch (1/2") thick heavy density UL listed fiberglass insulation with factory supplied vapor barrier jacketing. Jacketing shall have continuous pressure sealing lap adhesive for sealing of the longitudinal joint. Butt strips shall be sized to seal each circumferential joint. Jacket shall have vapor permeance not greater than 0.02 perm/in. Fittings shall be insulated with 1/2" precut fiberglass and molded snap on type PVC jacket cover having a 25/50 flame/smoke rating. Seal edges of snap-on cover.

2.02 DUCT INSULATION (SUPPLY, RETURN AND OUTSIDE AIR)

A. Ductwork shall be insulated on the exterior as follows:

- 1. All ductwork shall be wrapped with blanket flexible mineral fiber conforming to ASTM 553, Type 1, Class B-3, 1.0 pounds per cubic foot, 2.0 inches thick.
- 2. The insulation shall be stapled in place and all joints sealed as per manufacturer's directions. A copy of said directions shall be furnished the Engineer with shop drawings on insulation.
- 3. Duct dimensions indicated are actual metal sizes prior to installation of exterior insulation.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All insulation shall be installed in accordance with manufacturer's written instructions.
- B. All above insulation shall be applied by an approved insulating Contractor employing trained insulating personnel.

- C. No insulation shall be applied over pipes, fittings or other surfaces which are not clean. Insulation shall be applied after pipes have been thoroughly tested and proven tight by the Mechanical Contractor.
- D. Insulation shall fit in snug contact with pipe and be installed in accordance with Manufacturer's recommendations.
- E. Stagger joints on layered insulation.
- F. Seal joints in insulation.
- G. Provide six inch long, 20 gauge galvanized steel sleeve around pipe insulation at each support.
- H. Insulation exposed outside building (where not covered by aluminum jackets) shall have "slit" seams placed on bottom of pipe and given two coats of white adhesive finish as recommended by insulation manufacturer.
- I. Insulate fittings with sheet insulation and as recommended by Manufacturer where no other fitting insulation is indicated above.

END OF SECTION

SECTION 15300

PLUMBING FIXTURES, TRIM & ACCESSORIES

PART 1 GENERAL

1.01 SCOPE

- A. Provide all material, equipment and labor, etc., required to complete installation specified herein and/or shown or scheduled on Plans.
- B. Work Included: Plumbing fixtures, associated trim and fittings necessary to make a complete installation from wall or floor connections to rough piping, and certain accessories.
- C. Plumbing fixtures, trim and accessories shall be in accordance with the following industry standards:
 - 1. ANSI A112.36.2M Cleanouts
 - 2. ASME A112.6.1M Supports for the Off-the-floor Plumbing Fixtures for Public Use
 - 3. ASME A112.18.1M Plumbing Fixture Fittings
 - 4. ASME/ANSI A112.19.1M Enameled Cast Iron Plumbing Fixtures
 - 5. ASME A112.19.2M Vitreous China Plumbing Fixtures
 - 6. ASME A112.19.5 Trim for Water-Closet Bowls, Tanks, Urinals
 - 7. ASME A112.21.1M Floor Drains
 - 8. PDI WH 201 Water Hammer Arrestors
 - 9. IBC SPC Standard Plumbing Code

1.02 GENERAL

- A. All fixtures must be securely fastened to the floor or walls by means of inserts or expansion bolts in concrete work, and by means of expansion bolts, toggle bolts in masonry work, and by means of framing and screws in frame construction, to the satisfaction of the Architect/Engineer. Plumber shall install fixtures in accordance with standard industry practice and manufacturer's instructions. Plumber shall seal around counter mounted fixtures to provide positive seepage protection.
- B. All plumbing fixtures shall be provided complete with all necessary trim including bolt caps, tail pieces and drains, blank off caps, etc., such that the fixtures are fully functional and aesthetically complete, whether or not all such parts are specifically listed in the specifications below. All porcelain or vitreous china fixtures (and related trim) shall be furnished in white color unless otherwise noted.

1.03 FIXTURE TRIM

- A. All plumbing fixture brass trim shall be so designed that all wearing parts are to be in a standardized renewable operating unit which can be removed without detaching the supply fixture or faucet proper. The standardized renewable operating units are to be interchangeable with all supply fixtures and faucets whether quick compression or self-closing. All exposed metal parts of all fixtures, including faucets, waste fittings, waste plugs, strainers, flush valves, traps, supplies, nipples and escutcheons shall be chrome plated brass unless other materials or finish is specified. Angle stops with S.P.S. brass nipples from wall to stops shall be provided on all water supplies to fixtures. Fixture trim must be that of the fixture manufacturer wherever possible and must bear a permanent impression of the manufacturer. No "competitive grade" trim will be permitted. All tubular waste pipe and fittings under sinks and lavatories shall be 17 gauge chrome plated brass. All p-traps shall have cleanout plugs.

- B. SUBMITTALS: Provide submittal data showing product is in compliance with these specifications and the referenced industry standards.

PART 2 PRODUCTS

- 2.01 Furnish and install all plumbing fixtures as shown on Plans. Kohler fixtures are specified, however, Crane, Eljer, or American Standard may be used if they are equal in all respect to those specified. Contractor shall submit data on trim on well as fixtures. Where Zurn flush valves are specified, equivalent Delaney models will be the only permitted substitute.

- A. Trap Primers

- 1. Trap primer shall be connected to lavatory traps. Exposed piping shall be chrome plated and one chrome plated escutcheon shall be furnished to mount at wall. As Zurn Model CTP.

- B. Cleanouts

General: Furnish all cleanouts and/or test tees as shown on Plans and required by Code. Cleanouts shall be the same size as the pipe they serve, except that 4 inches shall be the largest size required. Cleanouts shall be provided at the foot of each soil stack and of each run, change in direction, and mains, not to exceed 50 feet apart inside of building and 100 feet apart outside of building. Cleanouts shall be as manufactured by Wade, Jay R. Smith, Zurn, or Josam, and shall be as follows:

- 1. Inside building- Zurn Model ZN 1400 NH.
 - 2. Outside building where concrete occurs - Zurn Model Z-1400HD-NH.

- C. Water Hammer Arresters:

- 1. All water supply piping fittings and fixtures shall be protected against water hammer, shock or surge pressure by water hammer arresters. Arresters shall incorporate metal piston. The following schedule for Zurn or Precision Plumbing Products, arresters shall apply:

<u>P.D.I. Symbol</u>	<u>Fixture Unit Ratings</u>
A	1-11
B	12-32
C	33-60
D	61-113
E	114-154

- 2. Fixture piping shall be adequately anchored to prevent vibration.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Fixtures, trim and accessories shall be installed in accordance with manufacturer's recommendations.

3.02 ROUGH-IN DATA:

- A. Where handicapped fixtures are indicated, the following dimensional data shall apply:
 - 1. Wall Mounted Water Closets - Mount rim at 18" A.F.F.
 - 2. Wall Mounted Lavatories - Mount so bottom of bowl is 2'-3" A.F.F.
 - 3. Drinking Fountain - Mount at 2'-3" to bottom of fountain.
 - 4. Urinals - Mount rim at 17" A.F.F.
- B. Where standard fixtures are indicated, follow manufacturer's rough-in instructions, except as noted.

END OF SECTION

SECTION 15617

DUST COLLECTOR SYSTEM

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

- A. The requirements of the General Conditions, Supplementary Conditions, and Section 15010 apply to all work specified in this Section.
- B. Refer to Specification Section 15011, titled "Submittals" for the submittal and approval requirements regarding the piping system.
- C. Furnish and install and required equipment, appurtenances, and accessories for a complete heating and cooling system.
- D. See other sections of these specifications that may specify accessories or features.
- E. Refer to the schedules on the drawings where equipment capacities are not included in this section.
- F. Review other sections of the specifications and the plans for services required to each piece of mechanical equipment. Any required accessories, appurtenances, or services omitted from the plans or specifications that are not called to the attention of the Architect at least 72 hours before bidding and corrected by addendum shall be provided as though shown.

1.02 COORDINATION:

- A. Motors required in connection with equipment shall be of sufficient size and speed for duty to be performed, not exceeding their full-rated load when driven equipment is operated at specified capacity under most severe conditions likely to be encountered.
- B. Belt drives shall be adjustable "V" belt type. Selection shall be based on 150% of the motor horse power. Selection shall be factory-set so that specified capacity is at midpoint setting, allowing 20% overall speed adjustment. Motors shall be selected on 110% of the brake horse power required with a service factor of 1. Motors and/or drives shall be changed if required to deliver specified CFM should static pressure differ from that specified.
- C. All exposed rotating machinery shall be equipped with guards.
- D. Submit all equipment for approval.

PART 2 PRODUCTS

- 2.01 COORDINATION: The units of one manufacturer have been used as the basis of design. Any modifications to electrical connections, building structure, etc., that result from the use of another manufacturer shall be coordinated with all other trades. This coordination shall occur before delivery of equipment from the manufacturer. Any modifications shall be performed without incurring any additional cost to the contract.

2.02 DUST COLLECTOR SYSTEM:

- A. Fabric Type Dust Collector - Furnish and install where shown on the plans, a high efficiency filter type collector with integral blower sized for design air flow as shown on the schedule.
- B. Duct collector shall be self-cleaning fabric type complete with cotton filters, backward inclined blower, motorized shaker, factory wired controller and external discharge silencer. Manufacturer's literature shall state that dust collector and selected filter spacing is designed for the collection of wood dust.

Dust collector shall be airtight, all steel construction with sealed seams and gasketed quick opening doors with 14 turn knobs. Housing shall be fabricated of minimum 14 ga. mild steel. Unit shall consist of a filter section and a funnel bottom section without slide gates or doors to allow downflow of dust directly into 55 gallon drum assemblies furnished by manufacturer and painted same color as dust collector.

- C. Unit to include multi-pocket filter modules, each of which is sewn from 8 ounce cotton sateen fabric designed to deliver in excess of 99.5% efficiency by weight on industrial dusts. The filter modules shall have rigid insert separators to prevent collapse of filters and loss of the effective filter area. Flat shaker fingers located at the bottom of the filter modules shall prevent adjoining pockets from touching one another and blanking off. The filter pocket spacing shall be of the wide spacing type (1½") to permit the collected dust to be shaken off the filters freely and recommended by the manufacturer for the collection of sawdust. Fabric media with narrow spacing or pleated cartridges will not be accepted. Total airflow to filter fabric area (air to cloth ratio) shall not exceed 10 CFM per square foot.
- D. Filters will be cleaned automatically after a fifteen second delay following the shutdown of the blower, by the oscillating action delivered by the motorized eccentric driven shaker assembly, which imparts a vibratory force throughout the entire surface of each individual filter pocket to dislodge the dust. Shaker motor shall be a minimum of 1/3 HP.
 - 1. Operation of the automatic shaker shall be controlled by a solid state dual mode timer with adjustable shaker cycle range from 1.8 - 180 seconds. Magnetic starters with overload relays for the blower and shaker motor and control transformer shall be factory wired in a NEMA 4 control panel mounted on the unit for single point wiring. Also included shall be a push button station for remote mounting.
- E. The control panel wiring shall be either UL or ETL labeled for compliance with UL 508A. Control panels not labeled by dust collector manufacturer shall be labeled in field by certified UL or ETL representative prior to placing equipment in operation. Contractor shall provide fused safety disconnect switch.
- F. The integral non-sparking AMCA Type C direct drive blower shall be located on the clean air side of the filters, top mounted at the factory and be of the airfoil or backward inclined design with a dynamically balanced impeller. It shall be driven by a shop schedule 3450 RPM TEFC motor. The blower shall be licensed to bear the AMCA seal and be tested in accordance with AMCA Standard 210 and comply with the requirements of the AMCA Certified Air Performance Ratings Program. Dust collecting units not complying with the AMCA license requirements shall be tested by an independent testing sub-contractor currently certified by the AABC to verify that the unit will meet specified performance. A factory supplied rain cover shall protect the motor cooling fan and reduce noise generated by the motor.

- G. Discharge noise from the blower shall be attenuated by an external field supported duct silencer fabricated with 4.75 lb. Density inorganic mineral or glass fiber. This media shall be protected from erosion by the air flow through the use of galvanized perforated metal with aerodynamic leading and trailing edges to insure maximum acoustical insertion loss at minimum retardancy and combustion. Average dynamic insertion loss of blower discharge shall be at least 10 db(A). Integral lined plenum silencer shall not be accepted.
- H. Interior and exterior carbon steel surfaces shall be primed with red oxide and exterior finished with alkyd resin gray enamel paint or one coat heat cured power spray.
- I. Unit shall be Sternvent Vibraclean or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION:

- A. The Contractor, prior to installing any equipment, shall examine the conditions under which the equipment is to be installed, and shall notify the Architect of conditions detrimental to the proper installation of the equipment.
- B. All equipment shall be installed in accordance with the latest manufacturer's written instructions, and in accordance with governing codes and recognized industry standards and practices.
- C. Coordinate all work with other trades as necessary for proper interfacing.
- D. All proper equipment shall be protected from any form of damage. Any damaged equipment shall be replaced without additional cost.

3.02 START-UP

- A. The initial start-up shall be made by an authorized representative of the equipment manufacturer. The balancing contractor shall be responsible for final verification and reporting of all airflows.

3.03 ADJUSTMENT

- A. The equipment shall be tested and adjusted to ensure the scheduled capacities as indicated. All controls shall be tested and adjusted.

END OF SECTION

SECTION 15710

VARIABLE SPEED DRIVES

PART 1 GENERAL

1.01 SCOPE

- A. Variable speed drives shall be provided for air handling units and pumps as specified herein.
- B. Adjustable frequency drive output power shall vary frequency to the motor from 0 to 60 Hz with resultant motor speed, with output voltage variation from zero to motor rated voltage for optimum volts per hertz (V/Hz) ratio for fan and pump loads. Output current shall be rated 125% of motor full load amps (FLA) for 1 minute based upon AFD's variable torque FLA rating (or 150% based upon AFD's constant torque rating). The output must be a voltage source type generating a sine coded PWM waveform utilizing an asynchronous carrier frequency (output transistor switching frequency is to be independent of drive output frequency) up to 15,000 Hz. This carrier frequency shall be adjustable to minimize harmonically induced noise or vibration. This must be accomplished using a microprocessor based technique which forms a true sine coded current waveform to the motor for smooth performance at all speeds.
- C. Adjustable frequency drive power structure which converts the input AC power to variable frequency output power shall consist of three functional stages:
 - 1. Input Stage - The AFD power input stage shall convert three-phase AC line power to a fixed DC bus voltage. This will be accomplished with a solid state three-phase fullwave diode rectifier with metal oxide varistor (MOV) three-phase protection. Displacement power factor shall be .98 throughout the speed range or power factor correcting capacitors will be provided. Drive shall not cause voltage line notching or input isolation transformer shall be provided.
 - 2. Intermediate Stage - The AFD intermediate power stage shall be interfaced with the AFD diagnostic to provide continuous monitoring for AFD power component protection. The DC bus shall be fused for short circuit power protection. The DC bus shall have capacitive filtering to provide smooth DC power to the output power stage.
 - 3. Output Stage - The AFD output stage shall utilize switching transistors to convert DC bus power to sine-coded PWM voltage source power for motor control. Current transformers (CTs) shall be utilized to detect the output current of all three phases to the motor. This three-phase current detection shall be utilized by the microprocessor to generate information for:
 - a. Electronic thermal motor overload protection or provide external thermal overload
 - b. Three-phase current limit
 - c. Ground fault and short circuit protection or an isolation transformer
 - d. Speed search that allows drive to start into a rotating motor, or provide a time delay relay or a mechanical brake to accomplish this.
 - 4. Insulated Gate Bipolar Transistors (IGBTs) shall be utilized in the inverter output section, enabling a fixed carrier frequency of 15 K-Hz, with performance results of:
 - a. Reduction of induced magnetic audible motor noise such that, under AFD power, motor noise will not increase by more than 2dB (@ 1 meter) above across-the-line power, or an output reactor shall be utilized to reduce this noise.

- b. Maximum torque per amp performance of motor such that start at minimum output frequency of 1.5 Hz will produce 100% full load motor torque without use of extreme levels of voltage boost.
- c. Reduced motor heat rise above ambient, thereby reducing stress on motor insulation and mechanical components and thus increasing motor life.

1.02 VARIABLE SPEED DRIVES

- A. Variable speed drives shall be in accordance with the following industry standards:
 - 1. IEEE 444 Standard Practices and Requirements for Thyristor Converters for Motor Drives, Part I.
 - 2. NEMA ICS1 General Standards for Industrial Control and Systems
 - 3. NEMA ICS2 Industrial Control Devices, Controller and Assemblies
 - 4. NEMA MG1 Motors and Generators
 - 5. UL 1917 Solid State Fan Speed Control

PART 2 PRODUCTS

2.01 OPERATION AND PROTECTION FUNCTIONS

- A. DC injection braking with start frequency, current limit and time duration all adjustable, and selectable for either stop (deceleration braking) or braking before start (anti-windmill) or provide a mechanical brake (for anti-windmill).
- B. In order to avoid mechanical resonant vibrations, drive shall have 3 prohibited frequency ranges with an adjustable span of 0 to 10 Hz, or provide a programmable logic controller (PLC) that provides a speed reference signal to the drive which can have portions of the signal locked out or interrupted to avoid these resonant points.
- C. Speed search shall allow drive to start into a rotating motor, or provide a time delay relay or a mechanical brake to accomplish a safe start.
- D. Detection of auto speed reference loss whereby the drive automatically drops to a preset speed upon loss of auto speed command signal, or provide discrete logic or programmable logic controller to accomplish.
- E. Auto restart shall be programmable for up to ten attempts and is fault selective, or provide a programmable logic controller to monitor the fault and selectively restart.
- F. Power loss ride thru of 2 seconds duration, or provide an external capacitor or battery back-up or uninterruptible external supply (UPS).
- G. A programmed reverse run inhibit shall be provided to prevent reverse rotation of motor for fans or pumps.
- H. An up/down setter, also known as on/off, incremental or floating point control, shall be provided that allows a set of contacts to increase or decrease output frequency and, when contacts are opened, will then hold that frequency.

2.02 ADJUSTABLE FREQUENCY DRIVE

- A. The adjustable frequency drive shall include a terminal strip for the purpose of accepting external control commands. These shall include:
1. Forward Run/Stop-A command from any normally-open contact shall cause the AFD to run.
 2. Speed Reference Input - Shall accept either a manual speed pot signal or an instrument follower signal of:
 - a. 0 to 10 VDC
 - b. 4 to 20 mA current
 - c. 1 to 5 VDC
 3. Multi-function output contacts shall be provided: one shall be a relay contact rated for 1A at 230VAC or 30VDC; two shall be open collector outputs rated for 48VDC at 50mA. All shall be individually programmable for any of the following indications:
 - a. Run mode
 - b. Zero speed detect
 - c. Overtorque detect
 - d. Coast to stop detect
 - e. Run reference mode
 - f. Speed reference mode
 - g. Speed synchronization
 - h. Output frequency detect
 - i. Low voltage detect
 - j. Operation ready
 - k. Speed reference missing
 - l. Braking resistor fault
 - m. Drive fault
 - n. Firestat / freezestat
 4. Output Fault Relay Contact - A form C fault relay contact shall be provided for remote indication that the AFD diagnostic has detected a fault condition and can be selectively activated when either a fault initially occurs or after final (unsuccessful) auto restart attempt. This contact shall be rated for 1A at 230 VAC or 30 VDC.
 5. Terminal that will accept contact closure for remote switching between local/remote control (or H.O.A.).
 6. Multi-function input terminals that will accept freezestat or firestat signals or any external fault signal that will then shut down the drive and give a digital readout, or provide external relays and indicating lights to accomplish this.
 7. A multi-function analog output signal shall be provided selectable for 0 to 10 VDC signal proportional to either output frequency or output current.
- B. The adjustable frequency drive shall have a front mounted sealed touch pad operator to include:
1. Local run/stop keys.
 2. Local speed command.
 3. Reset push button.
 4. Digital output frequency meter and speed reference meter which both can be reprogrammed for other speed related indications, including RPM, CFM, FPM, etc., or provide an integrally mounted meter.
 5. Digital voltmeter, or provide integrally mounted meter.
 6. Digital Kilowattmeter, or provide integrally mounted meter.
 7. Digital ammeter, or provide integrally mounted meter.
 8. Input and output terminal status indication, or provide a programmable logic controller to monitor drive terminals and provide status.

9. Ability to program various control functions without necessity of stopping Drive while in Run mode, including but not limited to the following:
 - a. Acceleration and deceleration
 - b. Frequency command bias & gain
 - c. Torque compensation
 - d. Slip compensation
 - e. Energy savings gain
 - f. Multi-step speed references
 10. Digital diagnostic indication and protection for:
 - a. DC bus undervoltage
 - b. DC bus over voltage
 - c. Load over torque
 - d. Fuse blown
 - e. Motor overload
 - f. AFD overload
 - g. Heatsink over temperature
 - h. Instantaneous over current
 - i. Operator error
 - j. Central processor fault
 - k. External fault
 - l. Dynamic braking fault
- C. The adjustable frequency drive microprocessor shall include the following adjustments:
1. Maximum output frequency - 0 to 400 Hz.
 2. Minimum output frequency - 0 to 400 Hz.
 3. Acceleration time - .5 to 600 seconds.
 4. Deceleration time - .5 to 600 seconds.
 5. Current limit - 0 to 170%.
 6. 15 V/Hz pre-set selection patterns.
 7. Capability to program a totally customized V/Hz pattern.
 8. Auto speed reference (instrument follower) input adjustable for bias and gain.
 9. Stall prevention accomplished by reducing output voltage and frequency during momentary overload. When overload clears, drive will automatically resume normal operation.
 10. Adjustable torque and/or current limit.
 11. Ramp to stop or coast to stop selection.
 12. Capability to set upper and lower frequency limits independent or min and max V/Hz frequency patterns.
 13. Linear or S-curve function for soft start.
 14. Two independent, selectable accel/decel ramp functions.
 15. A minimum of 4 programmable multi-function inputs.
 16. External start/stop shall be programmable for either 2 wire or 3 wire control. 3 wire option should not require a holding contact.
 17. There shall be a programmable lock out code available to prevent operator access to parameter setting.
 18. A selectable/adjustable energy saving gain shall be available that can be activated during frequency command synchronization.
 19. Minimum of 9 preset speeds.
 20. Capability via drive software programmability to provide Hand-Off-Auto (H.O.A.) selection without need for separate H.O.A. selector switch.
 21. Up/down frequency setting.

D. The adjustable frequency drive shall provide the following standard functions:

1. Ground fault protection.
2. Transducer (or process) follower.
3. Critical frequency rejection.
4. Diagnostics.
5. Auto restart.
6. Speed search.
7. DC Injection.
8. Digital keypad/display.
9. Minimum displacement power factor of .98 or provide power factor correction capacitor.
10. Minimum efficiency of .97.
11. 2 second power loss ride-thru.
12. Upper & lower freq limits.
13. Speed reference loss detection.
14. 9 pre-set speeds.
15. Stall prevention.

2.03 BYPASS CONTROL

A. A bypass control shall be provided for the purpose of running the AC motor at full speed with line power while the AFD is being serviced. Bypass and drive shall be electrically interlocked. The AFD package shall be configured so that the AFD can be removed for service with the bypass control left in place. The bypass control shall include:

1. NEMA 1 Enclosure.
2. Door interlocked disconnect.
3. Bypass Contactor.
4. AFD Input Contactor.
5. AFD Output Contactor.
6. Overload Relay.
7. 115 VAC Control Transformer.
8. Safety Circuit Terminal Strip.
9. Drive-Off-Line Selector.
10. Power On Light.
11. AFD Select Light.
12. Line Select Light.

2.04 QUALITY ASSURANCE

A. All Printed Circuit boards will utilize surface mounted devices (SMDs) to provide high reliability and strengthened printed circuit assembly:

1. Printed Circuit boards burned in for 96 hours.
2. Integrated circuit boards tested to a criteria of 0.5% AQL (Accepted Quality Level).
3. Fully assembled AFD tested with fully loaded induction motors.
4. Mean time between failures (M.T.B.F.) data should be available and have a minimum value of 100,000 hours.

B. Environmental Specification: The AFD shall be enclosed in a NEMA-1 package for use in the following environmental conditions:

1. Ambient Temperature from -10 to +40 deg. C.
2. Altitude to 3300 feet.
3. Service factor: 1.0.

- C. Variable speed drives shall be in accordance with IEEE 444 and UL 1917. Electrical systems shall be in accordance with NEMA ICS1, ICS 2, and MG 1.

PART 3 EXECUTION

3.01 PREPARATION

- A. Provide storage for equipment and materials at the project site. Parts shall be readily accessible for inspection, repair, and renewal. Protect materials and equipment from weather.

3.02 INSTALLATION

- A. Install variable speed drives as indicated on drawings and as recommended by manufacturer.

3.03 FIELD QUALITY CONTROL

- A. Schedule and administer specified tests. Provide personnel, instruments, and equipment for such tests. Correct defects and repeat the respective inspection and tests. Give the Contracting Office ample notice of the dates and times scheduled for tests and trial operations. Conduct inspection and testing in the presence of the Contracting Officer.

3.04 TESTING AND BALANCING

- A. Perform testing, adjusting and balancing in accordance with Section 15940, "Testing and Balancing."

END OF SECTION

SECTION 15740

AIR TERMINAL UNITS

PART 1 GENERAL

1.01 SCOPE

- A. Provide all material, equipment and labor required to complete the installation of air terminal units described herein.
- B. Terminal units shall include the following:
 - 1. Variable Volume Terminal Units
- C. Mechanical Contractor shall submit to the Architect/Engineer a computer analysis of the entire duct system utilizing the variable volume terminal units he proposes to furnish and install. Procurement orders shall not be placed with the manufacturer until the Architect/Engineer has approved the computer program of the entire duct system.
- D. Computer analysis shall incorporate algorithms derived for the specific brand of boxes used and shall contain as output NC level at box, size and location of any required orifices, static pressure level in each duct section, attenuation required, and all duct sizes and fitting required. Input shall include noise generating characteristics of the fan type used in the air/handler (e.g. forward curved, airfoil, backward inclined). Computer program shall use iterative procedure to select boxes, duct sizes, fittings and attenuators to meet the required design parameters as set forth on the Plans. Programs provided by sheet metal manufacturers will not be accepted.
- E. Submittal shall include a single line duct drawing showing numbering system for duct section input, duct sizes, box designations and trunk duct takeoff types. If program calls for additional attenuation, different duct sizes, box sizes or orifices to meet the required NC levels, air quantities or static pressure requirements, these changes shall be made at no additional cost to the Owner.

1.02 REFERENCES

- A. Terminal units shall be in accordance with the following industry standards:
 - 1. ARI 410 Forced Circulation Air Cooling and Air Heating Coils
 - 2. ARI 880 Air Terminals
 - 3. NFPA 90A Installation of Air Conditioning and Ventilating Systems
 - 4. SMACNA DCS HVAC Duct Construction

PART 2 PRODUCTS

2.01 VARIABLE VOLUME TERMINAL UNITS

- A. Cabinets shall be constructed of not lighter than 26 gauge zinc coated steel. Unit shall have factory applied enamel finish. Internal surfaces shall be acoustically and thermally insulated with 1 inch glass fiber material surface treated to prevent erosion. Unit shall meet NFPA 90A. All units shall be provided with provision for hanger rod support at each corner.
- B. Ratings: All pressure drops capacities and sound data will be certified as complying with ARI Standard 880 and bear the ARI seal.

- C. Operation: Air volume control shall be accomplished at the unit inlet. The unit shall modulate from design air flow to scheduled minimum air flow as indicated. The device shall be capable of a tight shut-off. The average leakage rate across the air throttling device shall not exceed four percent of design air flow at full shut-off and a three inch pressure differential. Air volume modulation shall be accomplished by an air valve or damper. The device shall be formed of aluminum, either die cast or extruded. It shall be permanently fixed to the control shaft which shall operate with bushings or bearings requiring no lubrication. The air modulation device shall be designed for linear control over the full modulation range. Unit shall be capable of maintaining air flow to within ± 5 percent of rated unit airflow setpoint with 1.5 duct diameters straight duct upstream from the unit. Units shall have pressure independent volume regulators.
- D. Electric heaters shall be factory mounted, UL listed open-type ni-chrome heater with stainless steel terminals and ceramic or phenolic insulators. Heater shall have a disc type automatic thermal primary safety device and a fusible link or manual reset thermal secondary cutout. Multiple staged heaters shall have equally balanced stages.
- E. Sound Levels: All unit sized and models specified for this project shall have certified sound data ratings at or below the specified NC level. Sound data shall be derived from empirical test data when conducted in a recognized sound laboratory. Sound data shall be based on total sound power level db re: 10**-12 watts and measured in accordance with ARI 880. Acoustical data shall be made available for octave bands 1 through 8 for both discharge and radiated sound power. It shall be tabulated at the proposed units required minimum pressure and at differential pressure a minimum of 2.50 inches above this value.
- F. Controls: Controls shall be DDC, pressure independent type. Operators shall be of the DDC type. DDC controls shall be furnished by controls manufacturer.
- G. Capacity: Capacity and characteristics shall be as indicated on drawings.

PART 3 EXECUTION

3.01 PREPARATION

- A. Provide storage for equipment and materials at the project site. Parts shall be readily accessible for inspection, repair, and renewal. Protect materials and equipment from weather.

3.02 INSTALLATION

- A. Install air distribution equipment as indicated and in accordance with the manufacturer's instructions. Provide clearance for inspection, repair, replacement and service.

3.03 FIELD QUALITY CONTROL

- A. Schedule and administer specified tests. Provide personnel, instruments, and equipment for such tests. Correct defects and repeat the respective inspection and tests. Give the Contracting Officer ample notice of the dates and times scheduled for tests and trial operations. Conduct inspection and testing in the presence of the Contracting Officer.

3.04 INSPECTION

- A. Prior to initial operation, inspect equipment installation for conformance with drawings and specifications.

3.05 TESTING AND BALANCING

- A. Perform air handling and distribution equipment tests, adjustments and balancing in accordance with Section 15940, "Testing and Balancing."

END OF SECTION

SECTION 15750

FUME HOODS

PART 1 GENERAL

1.01 SCOPE

- A. Provide all material and labor required to complete the installation of the fume hoods as shown on the drawings.
- B. Hood shall be in accordance with the following standards:
 - 1. NFPA 90A
 - 2. NFPA 45
 - 3. ASTM
 - 4. UL – United Laboratories
 - 5. NFPA 70 – National Electric Code
- C. Fume Hood General Design Requirements:
 - 1. Negative variations in face velocity shall not exceed 20% of the average face velocity.
 - 2. Maximum variation in exhaust CFM, static pressure and average face velocity as a result of baffle adjustment shall not exceed 5% for any baffle position.

1.02 SUBMITTALS

- A. Submit test reports on hood velocity conformance to test report specified.

PART 2 PRODUCTS

2.01 FUME HOOD

- A. Materials:
 - 1. Steel: High quality, cold rolled, mild steel meeting requirements of ASTM
 - 2. Stainless Steel: Type 304
 - 3. Ceiling enclosure panels: 18 gauge steel, upward directional louvers
 - 4. Bypass Grille: Low resistance type, 18 gauge steel, upward directional louvers.
 - 5. Safety Glass: 7/32" thick laminated safety glass.
 - 6. Sash Pull: Full width corrosion – resistant plastic, stainless steel or steel with chemical- resistant powder coating.
 - 7. Gaskets: PVC for interior access panels to eliminate air leakage.
 - 8. Interior liner consists of all interior surfaces, including sides, back, top and baffles. Liner shall be white polyresin, press molded, catalyzed glass polyester sheet with working temperature of 160° C.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Hood shall be installed by a factory certified technician.
- B. Installation shall be in a neat and workman-like manor.
- C. Test and Balance agent shall verify face velocities and exhaust rate in accordance with Section 15940 - "Testing and Balancing".

END OF SECTION

SECTION 15760

EXHAUST FANS/DUST COLLECTOR

PART 1 GENERAL

1.01 SCOPE

- A. Provide all material, equipment and labor required to complete the installation of exhaust fans shown on drawings and specified herein.
- B. Exhaust systems shall be in accordance with NFPA 90A.
- C. Exhaust fans shall be in accordance with the following industry standards:
 - 1. AMCA 210 Testing Fans for Rating
 - 2. AMCA 300 Certified Sound Ratings Program for Air Moving Devices
 - 3. NEMA MG1 Motors and Generators
 - 4. NFPA 90A Installation of Air Conditioning and Ventilation Systems
 - 5. SMACNA DCS HVAC Duct Construction Standards - Metal and Flexible
 - 6. UL 507

PART 2 PRODUCTS

2.01 IN-LINE BELT DRIVE TYPE FAN

- A. Exhaust fans shall be belt-driven in-line type. The square shaped fan housing shall be of heavy gauge formed steel. One of the sides shall be of heavy gauge formed steel. One of the sides shall be hinged and shall support the entire drive assembly and wheel, allowing the assembly to swing out for cleaning, inspection or service without dismantling the unit in any way. The motor shall be mounted on the hinged side exterior isolated from the air airstream. The belt and pillow block ball bearings shall be protected from the airstream by an enclosure. The shaft shall be keyed to both the wheel and the pulley.
- B. The fan inlet shall be a spun venture throat overlapped by a backward curved centrifugal wheel with spun cone for maximum performance.
- C. Each in-line type fan shall be furnished with hanging isolators and factory mounted and wired disconnect switch,
- D. Single phase motors shall have built-in thermal overload protection.
- E. Fan shall have init mounted disconnect switch.
- F. Capacity and characteristics shall be as indicted on Plans.

2.02 DUST COLLECTOR

- A. Dust collection system exhaust ventilation requirement shall be 2500 CFM at 6.3" w.c. E.S.P. as scheduled on the drawings.
- B. Filter unit dust collector shall be a DSP Monoxivent, MNX model #FT64S71D1 or equal.
- C. The dust collector fan shall be located on the "clean air side" of the filter. The fan shall be constructed of spark proof A356-T6 aluminum alloy, and shall rotate at a nominal speed of 3600 RPM in a direct drive configuration. The electrical power supply for the fan unit is to be 240V/3PH.

- D. The filter unit shall contain 64 5" diameter filter tubes.
- E. The filter unit shall be structurally self-supporting, incorporating an angle iron framework and airtight weatherproof enclosure panels of heavy gauge AISI 1010 cold rolled steel, structurally reinforced to operate at the specified system static pressure requirement.
- F. The filter unit shall be provided with a shaker mechanism, which is to be operated electrically.
- G. The motorized shaker shall be driven by a 1/6 HP, TEFC, 1800-RPM motor. Electrical power supply for the shaker is to be 120, 1PH.
- H. The motorized shaker is to be controlled automatically by an SST-1 shaker control.
- I. Collected dust shall be deposited in to a single 55-gallon drum containing 7.3 CU FT dust storage capacity.
- J. Units depositing collected dust in to standard 55-gallon drums shall incorporate a positive seal, clamp-on drum cover assembly. Those held in place by dust collector suction only are not acceptable.
- K. The filter unit shall be supplied with one coat of synthetic gray primer and a minimum of one coat machinery gray enamel.
- L. Contractor shall provide a 6" deep concrete pad with 1/2" steel 12" on center both ways. Unit shall include all required structure and anchored to pad as per manufacturer's recommendations.

2.03 HOOD EXHUAUST FAN

- A. Shall be fully enclosed, single-width single-inlet, as indicated.
 - 1. Fans shall have backward inclined or airfoil type of the non-overloading type, except wheels 10 inches in diameter or smaller may have forward curved blades.
 - 2. Fan wheels shall be steel plate, rigidly constructed, with die-formed blades attached. Fan blades may be flat or airfoil design in wheel sizes up to 27 inches. Fan blades for wheels over 27 inches shall be of airfoil design. Wheel shall be rigidly braced to resist torsional stresses; free from objectionable vibration or noise; statically and dynamically balanced; and shall be capable of operating at speeds not less than 1-1/2 times required operating speed.
- B. Housings and scroll shall have 3/4" drain hole with threaded plug and shall be of steel not lighter than 16 gauge. Fan shall have coating for protection against salt air.
- C. Shaft: Shall be steel, ground to close tolerance; fan wheel and pulley shall be tightly fitted and keyed.
- D. Bearings: Self-aligning heavy duty type having ball or roller bearings with permanently sealed greased packed lubrication; or having babbitted or bronze sleeve bearings with oil ring lubrication from ample oil reservoir and provided with an oil seal to prevent leakage of oil from bearings or entrance of foreign matter into bearings under high suction conditions. Bearings requiring periodic grease or oil lubrication shall be provided with suitable grease fittings or spring covered oil cups extended to readily accessible locations.
- E. Flat sections of housings shall be securely braced or stiffened to prevent vibration and adequately support bearings.

- F. Inlet rings shall be smoothly contoured to reduce turbulence, and shall be provided with adjustable radial-blade dampers where indicated, or where specified for temperature of air-flow control.
- G. Each fan outlet shall be designed for attachment of angles and bolts for attaching flexible connections.
- H. Painting: Fan wheels and inside and outside of fan housing, shall be given one coat of factory applied red-lead prime, followed by shop-applied body coat of red lead paint to inside.
- I. Furnish disconnect switch inside fan housing.
- J. Capacity and characteristics shall be as indicated on Plans.

PART 3 EXECUTION

3.01 PREPARATION

- A. Provide storage for equipment and materials at the project site. Parts shall be readily accessible for inspection, repair, and renewal. Protect materials and equipment from weather.

3.02 FANS

- A. Install with resilient mountings, flexible electrical leads, and flexible connections between fan inlet and discharge ductwork. Provide fixed sheaves required for final air balance and safety screen where inlet or outlet is exposed.

3.03 FIELD QUALITY CONTROL

- A. Schedule and administer specified tests. Provide personnel, instruments, and equipment for such tests. Correct defects and repeat the respective inspection and tests. Give the Contracting Officer ample notice of the dates and times scheduled for tests and trial operations. Conduct inspection and testing in the presence of the Contracting Officer.
- B. Inspection: Prior to initial operation, inspect equipment installation for conformance with drawings and specifications.

3.04 TESTING AND BALANCING

- A. Test and balance each exhaust system in accordance with Section 15940, "Testing and Balancing."

END OF SECTION

SECTION 15800

AIR HANDLING UNITS

PART 1 GENERAL

1.01 SCOPE

- A. Provide all material, equipment and labor required to complete the installation of air handling units shown on drawings and specified herein.
- B. Air handling units and fans shall be in accordance with the following industry standards:
 - 1. AMCA 300 Certified Sound Rating Program for Air Moving Devices
 - 2. AMCA 500 Louvers, Dampers and Shutters
 - 3. ARI 410 Forced-Circulation Air-Cooling and Air-Heating Coils
 - 4. ARI 430 Central-Station Air-Handling Units
 - 5. ASHRAE 52 Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter
 - 6. ANSI/ASHRAE 68 In-Duct Sound Power Measurement Procedure for Fans
 - 7. ASTM C423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients
 - 8. NEMA ICS 2 Industrial Control Devices, Controllers and Assemblies
 - 9. NEMA ICS 6 Enclosures for Industrial Controls and Systems
 - 10. NEMA MG 1 Motors and Generators
 - 11. NFPA 70 National Electric Code
 - 12. NFPA 90A Installation of Air Conditioning and Ventilating Systems
 - 13. SMACNA DCS Duct Construction Standards, Metal and Flexible Type
- C. Air handling units shall be single zone, variable air volume, air handling units.

PART 2 PRODUCTS

2.01 GENERAL

- A. Single Zone Draw Through A.H.U.: Unit shall be in accordance with ARI 430 with sound ratings in accordance with ANSI/ASHRAE 68. Unit shall be draw through single zone type with capacity as indicated. Unit shall be of the vertical discharge type as indicated on drawings. Units shall include the following sections:
 - 1. Casings: Construct casings of steel, galvanized steel, or aluminum on channel base and drain pan coated externally with manufacturers standard paint finish. Provide removable panels and access doors for inspection and access to internal parts. Insulate casings with manufacturer's standard materials. Casing shall be double wall type.
 - 2. Filter shall be Farr 30/30 type with flat filter section.

3. Cooling Coil: Provide removable direct expansion coil per ARI 410. Coil shall have aluminum fins and copper tubes and shall have drain pans with piping connections to remove condensate. Seal coils to casing to prevent leakage of air around coils. Cooling coil shall be cleanable type. Coils shall be tested to at least 250 psi under water. There shall be adequate space for insertion of thermostat bulb.
 - a. Equip each cooling coil having an air velocity of over 400 fpm through the net face area with moisture eliminators, unless the coil manufacturer guarantees, over the signature of a responsible company official, that no moisture will be carried beyond the drip pans under actual conditions of operation. Construct of minimum 24-gage zinc-coated steel or copper nickel, removable through the nearest access door in the casing or ductwork. Eliminators shall have not less than two bends at 45 degrees and shall be spaced not more than 2-1/2 inches center-to-center on face. Each bend shall have an integrally formed hook as indicated in the SMACNA DCS.
4. Drip Pans: Provide each cooling coil section in factory assembled casings with a stainless or galvanized steel drip pan not less than 18 gage with drain connections. Drip pans shall collect and dispose of all condensate from cooling coils and attachments, including headers, return bends, distributors, and uninsulated pipe and fittings. Where individual eliminator blades are in section (not in one piece from top to bottom of coil bank), provide auxiliary drip troughs at bottom of each section with drains to drip pans. Insulate drip pans with water impervious insulation of sufficient thickness to prevent condensate formation on the exterior at ambient conditions to be encountered.
5. Supply Blower (Fan) Sections: Airfoil fan with V-belt drive motor, adjustable, with belt guards for external mounted motors. Bearings shall be grease-lubricated ball-bearing type, with minimum average life of 200,000 hours at design operating conditions.
6. Motors and Motor Starters: NEMA MG 1, NEMA ICS 2, and NEMA ICS 6, respectively, with electrical characteristics as indicated. Motors shall be open dripproof. Motor starters shall be manual magnetic-across-the-line type with general-purpose enclosure.
7. Capacity and Characteristics: Capacity and characteristics of each air handling unit shall be as indicated on drawings. As Trane Model indicated.
8. Variable frequency drive shall be as described in Section 15710

PART 3 EXECUTION

3.01 PREPARATION

Provide storage for equipment and materials at the project site. Parts shall be readily accessible for inspection, repair, and renewal. Protect materials and equipment from weather.

3.02 INSTALLATION

- A. Install air distribution equipment as indicated and in accordance with the manufacturer's instructions. Provide clearance for inspection, repair, replacement, and service. Electrical work shall conform with NFPA 70 and Division 16, "Electrical." Provide overload protection in the operating disconnect switches and magnetic starters. Locate air intake of air handling equipment at a minimum of 25 feet from industrial stacks, bathroom vents, and sanitary risers. Prevailing wind direction shall not be used as justification for placing air intake closer than 25 feet of exhaust stacks. Locate annunciator panel in maintenance office or foreman's office.

- B. Air Handling Units: Install assembled units on vibration isolators and isolate fan section with flexible duct connections. Bolt sections together in high pressure units. Pipe drain pan to the nearest floor drain.

3.03 FIELD QUALITY CONTROL

- A. Schedule and administer specified tests. Provide personnel, instruments, and equipment for such tests. Correct defects and repeat the respective inspection and tests. Give the Contracting Officer ample notice of the dates and times scheduled for tests and trial operations. Conduct inspection and testing in the presence of the Contracting Officer.
- B. Inspection: Prior to initial operation, inspect equipment installation for conformance with drawings and specifications.
- C. Preliminary Tests: For each item of air handling and distribution equipment and its components, perform an operational test for a minimum period of 4 hours.
- D. Testing and Balancing: Perform testing, adjusting and balancing in accordance with Section 15940, "Testing and Balancing."

END OF SECTION

SECTION 15860

DUCTWORK AND ACCESSORIES

PART 1 GENERAL

1.01 SCOPE

- A. Provide all material, equipment and labor required to complete the installation of ductwork systems shown on the drawings and specified herein.
- B. Ductwork systems shall include the following types of systems:
 - 1. Supply, return and exhaust air systems.
 - 2. Flexible supply air systems.
- C. Ductwork systems shall be in accordance with the following industry standards:

1. AMCA 500 2. AMCA 501 3. ASTM A 527/A 527M 4. ASTM C 423 5. ASTM C 553 6. ASTM C 1071 7. ASTM E 90 8. ASTM E 96 9. NFPA 90A 10. SMACNA DCS 11. UL 181 12. UL 555	- Louvers, Dampers and Shutters - Application Manual for Air Louvers - Steel Sheet, Zinc-Coated (Galvanized) by Hot-Dip Process, Lock-Forming Quality - Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method - Mineral Fiber Blanket and Felt Insulation (Industrial Type) - Thermal and Acoustical Insulation (Mineral Fiber, Duct Lining Material) - Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions - Water Vapor Transmission of Materials - Installation of Air Conditioning and Ventilating Systems - HVAC Duct Construction Standards - Metal and Flexible - Factory-Made Air Ducts and Air Connectors - Fire Dampers

1.02. SUBMITTALS

- A. Manufacturer's Catalog Data:
 - 1. Dampers
 - 2. Acoustical duct lining
 - 3. Flexible ducts and connectors
 - 4. Duct-liner adhesives
 - 5. Diffusers, registers, and grilles
 - 6. Metal ducts
 - 7. Fire dampers

PART 2 PRODUCTS

2.01 MEDIUM VELOCITY DUCTWORK (RECTANGULAR, 4" w.g. STATIC POSITIVE)

- A. All duct and fittings shall be manufactured by Ductmate or approved equal. Manufacturer shall have been in the business of manufacturing ductwork for at least ten (10) years. Manufacturer shall furnish Engineer certified copies of test data made by an independent laboratory covering all pipe and fittings.

- B. All rectangular duct shall be manufactured of galvanized steel meeting ASTM A 653/A 653M and A924 standard by the following methods and in the minimum gauges listed below:

<u>Duct Size</u>	<u>Minimum Gauge</u>	<u>Reinforcement Spacing</u>
3" - 22"	24	6'
23" - 42"	22	6'
43" - 60"	22	3'
61" and up	18	3'

- C. Duct system shall consist of the following components:
1. Angle shall be roll-formed from 24 gage galvanized steel, with an integral sealant conforming to ASTM A 653 G 60/90.
 2. Corner pieces shall insert into the hollow web of the angle conforming to ASTM A 653 G 60/90.
 3. Metal cleat shall be roll-formed from 20 gage galvanized steel conforming to ASTM A 653 G 60/90.
 4. Gasket shall be extruded butyl for use between mating flanges.
 5. Duct shall be connected by nuts and bolts (5/16"x1").
- D. Ductwork shall meet or exceed SMACNA requirements and shall be certified by Pittsburgh Testing Laboratory.
- E. Ductwork shall be installed per the manufacturer's recommendations and requirements.

2.02 HIGH VELOCITY DUCTWORK (ROUND AND SPIRAL)

- A. All duct and fittings shall be manufactured by the same company. Said company shall have been in the business of manufacturing spiral ductwork for at least ten (10) years. Manufacturer shall furnish Engineer certified copies of test data made by an independent laboratory covering all pipe and fittings.
- B. Round pipe shall be manufactured of galvanized steel meeting ASTM A-527-90 by the following methods and in the minimum gauges listed below:

<u>Diameter</u>	<u>Minimum Gauge</u>	<u>Method of Manufacture</u>
3" - 8"	26	Spiral Lockseam
9" - 22"	24	Spiral Lockseam
23" - 36"	22	Spiral Lockseam
37" - 50"	20	Spiral Lockseam
51" and up	16	Longitudinal Seam

- C. Spiral pipe shall have locked seams so made as to eliminate any leakage under the pressures for which the system shall be subjected. Longitudinal seam duct shall have a fusion welded butt seam.

- D. Fittings and couplings shall be of the following minimum gauges:

<u>Diameter</u>	<u>Gauge</u>
3" - 36"	20
38" - 50"	18
Over 50"	16

All fittings shall have continuous welds along all seams. All divided flow fittings shall be manufactured as separate fittings, not as tap collars welded into spiral duct sections.

- D. All 90 degree tees and 45 degree laterals up to and including 12" diameter tap size shall have a raised entrance into the tap, produced by machine or press forming. The entrance shall be free of weld build-up, burrs or irregularities.
- E. Elbows in diameters 3" through 8" shall be two section elbows. All other elbows shall be gored construction with all seams continuous-welded. Elbows shall be fabricated to a center-line radius of 1.0 times the cross-section diameter. All elbows not die-stamped shall be constructed according to the following schedule:

<u>Elbow Angle</u>	<u>Number of Gores</u>
Less than 10 degrees	2
10 degrees - 60 degrees	3
Over 60 degrees	5

Where it is necessary to use two-piece mitered elbows, they shall have turning vanes in accordance with the following schedule:

<u>Diameter</u>	<u>Number of Vanes</u>
3" - 9"	2
10" - 14"	3
15" - 19"	4
20" and over	5

- F. The leading edge of all vanes in ducts over 20 inches diameter shall be hemmed with 1/2 inch fold back. Turning vanes in ducts over 24 inches shall be reinforced by rods or sectional construction to limit unsupported length to 24 inches. Vanes shall be a minimum of 20 gauge. Spun bell mouth connections are to be used at each round take-off from the high pressure plenum. Galvanized areas that have been damaged by welding shall be coated with corrosion resistant paint.
- G. Pipe to pipe joints shall be by the use of sleeve couplings, reinforced by rolled heads. Pipe to fittings joints shall be by slip fitting of projecting collar of the fitting into the pipe. Bolt hole spacing for angle rings shall not exceed 6 inches.
- H. Duct sealer shall be applied to the male end of the couplings and fittings. After the joint is slipped together, sheet metal screws shall be placed 1/2 inch from the joint heat and covering the screw heads. Plastic backed tape shall be immediately applied over the wet sealer. The sealer shall be compatible with plastic-baked duct tape so the two can cure together. Samples shall be submitted to the Engineer for approval.
- I. Engineer shall be furnished shop drawings of entire duct system. Samples of pipe and each of the fittings indicated on Plans shall also be submitted. System shall be tested in accordance with Testing and Balancing Section 15960 of these specifications.

2.03 LOW VELOCITY RECTANGULAR DUCTWORK

- A. Steel Ducts: ASTM A 527/A 527M galvanized steel sheet, lock-forming quality; coating designation G90. Construction, metal gage, hangers and supports, and reinforcements shall conform with SMACNA DCS, except that ducts with pressure classifications below 2 inch water gage that are located outside of the conditioned space shall have a seal class C. Ductwork shall be airtight and shall not vibrate or pulsate when system is in operation. Pressure sensitive tape shall not be used as a primary sealant on ductwork with pressure classifications above one inch water.
- B. All necessary allowances and provisions shall be made for beams, columns, pipes, conduits, iron work or other obstructions in the construction of the building or the work of other contractors, whether or not the same is shown on these drawings. Where necessary to avoid beams or other structural systems, piping or conduit, the Contractor shall divide or curve ductwork to avoid said systems. Ductwork when divided shall maintain the same cross-sectional areas in accordance with the latest edition of the ASHRAE Guide.
- C. Gauges of galvanized steel shall be as follows:

0. Low Pressure Ductwork:

<u>Maximum Size Inches</u>	<u>Steel Gauge</u>	<u>Bracing</u>
Up to 12"	26	S slip, drive slip, 1 inch pocket lock on 8 ft. centers
13" - 18"	24	S slip, drive slip, 2 inch pocket lock on 8 ft. centers
19" - 30"	24	S slip, 1" pocket lock on 8' centers with 1x1x1/8" angles 4' from joint.
31" - 42"	22	Longitudinal standing seam, 1" standing S cleat, bar slip, or pocket lock on 4' centers with 1x1x1/8" angles 4' from joint.
43" - 54"	22	Longitudinal standing seam inside 1-1/2" standing S

- D. Turning vanes shall be installed at each elbow and change in direction of supply duct where shown. Turning vanes shall be a true airfoil design; smoothly rounded entry nose with extending trailing edge. Generated sound power level shall not exceed 54 dB in the third octave band at 2000 fpm duct velocity. Vane spacing shall be 2.4 inches on center across the full diagonal dimension of the elbow. Vanes shall be as manufactured by Aero/Dyne Co., High Efficiency Profile model with factory side rails, or approved equal.
- E. Ductwork shall be connected to air handling devices supply return and outdoor air connections by flexible connectors. Connector shall be Dura-Dyne Type DPN or approved equal waterproof and fireproof fabric. Flexible connections shall be at least five inches (5") long and securely fastened with galvanized band iron hoops.
- F. Hard Cast DT-Tape with FTA-20 adhesive shall be applied to each duct joint and point of attachment of duct hanger. Samples shall be submitted to the Engineer for approval.

2.04 LOW VELOCITY ROUND DUCTWORK

- A. All necessary allowances and provisions shall be made for beams, columns, pipes, conduits, iron work or other obstructions in the construction of the building or the work of other contractors, whether or not the same is shown on these drawings. Where necessary to avoid beams or other structural systems, piping or conduit, the Contractor shall divide or curve ductwork to avoid said systems. Ductwork when divided shall maintain the same cross-sectional areas in accordance with the latest edition of the ASHRAE Guide.

- B. Gauges of galvanized steel shall be as follows:

0. Low Pressure Ductwork:

<u>Maximum Size Inches</u>	<u>Steel Gauge</u>
Up to 8"	28
9" - 14"	26
15" - 26"	24
27" - 36"	22

1. Ductwork shall be longitudinal seam, snap lock type, with aluminized duct tape applied over entire length of longitudinal and circumferential seams. Ductwork shall be externally insulated.
- C. Ductwork shall be connected to air handling devices supply return and outdoor air connections by flexible connectors. Connector shall be Dura-Dyne Type DPN or approved equal waterproof and fireproof fabric. Flexible connections shall be at least five inches (5") long and securely fastened with galvanized band iron hoops.
- D. Furnish and install manually operated volume control dampers in all branches, splits, or at all supply air, return air, exhaust or transfer openings where necessary for proper balancing of air distribution. Dampers shall be of single blade type. Dampers shall have a quadrant type indicating device with lock to hold damper in position for proper setting. Damper shall be as Ruskin CDRS-25.

2.05 FLEXIBLE DUCTS

- A. Flexible ductwork shall be constructed in accordance with UL 181, Class 1, SMACNA DCS and additional requirements herein specified. Provide to connect between rigid ductwork and air diffusion devices. There shall be no erosion, delamination, loose fibers, or odors from the ducts into the air stream.
- B. Flexible ductwork shall be satisfactory for operating pressure up to 6 inches water gauge.
- C. Insulated flexible ductwork shall be constructed with aluminized mylar laminated to a corrosion resistant steel wire helix. Duct shall be insulated with one inch (1") thickness of fiberglass insulation having a density of 1 lb./cu. ft. Sheathe insulation with a vapor barrier having a maximum water vapor permeance of 0.20 perm in accordance with ASTM E96, Procedure A. Coat ends of insulation with cement to prevent erosion and delamination.
- D. Maximum length of flexible ductwork shall not exceed 6'-0".
- E. Flexible ducts shall be suspended on 36 inch centers with a minimum 3/4 inch wide flat banding material. All joints and connections shall be made with 1/2 inch wide positive locking steel straps.

2.06 CASINGS AND PLENUMS

- A. Factory fabricated components with field installation. Furnish certified testing data from plenum or casing manufacturer obtainable directly from an independent acoustical laboratory, listing sound absorption and transmission loss characteristics of panel assembly. Sound absorption coefficients and sound transmission loss, determined by an independent laboratory, shall be in accordance with ASTM C 423 and ASTM E 90 respectively.

2.07 DAMPERS AND OPERATORS

- A. Furnish and install manually operated volume control dampers in all branches, splits, or at all supply air, return air, exhaust or transfer openings where necessary for proper balancing of air distribution. Dampers shall be of opposed blade type. Dampers shall have a quadrant type indicating device with lock to hold damper in position for proper setting. Damper shall be as Ruskin MD-35.
- B. Damper blades shall be constructed of 16 gauge minimum galvanized steel. Blades to be of single unit design with EPDM edge seals. Jamb shall have flexible metal seal.
- C. Frame shall be 16 gauge galvanized steel hat channel with corner braces, and shall incorporate nylon bearings.
- D. Operator shall open damper when fan is energized and shall close when fan is de-energized.

2.08 DIFFUSERS, REGISTERS, AND GRILLES

- A. Material and Finishes: Provide factory-furnished diffusers, registers, and grilles constructed of aluminum. Exterior and exposed edges shall be rolled, or otherwise stiffened and rounded. Colors shall be selected by Owner.
- B. Sound Pressure Level: Manufacturer certified sound pressure level ratings of inlets and outlets.

- 1. Conform with the following permissible room sound pressure levels:

NC Range, dB	Typical Application
30 - 35	Office or Laboratory Area

- C. Throw: The distance from the diffuser, register or grille to the point which the air velocity falls below 50 feet per minute shall not exceed 1.5 times the outlet mounting height.
- D. Drop: Maximum drop of air stream shall not be within 5 feet of the floor at the end of the throw.
- E. Ceiling Diffusers: Equip with baffles or other devices required to provide proper air distribution pattern as indicated. Provide factory-fabricated, single key, volume dampers. Except for linear diffusers, internal parts shall be removable through the diffuser neck for access to the duct and without the use of special tools.
- F. Square Diffusers: Construct each ceiling diffuser of four or more concentric elements designed to deliver air in a generally horizontal direction without excess smudging of the ceiling. Interior elements of square and rectangular ceiling diffusers may be circular, square, or rectangular as manufacturer's standard.

G. Return Air and Exhaust Air Grilles:

1. Ceiling Type Grilles: Grilles shall be 1/2" by 1/2" grid opening of aluminum construction. Grille shall be surface mounted. Grille shall be white finish. Size and capacity shall be as indicated on Plans.

2.09 DUCT SLEEVES, PREPARED OPENINGS, AND CLOSURE COLLARS

- A. Duct Sleeves: Fabricate from minimum 20-gauge galvanized steel. Where sleeves are installed in bearing walls, provide structural steel sleeves as indicated. Size sleeves to provide one-inch clearance between duct and sleeve or between insulation and sleeve for insulated ducts.
- B. Prepared Openings: Provide one-inch clearance between the duct and the sleeve, or one-inch clearance between insulation and sleeve for insulated ducts except at grilles, registers, and diffusers.
- C. Packing: ASTM C553, Type 1, Class B-2, mineral fiber.
- D. Closure Collars: Four inches wide minimum, fabricated from minimum 20 gage galvanized steel.

2.10 DEFLECTORS

- A. Factory-fabricated and factory or field-assembled units consisting of curved turning vanes or scoop type extractors for uniform air distribution and change of direction with minimum turbulence and pressure loss. Provide curved vanes for square elbows.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Conform to NFPA 90A and SMACNA DCS. Provide mounting and supporting of ductwork and accessories including, but not limited to, structural supports, hangers, vibration isolators, stands, clamps and brackets, access doors, and dampers. Provide electrical isolation between dissimilar metals. Electrical isolation may be fluorinated elastomers or sponge-rubber gaskets. Install ductwork accessories as indicated and as recommended by manufacturer's printed instruction. Allow clearance for inspection, repair, replacement, and service. Louvers in accordance with AMCA 501.
- B. Ductwork: Air distribution systems shall operate with no chatter or vibration.
 1. Field Changes to Ductwork: Those required to suite the sizes of factory-fabricated equipment actually furnished, shall be designed to minimize expansion and contraction. Use gradual transitions in field changes as well as modifications to connecting ducts. Provide jumper ducts for discharging air into duct junctions as indicated.
 2. Dampers: When installed on ducts to be thermally insulated, equip each damper operator with stand-off mounting brackets, bases, or adapters to provide clearance between the duct and operator not less than the thickness of insulation. Stand-off mounting items shall be integral with the operator or standard accessory of damper manufacturer.
 3. Deflectors: Provide in square elbows, duct-mounted supply outlets, take-off or extension collars to supply outlets, and tap-in branch-off connections. Adjust supply outlets to provide air volume and distribution as indicated or specified.

4. Fire Dampers: Install in accordance with manufacturer's instructions for condition of UL 555 and NFPA 90A. Locate as indicated and provide surface penetration sleeves in accordance with approved detail drawings.
 5. Access Doors: Provide for automatic dampers, volume dampers, fire dampers, coils, thermostats, temperature controllers, valves, filters, humidifiers and other concealed apparatus requiring service and inspection in the duct systems.
 6. Duct Sleeves, Prepared Openings, and Closure Collars: Provide for ductwork penetrations in floors, walls, and partitions through which metallic ductwork passes.
 - . Duct Sleeves: Fill space between duct and sleeve or between insulation and sleeve for insulated ducts with mineral fiber, except at grilles, registers, and diffusers.
 - a. Prepared Openings: Fill space between duct and opening or between insulation and opening for insulated ducts with mineral fiber, except at grilles, registers, and diffusers.
 - b. Closure Collars: Fit collars snugly around ducts or insulation. Grind edges of collar smooth to preclude tearing or puncturing insulation covering or vapor barrier. Provide nails with maximum 6-inch centers on collars.
- C. Ductwork Hangers and Supports: Ductwork hangers and supports shall be in accordance with SMACNA DCS, Section 4. Attach supports only to structural framing members and concrete slabs. Do not anchor supports to metal decking unless a means is provided and approved for preventing the anchors from puncturing the metal decking. Where supports are required between structural framing members, provide suitable intermediate metal framing.
- D.
1. Flexible Ducts: Support ducts by hangers every 3 feet, unless supported by ceiling construction. Stretch flexible air ducts to smooth out corrugations and long radius elbows. Provide minimum length to make connections.
 2. Flexible Connectors: Provide flexible connectors between fans and ducts or casings and where ducts are of dissimilar metals. For round ducts, securely fasten flexible connectors by zinc-coated steel clinch-type drawbands. For rectangular ducts, lock flexible connectors to metal collars.
 3. Inspection Plates and Test Holes: Provide, where required, in ductwork or casings for all balance measurements. If possible, test holes should be located at least 7.5 times diameters downstream from a disturbance. Extend cap through insulation.
 4. Cleaning of Ducts: Remove all debris and dirt from ducts and wipe clean. Before installing air outlets, force air through entire system at maximum attainable velocity to remove accumulated dust. Provide temporary air filters to protect ductwork which may be harmed by excessive dirt. For large systems, clean duct with high power vacuum machines.
- 3.02 FIELD QUALITY CONTROL
- A. Administer and direct tests. Furnish instruments, equipment, connecting devices, and personnel for the tests. Notify Contracting Officer 14 days before inspection or testing is scheduled. Correct defects in work. Repeat tests until work is in compliance.
- 3.03 TESTING AND BALANCING
- A. Perform testing and balancing on ductwork systems in accordance with Section 15940.

END OF SECTION

SECTION 15940

TESTING AND BALANCING

PART 1 GENERAL

1.01 SCOPE

- A. Provide all material, equipment and labor required to test and balance all mechanical systems.
- B. Test and Balance Agency Credentials: Test and Balance Agency shall hold current membership in the Associated Balance Council (AABC). Test and Balance Agency shall have completed at least five jobs of comparable size and similarity to this project. Test and Balance Agency job list, credentials and procedures shall be submitted with shop drawings by Mechanical Contractor for approval by Engineer.
- C. Balance procedures required herein shall be accomplished in accordance with Chapter 34 of the 1991 ASHRAE HVAC Applications Handbook. Requirements therein shall be as binding as though full reprinted herein. Test and Balance Agency shall be completely familiar with the requirements of Chapter 34 of the 1991 ASHRAE HVAC Applications Handbook. Requirements therein shall be as binding as though full reprinted herein. Test and Balance Agency shall be completely familiar with the requirements of Chapter 34 and shall perform each task listed therein on the required systems. As a minimum, report shall include items required by "Report and Report Information" in Chapter 34, plus information on hydronic systems necessary to determine proper conformance to design requirements, including motor design and operating amps, and system flows and pressure drops:
- D. Procedures required on this job shall be:
 - 1. Air Side Balancing
 - 2. Temperature Control Verification
 - 3. Sound Testing
 - 4. Vibration Testing
- E. Instrumentation used by agency shall be in calibration at time of testing. Required instruments shall be as listed in Chapter 34 as a minimum. Accuracy of instruments shall conform to the following list:

1. Temperature Indicators	$\pm$ 0.1 degrees F max
2. Air Flow Indicators	$\pm$ 10% max
3. Differential Pressure Gauges	$\pm$ 5% max
4. Ampere Meters	$\pm$ 3% max

1.02 BALANCING OF SYSTEMS

- A. Job Inspection:
 - 1. Testing and Balancing Agency shall act as an authorized inspection agency, responsible to the Engineer, and shall list all items which require correction or have not been installed in accordance with contract drawings and/or specifications pertaining to heating, ventilating and air conditioning systems.

2. The Testing and Balancing Agency shall be given access to the project site at all times and shall not be required to make prior arrangements with the contractor for site visiting to perform any balancing work or pre-balancing inspection the Agency may require.

B. Air Balance:

1. Actual air balancing shall not begin until all systems have been completed, placed into operation, final filters installed, and all control systems completed and calibrated.
2. Air balance shall include performance ratings of all supply, return and exhaust fan motors. Fan speeds shall be adjusted to provide design flows, including system diversities, at actual system pressures. Any drive changes necessary to meet this requirement shall be provided by the fan manufacturer and installed by the mechanical contractor under the direct supervision of the Testing and Balancing Agency at no additional cost to the Owner.
3. Pilot Tube traverses of all trunk lines and major branch lines shall be made to determine proper proportioning of air flows within all systems.
4. Pressure drop readings across all major system components and significant drops within duct systems shall be reported to determine any deviation between actual and theoretical value.
5. Accurate flow and pressure measurements shall be made at each terminal device and each supply, return, or exhaust diffuser. Flow at terminal units and outlets shall be adjusted by appropriate means to within 10% of design requirements.
6. Outside air, return air, and supply air quantities for all systems shall be adjusted to within 10% of design requirements.

C. Control Systems:

1. The Mechanical Contractor shall have installed and thoroughly checked the action and calibration of all control devices and placed the entire system into operation.
2. Testing and Balancing Agency shall thoroughly re-check all control sequences, and calibration of all control devices. Mechanical Contractor shall cooperate with Testing and Balancing Agency in the re-calibration of set-point readjustment of any control device he may require.

D. Vibration Testing:

1. Testing and Balancing Agency shall make a visual inspection of all fans and air handling units for defects which cause excessive vibration when unit is operating.
2. Vibration isolation on equipment shall be checked for equal deflection and proper operation.
3. Testing and Balancing Agency shall measure the vibration of each unit with a vibration meter capable of frequency and amplitude analysis, including displacement and velocity readouts. Vibration shall be checked against Table 33 of Chapter 42 of ASHRAE 1991 HVAC Applications Handbook. If vibration exceeds amount listed therein, mechanical contractor shall take corrective action.
4. A complete frequency analysis shall be made in areas where vibration amplitude measurements exceed those specified, in order to determine the cause of the excessive vibration.

E. Sound Testing:

1. Upon completion of air and water balance requirements and vibration analysis, Testing and Balancing Agency shall perform all sound measurements and supervise all correction and/or additions to equipment and materials furnished under this contract so that sound levels will not exceed those levels specified in various sections of specifications.
2. Measurements shall be taken with a Type 1 Precision Sound Level Meter, complete with Octave Band Analyzer which meets ASA Standard 47-83.
3. A complete analysis of all readings including causes for excessive noise levels and detailed recommendations for the remedy of same shall be included in the final report.
4. Sound testing shall not be completed until vibration analysis has been made and any necessary corrections have been completed.
5. Sound levels shall not exceed those listed in Table 2 of Chapter 42, 1991 ASHRAE HVAC Applications Handbook. Consult with Engineer if room type is not listed, for specific requirements. Sound levels shall be recorded for each space, where excess noise is indicated or as requested by the Engineer, and shall be converted to NC levels.

- F. Owner Instruction: Testing and Balancing Agency shall provide neatly typed final reports listing results of all air balancing as well as vibration and energy projection measurements and conclusion. Final reports shall be submitted to Architect/Engineer for his approval.

PART 2 PRODUCTS
Not Used

PART 2 EXECUTION

2.01 SCHEDULING

- A. Contractor shall notify Testing and Balancing Agency immediately upon receipt of contract, the approximate completion date of project.
- B. Contractor shall give two weeks prior notice to Agency for testing and balancing schedule.
- B. Contractor shall operate all equipment during each day of testing and balancing as requested by Testing and Balancing Agency.
- C. Contractor shall allow sufficient time in completion schedule for testing and balancing.

2.02 COOPERATION

- A. Cooperation among all involved parties is essential to expedite completion of final testing and balancing. Contractor shall be responsible for coordinating all jobsite meetings between testing and balancing personnel and various sub-contractors and equipment suppliers. Building will not be turned over to the owner until final testing and balancing reports have been submitted to the engineer and approved.
- B. Contractor shall furnish and install through fan manufacturer, any additional drive change recommended by Testing and Balancing Agency, at no additional cost to the Owner.

- C. Contractor shall install necessary dampers and gauge connections as recommended by Testing and Balancing Agency to achieve proper balance.
- D. Contractor shall install all final filters before final air balancing begins.
- E. Contractor shall supply to Testing and Balancing Agency one copy of approved submittal data, including accurate performance data for all submitted equipment and one copy of final mechanical drawings and approved control drawings upon receipt of contract.
- F. It is the expressed responsibility of the Testing and Balancing Agency to carry out all procedures described within these specifications in a professional manner.
- G. It is the responsibility of the Testing and Balancing Agency to locate and identify all current and potential problem areas within the scope of these specifications and to initiate action by responsible parties to remedy such problems during the testing and balancing period. Test and Balancing Agency shall fully cooperate with the owner and Engineer to alleviate problem areas by system adjustment to the full extent that the system is adjustable.
- H. Testing and Balancing Agency shall release no reports until such have been approved by the Engineer.

2.03 COMPLETION OF WORK

- A. Testing and Balancing Agency shall inform contractor as to the extent of completion of all testing and balancing requirements listed within these specifications.

2.04 ACCEPTANCE

- A. Installation shall not be considered complete until final testing and balancing reports have been submitted to consulting engineer and have been approved by him. One copy of all final reports shall be given to the Owner's representative after final approval by the Consulting Engineer.

2.05 WARRANTY

- A. Testing and Balancing Agency shall include an extended warranty of three (3) months, after submission of report during which time the engineer or owner may request a recheck or resetting of any item included in the report. Should it be found that the system has not been properly and completely balanced, the warranty period will be extended until the engineer is completely satisfied.

END OF SECTION

SECTION 15950

H.V.A.C CONTROL SYSTEMS

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install a complete Control System consisting of a Building Automation System and an Automatic Temperature Control System. The system shall be complete in all respects including labor, materials, equipment, and services necessary, and shall be installed by personnel regularly employed by the manufacturer.
- B. All automation and control components shall be integrated into a distributed network system communicating over a nonproprietary local area network. This system shall consist of field Stand-alone Direct Digital Controllers (DDC), Smart Local DDC's and PC-based operator workstations.

1.02 CONTRACTOR QUALIFICATIONS

- A. Qualified Bidders: System shall be as manufactured, installed and serviced by Trane Company, Johnson Controls, Siemens or approved equal.
- B. Longevity: The Facilities Management System contractor shall have a minimum of ten years experience installing, and servicing computerized Facilities Management Systems (FMS). All subcontractors utilized by the FMS contractor shall have a minimum of five year experience within their appropriate trades.
- C. Personnel, Coverage and Response Capabilities: The FMS contractor shall have a minimum of 4 full time electronic service personnel within a 100 mile radius of the project location. One of the five full time electronic service personnel must work within a 50 mile radius of the project location.
- D. Past Projects: The FMS contractor shall have completed a minimum of twenty projects within the last five years which are at least equal in dollar value and scope to this project. A list of similar projects, dollar volume, scope, contact name and contact number shall be provided by the FMS contractor if asked for by the owner.
- E. Engineered Drawings: All control drawings shall be generated using Computer Aided Drafting. All project drawings shall be supplied to the owner on an MS-DOS formatted diskette using the DXF file format upon project completion. Further additions or changes to the FMS shall be reflected upon the CAD drawings.

1.03 WORK BY OTHERS

- A. Sheet Metal Subcontractor:
 - 1. Setting of automatic control dampers, smoke control dampers, and necessary blank off plates.
 - 2. Access doors where and as required.
- B. HVAC Contractor:
 - 1. Installation of immersion wells and pressure tapplings.
 - 2. Installation of flow switches.

3. Setting of automatic control valves.
4. Installation of pressure tappings and associated shut-off cocks.

C. Electrical Subcontractor:

1. All power wiring and line voltage interlock wiring such as exhaust fan interlocked to supply fan.
2. All control wiring shown on electric plans such as unit heater room thermostats.

1.04 ELECTRICAL WORK FOR CONTROLS

- A. Complying with the principle of "unit responsibility" all electrical work for automatic controls, except as otherwise specified, or shown on the electrical drawings shall be included in Division 15.
- B. Electrical work shall, in general, comply with the following:
 1. All low voltage wiring in finished rooms shall be concealed below working heights and exposed above.
 2. Electrical work may include both line voltage and low voltage wiring, as required.
 3. Conduit network for power systems may be used for running control high voltage wiring.
 4. All electrical work shall comply with the N.E.C. and local electrical codes.
 5. All safety devices shall be wired through both hand and auto positions of motor starting device to insure 100% safety shut-off.
 6. All magnetic starters furnished by Electrical Contractor for mechanical equipment shall be furnished with integral 120 volt control transformers, sized to handle the additional VA needed for the controls - pilots, EP valves, etc.
 7. The motor starter supplier shall provide auxiliary contacts as required for interlock by FMS Contractor; the supplier shall estimate an allowance of at least one auxiliary contract per starter. All interlock and control wiring shown on the electrical prints is by the electrical subcontractor.
 8. Low voltage plenum rated wiring can be run exposed above working heights in equipment rooms and above accessible ceiling. Wiring shall be neatly tied to pipes, EMT or other devices and not laid on ceiling tile.

1.05 DRAWINGS AND LAYOUTS

- A. The FMS manufacturer shall submit description of operation and schematic drawings of the System to the Engineer for approval before starting work. At least eight sets of submittals shall be sent through channels. At least four sets of operator and maintenance manuals with "as built" drawings, parts lists, etc., shall be provided at job completion.

1.06 CONTROL EQUIPMENT AND DEVICES

A. The control system shall include all necessary and specified control equipment properly installed in accordance with specifications and drawings, and shall include the automatic control of the following:

1. **Control Dampers:** Dampers required in the temperature and smoke control functions of the automatic control system shall be factory fabricated and shall be manufactured by the FMS Systems Manufacturer. All dampers shall be sized as shown on drawings or as specified. All damper frames shall be constructed of 13 gauge galvanized sheet metal or extruded aluminum of 12 gauge thickness, and shall have a flange or duct mounting. The blades shall be parallel or opposed, as required, and suitable for the air velocities to be encountered in the system. Replaceable Butyl rubber seals are to be provided on damper blades and installed along with the top and bottom of the frame. Stainless steel damper blades and seals shall be installed inside the frame sides. Seals and bearings shall be able to withstand temperatures ranging from minus 40 degrees F to plus 200 degrees F. Dampers shall be leak rated for 3 CFM/foot squared at 1" WG and 20 CFM/foot squared at 4" WG or less in full closed position at 4" WG pressure differential across damper. All smoke control dampers must conform to UL5555 and be Ruskin SD-60 or equal. Damper blades shall not exceed 6" in width. All blades shall not exceed 6" in width. All blades are to be corrugated type construction, fabricated from two sheets of #22 gauge galvanized sheet steel, spot welded together. Blades are to be suitable for high velocity performance. Damper blades shall be a maximum of 48" long. Longer units shall be fabricated in sections. Dampers shall be Ruskin CD-60 or equal.
2. **Control Valves:** Valves shall be sized by the control manufacturer to produce the required capacity at a pressure loss not exceeding the allowable pressure drop indicated on the drawing. Nominal body rating shall be not less than 125 PSI. However, the valve body and packing selected shall be sized to withstand the system static head plus the maximum pump head and the maximum temperature of the control medium, hot water. Two-way modulating valves shall have close-off ratings exceeding the maximum pressure difference, at any load condition, between the outlet and inlet. Each valve shall be equipped with proper packing to assure there will be no leakage at the valve stem.
3. **Operators:** A damper or valve operator shall be **Electric** and be provided for each automatic damper or valve and shall be of sufficient capacity to operate the damper or valve under all conditions and to guarantee tight close-off of valves, as specified, against system pressure encountered. Each shall be provided with spring-return for normally closed or normally open position for fail safe operation to account for fire, low temperatures, or power interruption as indicated. Damper and valve operators are to be made out of diecast metal; no plastic or sheet metal bodies will be allowed.
4. **Sensors and Controllers:**
 - a. Differential Pressure Switch for air shall have a single-pole, single-throw (SPST) contact, adjustable setpoint, UL rated 9.8 amperes at 120 volts, and shall be Johnson Controls P32 Series or equal.
 - b. Low Limit Thermostats shall be of manual reset type, with setpoint adjustment. The sensing element shall be 20 foot minimum and shall be installed completely across the coil. When any one foot of the element senses a temperature as low as the setpoint, the thermostat contacts shall open. These shall contain double pole switches for simultaneous remote alarms or as desired. Thermostat shall be Johnson Controls A70 or equal.

- c. Duct Type Temperature Transmitter shall be a general purpose RTD sensing element, moisture resistant transmitter for mounting into a duct. The operating range shall be as indicated with an accuracy of $\pm 1\%$ over the full range. The output shall be compatible with the panel it serves.
- d. Space Temperature Transmitter shall contain an RTD sensing element to monitor room air temperatures in the range of 30 degrees F to 90 degrees F, unless indicated otherwise. The transmitter shall be factory calibrated to an accuracy of $\pm 1\%$. The assembly shall be installed within a metal ventilated enclosure suitable for wall mounting. The output shall be compatible with the panel it serves. Transmitter shall be factory calibrated to an accuracy of $\pm 1\%$ over the full range.
- e. Outdoor Air Temperature Transmitter shall contain an RTD sensing element mounting in an enclosure rated for outdoor use. The output shall be compatible with the panel it serves. Transmitter shall be factory calibrated to an accuracy of $\pm 1\%$ over the full range.
- f. Smoke Detectors shall be ionization type for duct installation with supply and return sampling tubes. Detector shall be UL listed with housing, relays for air handling unit stop and remote alarm. Duct mounted smoke detector shall be BRK Model DH1851AC or equal with duct sampling tube to match duct work, 120 volt, 60 hertz, single-phase power source, reset switch, two SPST contacts rated for 125 V AC and 3 amp, and local indicator light.

PART 2 PRODUCTS

2.01 HVAC CONTROL SYSTEM - GENERAL PRODUCT DESCRIPTION

- A. The Facility Management System (FMS) shall be capable of integrating multiple building functions, including equipment supervision and control, alarm management, energy management, and trend data collection.
- B. The FMS shall consist of the following:
 - 1. Operator Workstation
 - 2. Network Control Panel
 - 3. Standalone Application Specific Controllers (ASCs)
- C. The system shall be modular in nature, and shall permit expansion of both capacity and functionality through the addition of sensors, actuators, ASCs, and operator devices.
- D. The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices.

2.02 NETWORKING/COMMUNICATIONS

- A. General: The design of the FMS shall be networked as described. Inherent in the system's design shall be the ability to expand or modify the network either via a local network, auto-dial telephone line modem connections, or a combination of the two networking schemes.

2.03 LOCAL NETWORK

- A. Panel Support: The Network Control Panel shall directly oversee a local network such that communications may be executed directly to and between ASCs.
- B. Data Access: All operator devices, either network resident or connected via dial-up modems, shall have the ability to access all point status and application data on the network. Access to system data shall not be restricted by the hardware configuration of the facility management system.
- C. Global Data Sharing: Global Data Sharing or Global Point Broadcasting shall allow point data to be shared between ASCs when it would be inefficient or impractical to locate multiple sensors.
- D. General Network Design: The network shall detect single or multiple failures of ASCs or the network media. The network shall be composed of commonly available, multiple-sourced, networking components operating an industry standard protocol, such as Optomux, and IEEE RS-485 communications interface.

2.04 OPERATOR WORKSTATION

- A. Personal Computer: A standard Personal Computer shall be provided for command entry, information management, network alarm management, and data base management functions.
- B. The Personal Computer (Desktop) shall be general purpose and commercially available, with sufficient memory and processor capacity to perform all functions described in this specification.
- C. The Personal Computer shall be directly connected to the digital panel or communicate to it over dial-up telephone lines.

2.05 OPERATOR INTERFACE

- A. The workstation shall operate on a true Windows XP platform. This platform shall allow for the interface to the Facility Management System to be active when other third party software is being used on the personal computer. The third party systems shall include, but not be limited to word processing, database, and spreadsheet systems compatible with the Microsoft operating systems.
- B. A phone book supporting up to 1500 dial up sites (one site at a time) shall be provided with the system.
- C. The following features/capabilities shall be provided as a minimum:
 - 1. Dynamic Graphics with animation capabilities.
 - 2. Graphical viewing of archived Trend data.
 - 3. Pop up alarm notification.
 - 4. Ability to upload and archive Trend data from the panel, either on demand or automatically on a daily basis.
 - 5. Ability to upload and download Facility Management System databases.

6. Any Windows 98 or Windows XP supported printer may be used. The capability of printing in black and white or in color must be supported by the system. The system shall, as a minimum, allow for the following items to be printed using standard Windows printing facilities:
 - a. Phone book summary.
 - b. Change of state messages.
 - c. Component documents (as per Document Server capabilities)
- D. Text-Based Displays: The operator interface shall provide consistent text-based displays, on each graphic, for all system point and application data described in this specification. Point identification, engineering units, status indication, and application naming conventions shall be the same at all operator devices.
- E. User Interface: System shall employ standard graphical user interface components (i.e. menu bar, tool bar, status bar, scroll bar, tool tips, etc.) for ease of use. The user interface shall also include the following features:
 1. Simplistic point and click navigation between and within application components
 2. Dockable alarm panel which may be temporarily hidden
 3. Provides a tabbed workspace environment which is fully ActiveX compliant
 4. User can add additional ActiveX workspaces on line
 5. Enhanced terminal workspace providing pass through VT-100 interface with mouse/keyboard navigation, user selectable display preferences and screen prints.
- F. Graphics Display: The workstation shall integrate leading ActiveX technology based graphics.
 1. Accommodate the launching of any associated ActiveX applications from the graphical display.
 2. A comprehensive symbol and template library with pre-bound tags shall be provided to simplify the engineering of the system
 3. Support both static and unlimited dynamic characteristics including animation, color gradients and diagnostic trend graphs
 4. Provide symbol animation and multifaceted zooming characteristics
 5. Import capabilities including Metafile, bitmap or digital image
 6. Provide the ability of the user to directly command objects from the graphical display.
 7. Allow for a full featured on-line graphics editor.
- G. Password Protection: Multiple-level password access protection shall be provided to allow the user/manager to limit control, display, and data base manipulation capabilities as he deems appropriate for each user, based upon an assigned password.
 1. Passwords shall be exactly the same for all operator devices.
 2. A minimum of four (4) levels of access shall be supported:
 3. Operators will be able to perform only those commands available for their respective passwords. Menu selections displayed at any operator device shall be limited to only those items defined for the access level of the password used to log-on.
 4. User-definable, automatic log-off timers of from 1 to 60 minutes shall be provided to prevent operators from inadvertently leaving devices logged on.

- H. Operator Commands: The operator interface shall allow the operator to perform commands including, but not limited to, the following:
1. Start-up or shutdown selected equipment
 2. Adjust setpoints
 3. Add/Modify/Delete time programming
 4. Enable/Disable process execution
 5. Lock/Unlock alarm reporting for each point
 6. Enable/Disable Totalization for each point
 7. Enable/Disable Trending
 8. Enter temporary override schedules
 9. Define Holiday Schedules
 10. Change time/date
 11. Enter/Modify analog alarm limits
 12. Enable/Disable demand limiting
 13. Enable/Disable duty cycle
 14. Enable/Disable average/high/low signal select and reset
- I. Logs and Summaries: Reports shall be generated manually, and directed to the displays. As a minimum, the system shall allow the user to easily obtain the following types of reports:
1. Trend
 2. Change of State
 3. Alarm Summary
 4. Point Summary
 5. System Summary
 6. Schedule Summary
- J. A general listing of all points in the system shall include, but not be limited to, the following:
1. Points currently in alarm
 2. Off-line points
 3. Points currently in override status
 4. Points in Weekly Schedules
 5. Holiday Programming
- K. Summaries shall be provided for specific points, for a logical point group, for a user-selected group of groups, or for the entire facility without restriction due to the hardware configuration of the facility management system. Under no conditions shall the operator need to specify the address of hardware controller to obtain system information.
1. Historical Trend Analysis: Shall include the following features:
 - a. Integrated ActiveX technology viewing component
 - b. Support up to 32 data sources per trend view
 - c. Enable the viewing of a single object in multiple trend views
 - d. Allow both graphical and tabular displays
 - e. Provide single or stacked graphical displays with or without grid lines
 - f. Graphical zooming with automatic axis scaling
 - g. Individual data point identification with context sensitive focus windows
 - h. User selectable date and time view and study ranging with wildcarding
 - i. Automatic or user selectable axis scaling

- j. User selectable plot style, font and color characteristics
 - k. Flexible data collection options.
- L. System Configuration and Definition: All temperature and equipment control strategies and energy management routines shall be definable by the operator. System definition and modification procedures shall not interfere with normal system operation and control.
 - 1. The system shall be provided complete with all equipment and documentation necessary to allow an operator to independently perform the following functions:
 - a. Add/Delete/Modify Application Specific Controllers
 - b. Add/Delete/Modify points of any type, and all associated point parameters, and tuning constants
 - c. Add/Delete/Modify alarm reporting definition for each point
 - d. Add/Delete/Modify energy management applications
 - e. Add/Delete/Modify time- and calendar-based programming
 - f. Add/Delete/Modify Totalization for every point
 - g. Add/Delete/Modify Historical Data Trending for every point
 - h. Add/Delete/Modify configured control processes
 - i. Add/Delete/Modify dial-up telecommunication definition
 - j. Add/Delete/Modify all operator passwords
 - k. Add/Delete/Modify Alarm Messages
- M. Programming Description: Definition of operator device characteristics, ASCs, individual points, applications and control sequences shall be performed through fill-in-the-blank templates.
- N. Network-Wide Strategy Development: Inputs and outputs for any process shall not be restricted to a single ASC, but shall be able to include data from any and all other ASCs to allow the development of network-wide control strategies.
- O. System Definition/Control Sequence Documentation: All portions of system definition shall be self-documenting to provide hardcopy printouts of all configuration and application data. Data base Save/Restore/Back-Up:
Back-up copies of all ASC and Digital Panel data bases shall be stored in at least one personal computer or laptop. Users shall also have the ability to manually execute downloads of an ASC or Digital Panel data base.

2.06 NETWORK CONTROL PANELS

- A. General: Network Control Panels shall be microprocessor-based, multi-tasking, multi-user, digital control processors.
- B. Each Network Control Panel shall have sufficient memory to support its own operating system and data bases including:
 - 1. Control Processes
 - 2. Energy Management Applications
 - 3. Alarm Management
 - 4. Trend Data
 - 5. Maintenance Support Applications
 - 6. Operator I/O
 - 7. Dial-Up Communications
 - 8. Manual Override Monitoring

- C. Expandability: The system shall be modular in nature, and shall permit easy expansion through the addition of field controllers, sensors, and actuators.
- D. Serial Communication Ports: Network Control Panels shall provide at least two RS-232C serial data communication ports for simultaneous operation of multiple operator I/O devices, such as laptop computers, Personal Computers, and Video Display terminals.
- E. Hardware Override Monitoring: Network Control Panels shall monitor the status of all overrides, and include this information in logs and summaries to inform the operator that automatic control has been inhibited.
- F. Integrated On-line Diagnostics: Each Network Control Panel shall continuously perform self-diagnostics, communication diagnosis and diagnosis of all subsidiary equipment. Master Digital Panels shall provide both local and remote annunciation of and detected component failures, or repeated failure to establish communication. Indication of the diagnostic results shall be provided at each Network Control Panel.
- G. Surge and Transient Protection: Isolation shall be provided at all network terminations, as well as all field point termination's, to suppress induced voltage transients consistent with IEEE Standard 587-1980. Isolation levels shall be sufficiently high as to allow all signal wiring to be run in the same conduit as high voltage wiring where acceptable by electrical code.
- H. Powerfail Restart: In the event of the loss of normal power, there shall be an orderly shutdown of the Network Control Panel to prevent the loss of data base or operating system software. Non-volatile memory shall be incorporated for all critical controller configuration data, and battery backup shall be provided to support the real-time clock and all volatile memory for a minimum of 72 hours. Upon restoration of normal power, the Network Control Panel shall automatically resume full operation without manual intervention. Should Network Control Panel memory be lost for any reason, the user shall have the capability of reloading the Network Control Panel via the local RS-232C port.

PART 3 EXECUTION
Not used.

END OF SECTION

SECTION 15960

PROJECT CLOSE OUT

PART 1 GENERAL

Not Used

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 TESTS

- A. This Contractor shall conduct such tests as required to determine that systems and equipment installed conform to Specifications. Contractor shall supply all labor, materials, instruments, operations, etc., required to facilitate testing. Gauges, thermostats, and instruments used in testing shall be accurate, recently calibrated and approved by the Engineer prior to test. Instruments installed permanently in systems as specified hereinbefore may be used in testing when approved by the Engineer. Engineer shall be notified when tests are to take place. If Engineer is not notified, Engineer may require test to be repeated. Tests shall be as follows:
1. Sanitary waste and vent: Minimum 10 feet hydrostatic test and as required by Standard Building Code.
 2. Water Piping: (Circulating systems) 150 psi hydrostatic, with no discernable pressure loss for a period of eight (8) hours.
 3. Relief Valves: Operate equipment until safety valves relieve. Record temperature and/or pressure at time of opening.
 4. Thermometers, Gages, etc.: Contractor shall remove, recalibrate and/or replace any instrument installed in the system, as directed by the Engineer, when accuracy is questionable, mercury columns are separated, or other such conditions exist.
 5. Upon completion of the various systems, this Contractor shall set and adjust all valves, dampers, controllers, thermostats, etc.
 6. Each and every phase of the heating and ventilating system shall be operated for a sufficient period of time to demonstrate to the entire satisfaction of the Engineer, the ability of the system to meet the capacity and performance requirements.

3.02 SYSTEM CLEANING AND TREATMENT

- A. All closed hot and chilled water piping systems shall be cleaned as follows:
1. All piping shall be cleaned of iron cutting and other debris as installed into the system. Particular attention shall be given to coils, valve seats and glands, pump mechanical seals and packing glands, strainers, etc., such that the surfaces are clean and free of all foreign material.
 2. At completion of the piping hook-up, after pressure tests and prior to operation of any equipment, the Contractor shall thoroughly flush the piping system with clean water to remove any debris remaining in pipe.

3. After the system has been thoroughly flushed with clean water, the system shall be filled and vented with clean water and a sufficient concentration of Anderson Chemical Company's detergent type system cleanser. Circulation shall be provided by the installed circulating pump. System shall be then heated to between 140-160 degrees F and circulated for not less than 24 hours. During circulation of detergent, 3-way valves, etc., shall not be operated such that solution shall reach all branches, bypasses, etc. After 24 hour detergent cleaning, system shall be drained and flushed with clean water until all detergent has been removed and water runs clear. Strainers shall be checked and cleaned. System shall then be filled with clear water, vented and pressurized such that 4 psig is obtained at the highest point of the system.

3.03 FILTER CLEANING

- A. No air handling equipment shall be operated during any stage of construction, cleanup or testing without filters.
- B. All filters on air handling equipment shall be new and unused and shall be installed by time mechanical construction is accepted and taken over for operation by the Owner.

3.04 OPERATING INSTRUCTIONS

- A. All equipment and systems shall be tested as hereinbefore specified.
- B. Furnish a competent mechanic to supervise the starting, adjusting and testing of all equipment and to train the operator in the operation of the system. Where specified, certain major items of equipment shall be installed under the supervision of and tested by a specialist furnished by the manufacturer of the equipment. Such specialist shall train the operator in the use of his equipment.
- C. Contractor shall furnish three (3) copies of operating and maintenance instructions for each and every piece of equipment supplied by him together with four (4) copies of spare parts lists. Information to be neatly bound in three ring binders, indexed, and labeled for each piece of equipment. Contractor will spend sufficient time with the operator to acquaint him with the complete operations of the system. Provide framed, glass enclosed, typewritten instructions, easily read, explaining exactly the procedure to be followed in starting up, and in shutting down the systems for each of the various control cycles. Operators, such as switches, pushbuttons, changeovers, etc., shall be numbered and referred to by number and function in the operating instructions. The manuals shall be transmitted to Physical Plant at least one month prior to the completion of the work. Also, the names and addresses of all subcontractors shall be listed in the front of the manual.

END OF SECTION

SECTION 16010

COMMON ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 GOVERNING CLAUSE

- A. For the sake of brevity these specifications shall omit phrases such as "Contractor shall furnish and install", "unless otherwise indicated or specified", etc., but these phrases are nevertheless implied. Mention of materials and operations requires the Contractor to furnish and install such materials and perform such operations to provide a complete and operating system to the satisfaction of the Architect.

1.02 GENERAL CONDITIONS

- A. General Conditions, Supplementary General Conditions, Information to Bidders, General Requirements and Alternates and other pertinent documents issued by the Architect are a part of these specifications and shall be complied with in every respect.
- B. This project requires major renovation of existing systems along with additions and modifications. All existing areas and equipment not under modification shall remain in operation. Electrical service shall not be interrupted except with approval of the Architect and interruption shall occur at the convenience of the Owner with proper advance notification. This may require week-end and night work.
- C. Where new work or demolition affects existing electrical equipment and/or circuitry which will remain, the equipment shall be removed, relocated as required, and recircuited in accord with these specifications. Any necessary temporary relocation, as determined by the Architect, shall be done at no extra cost and in a safe and secure manner.
- D. Demolition of existing equipment noted or required by the new work shall consist of removal of equipment, removal of exposed conduit, removal of wiring back to next in line junction or over-current protection and re-connection and/or rerouting of feed-thru circuits. All equipment removed shall remain the property of the Owner unless the Contractor is otherwise instructed in which case it shall be removed from the site by the Contractor.
- E. Prior to beginning work, Contractor shall note (in writing to the Architect) any deficiencies in the existing systems that are to be modified by this project. This shall be used to determine the final operating condition of systems at the completion of this project.
- F. Where existing panels/switchboards are shown or noted to be used for new circuits, existing adequate breakers and spaces may be used for the new circuits. All required hardware and accessories necessary for installation of new breaker(s) shall be provided. Where space is inadequate, Contractor shall furnish new panel/enclosure with sufficient pole capacity and serve by tapping bus of existing panel.

1.03 RECORD DRAWINGS

- A. The contractor shall provide the Architect at job acceptance the following:
 - 1. Two (2) sets of blue line prints of same scale as original drawings marked in red showing all variations of the work actually installed related to the original drawings. This set of drawings shall include all, addenda, approved and installed change orders, field condition changes, and other departures from the original plans and specifications.

2. Three (3) sets of shop drawings and other data required by the specifications reflecting the manufacturer's shop fabrication of the materials actually installed. The Division 16 shop drawings shall be separately post bound, indexed, and tabbed by specification section. Faxed or copies of faxed material shall not be used in Close-Out Documents.
3. Operation and maintenance manuals and manufacturer=s instructions.

PART 2 – PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 TESTS AND OBSERVATIONS

- A. The complete job shall be, during and/or after construction, subject to the tests and observations as herein described and as noted on the drawings. Deficiencies found as a result of these tests and observations shall be corrected by the Contractor within a reasonable period and at no expense to the Owner.
- B. By Architect's observations and tests conducted by him or for him in his presence. Upon notice, Contractor shall furnish not to exceed two men, one to include the job foreman, and tools to assist and be directed by the Architect for a reasonable amount of time to make such tests and observations as are requested by the Architect.
- C. Conductor insulation tests shall be performed in the Architect's presence and shall be subject to his approval. A written report of these tests shall be submitted to the Architect for approval prior to acceptance of the work.
 1. 600-Volt Conductor: Using a 500-volt megger, each circuit conductor shall be tested with all splices made but no equipment connected. The ohmic value shall be recorded and results must meet minimum requirements as follows:

<u>Wire Size</u>	<u>Kilohms</u>
#12	1000
#10-#8	250
#6-#3	100
#2-#3/0	50
#4/0-500 MCM	25
750 MCM	12

2. Feeders with paralleled conductors shall have conductors tested separately prior to paralleling.
3. Conductors not meeting these minimum values shall be repaired or replaced as directed by the Architect.
- D. By any Federal, State and/or local authority.
- E. By the Owner's Insurance Carrier. After inspection by this agency, Contractor shall make corrections of any deficiencies found adversely affecting the insurance to be carried by the Owner. Acceptance of the Owner's Insurance Carrier's report or subsequent reports lie with the Architect or Owner.

3.02 GUARANTEE

- A. Guarantee to the Owner all work performed under this contract to be free from defects in workmanship and materials for a period of one year from date of final acceptance by the Architect and the Owner except as hereinafter noted.
 - 1. Remedy within a reasonable period any defects arising during this period at his own expense upon notice of the Owner or his authorized representative.
 - 2. Lamps are hereby exempt from a one-year guarantee as follows:
 - a. All lamps are to be operating upon acceptance of the job.
 - b. All incandescent lamp burn-outs occurring during the first thirty (30) days after final acceptance shall be reported to the Architect at the end of this thirty-day period. Replacements for these burn-outs shall be furnished and installed by the Contractor upon notice from the Architect.
 - c. All gaseous vapor discharge lamp burn-outs occurring during the first one-hundred eighty (180) days after final acceptance shall be reported to the Architect at the end of this one hundred eighty-day period. Replacements for these burn-outs shall be furnished and installed by the Contractor upon notice from the Architect.

END OF SECTION

SECTION 16020

CODES AND STANDARDS

PART 1 - GENERAL

1.01 CODES

- A. Strictly comply with the latest edition of the National Electrical Code (NEC), National Fire Protection Association (NFPA), Standard Building Code (SBC), National Electrical Safety Code (ANSI-C2) and all Federal, State and/or local codes. Notify Architect of any conflict between these codes and the drawings and/or specifications before bid date or correct conflicts at his own expense.

1.02 STANDARDS

- A. Familiarize himself, coordinate, and cooperate with all other trades in installation of his materials. Layout of Division 16 work shall be the responsibility of this Contractor and all conflicts with Division 16 work and other trades shall be resolved prior to installation.
- B. Use only new equipment/materials of current manufacturer which are listed by Underwriters' Laboratories when such listings are issued for the type of equipment/materials, approved by NEMA standards, National Electrical Code standards or other appropriate agency. Equipment/material shall be of current production from manufacturer=s of long experience in the manufacturer of such type equipment/material and who are regularly engaged in the production of this type equipment/material.
- C. Equipment/materials shall have local service representation where applicable.
- D. Notify Architect prior to installation of conflicts between electrical and structural, architectural, mechanical, etc. work.
- E. Equipment/materials installed and connected in strict compliance with manufacturer's recommendations unless these requirements are exceeded as noted on the drawings or specified herein.
- F. Equipment/materials shall be installed and connected in a neat and workmanlike manner.
- G. Use experienced labor or employ appropriate Sub-Contractor to do all cutting and patching necessary for installation of his materials. Obtain permission from Architect and General Contractor before cutting any structural member.
- H. Not to scale electrical drawings. Follow architectural, equipment supplier shop drawings, and manufacturer's shop and installation drawings for accuracy.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 16030

ELECTRICAL SYSTEMS SCHEDULE

PART 1 - GENERAL

1.01 SYSTEMS

A.. All electrical materials and operations for complete and operative systems as follows:

1. Secondary electrical distribution system
2. Power outlets and connections to all motors and equipment.
3. Lighting system complete with controls and fixtures.
4. Telephone outlets and conduits.
5. Data outlets & conduits.
6. Miscellaneous as shown on the drawings and as stated herein.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 16100

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 BASIC CONDITIONS

- A. Equipment is specified by manufacturer's name and catalog number and is intended to establish the minimum standards of quality acceptable.
- B. Substitute equipment, equivalent in all respects to that specified, is permitted with the written approval of the Architect. Approval **Will Not** be considered until after award of contract and only if submitted by the Contractor.
- C. The manufacturers name first mentioned in this specification is considered to be the specified equipment. The "or equal" manufacturers mentioned or other manufacturers proposed by the Contractor shall be considered as substituted equipment.
- D. Substituted equipment shall meet the dimensional and functional requirements of the building as represented by the plans and specifications. All revisions to the contract precipitated by the use of substituted equipment shall be incorporated by the Contractor, after approval in writing by the Architect, at no additional cost to the Owner.
- E. Architect's approval of shop drawings does not relieve the Contractor from satisfying the requirements of the drawings and specifications. Any equipment or work found in the judgement of the Architect to be defective or otherwise unsuitable shall be repaired or replaced by the Contractor at no additional cost to the Owner.
- F. If requested in writing by the Architect, the Contractor shall submit a scale drawing (scale as directed by Architect) of any electrical equipment area, conduit layout, or the like which in the opinion of the Architect may present difficulty regarding space allocation or clearances.
- G. Mounting Heights
 - 1. Mounting heights of various devices, outlets, safety switches, panelboards and the like shall reference the height above the finished floor or grade above which they are mounted. Heights specified shall reference the center of the device, box, breaker or switch operating handle.
 - 2. Mounting heights may be adjusted slightly to permit cutting of masonry block to the top or bottom of the block course nearest the required height. All heights shall be consistently cut above or below block coursing so that they will be the same height above the reference.
 - 3. Mounting heights shall be as follows:

<u>Description</u>	<u>Mounting Height</u>
Switch Toggle	48" to center
Receptacle	16" to center
Safety Switch	54" to center
Panelboard	78" to top breaker
Enclosed Circuit Breakers	54" to center
Receptacle or Switch above counter top	4" to center above counter / backsplash

1.02 SUBMITTALS

- A. After the project notice to proceed has been issued and with promptness to assure reasonable time for review with no delay to the project, the Contractor shall submit to the Professional a minimum of six (6) copies of shop drawings for all equipment and material for the electrical systems for approval whether or not substituted equipment or materials.
- B. Shop drawings shall be post-bound, indexed and tabbed per the appropriate specification sections. All material/equipment shop drawing cut sheets shall be properly located under the appropriate specification section. All shop drawings shall be originals (no faxed copies) and shall be readable without being removed from the bindings. All information listed on the shop drawings shall be typed. Handwritten information will not be accepted.
- C. All submitted equipment/material and associated options, accessories, special features, etc. shall be clearly marked and indicated on all copies of the shop drawings. Provide appropriate shop drawings on all required accessory equipment.
- D. All shop drawings for all systems, equipment and materials including any required one-line drawings, diagrams, etc. shall be submitted together. Partial submittals will not be reviewed without prior consent. Special systems provided by specialized vendors or distributors may be submitted in a separate binder.
- E. Provide complete shop drawings with all pertinent information for the following equipment and/or systems and all required components:
 - 1. Panelboards
 - 2. Conduit and other raceways
 - 3. Wire and cable
 - 4. Wiring devices
 - 5. Lighting fixtures
 - 6. Lamps

PART 2 - PRODUCTS
Not Used

PART 3 - EXECUTION
Not Used

END OF SECTION

SECTION 16110

RACEWAYS AND FITTINGS

PART 1 - GENERAL

1.01 SUMMARY

- A. All conductors, except where specifically noted, to be installed in raceways.
- B. Provide air/vapor barrier in all raceways where required.

PART 2 - PRODUCTS

2.01 COMPONENTS

- A. Conduit in accordance with the following schedule:
 - 1. In any poured concrete: Hot-dipped galvanized rigid steel conduit or IMC.
 - 2. In masonry walls: Hot-dipped galvanized rigid steel conduit, IMC or EMT.
 - 3. In suspended ceiling construction or non-masonry partitions: Hot-dipped galvanized rigid steel conduit, IMC or EMT.
 - 4. In exposed locations indoors: Hot-dipped galvanized rigid steel conduit, IMC or EMT.
 - 5. In exposed locations out of doors. Hot-dipped galvanized rigid steel conduit or IMC. All conduits in earth shall be hot-dipped galvanized rigid steel coated with polyvinyl, polyethylene or asphaltum. Conduits installed in earth shall be buried a minimum of 24 inches to top below finished grade.
 - 6. All feeders shall be run in hot-dipped galvanized rigid steel conduit or IMC. Feeder routing shall follow shortest route possible within other requirements herein specified.
 - 7. Conduit in excess of 1-1/4 inches trade size shall be hot-dipped galvanized rigid steel conduit or IMC.
- B. Provide insulating bushing where conductors #4 or larger enter junction box, gutter, cabinet or cutout box. Bushings to be OZ type "BLG", Steel City, Thomas and Betts or equal approved by the Architect.
- C. Openings around electrical penetrations through smoke-stop or fire-resistant rated walls, partitions, floors or ceilings shall be smoke and/or fire-stopped using approved UL listed system designed for the materials encountered to maintain the smoke-stop and/or fire-resistant rating.
- D. Expansion fittings in conduits where shown on the drawings or where passing through expansion joints imbedded in concrete. Fittings shall be Crouse-Hinds type XJ complete with type GC100 grounding strap and type GC102 strap clamps or approved equal in Killark or Appleton.

- E. Provide seal-off fittings where shown on the drawings or as required by a condition encountered requiring a seal. Seals shall be installed where conduits are installed between areas of different temperatures where condensation may occur. These shall include, but not be limited to, refrigerators, freezers, air-handling units, environmental rooms and building exterior. Seals shall also be installed where conduits enter the building or a piece of equipment and there is a possibility of moisture migration thru the raceway to the equipment or into the building. Fittings shall be Crouse-Hinds type EYS for horizontal and vertical runs, or type EYS elbow seals or approved equal in Killark or Appleton. All seals shall be properly installed using "Chico X" fiber and "Chico A" sealing compound.
- F. Conduit Fittings
 - 1. All conduit fittings shall be of steel or malleable iron. Die cast fittings are not acceptable.
 - 2. Rigid Steel and IMC Conduit Fittings:
 - a. Standard steel or malleable iron threaded couplings, locknuts, bushings, and elbows.
 - b. Locknuts: Bonding type of steel or malleable iron with sharp edges for digging into the metal wall of an enclosure.
 - c. Bushings: Insulating type of steel or malleable iron consisting of an insulating insert molded or locked into the metallic body of the fitting. Grounding type with ground lug.
 - 3. EMT Conduit Fittings:
 - a. Couplings and connectors shall be compression type of steel or malleable iron as manufactured by T&B, Appleton or equal and shall be properly secured to each conduit or box.
- G. Where specifically noted and/or indicated on the drawings, wiring may be installed in PVC conduit. PVC conduit shall be electrical grade Schedule 40 as manufactured by Carlon, Triangle, PWC or equal approved by Architect.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Size conduits as shown on the drawings or where size not shown follow National Electrical Code. Four-wire branch circuit homeruns shall be 3/4" trade size minimum. Homeruns shall not exceed the number of conductors shown on the drawings unless specific approval is given by the Architect.
- B. Conceal all conduits not shown exposed on drawings. Conceal all conduits in partitions unless specifically shown otherwise on drawings or stated herein.
- C. Where conduits are shown concealed in concrete slabs in contact with earth, conduits 1/2 inch through 1-1/4 inches trade size shall be installed in and not under slabs. Conduits in excess of 1-1/4 inches trade size shall be installed under slab and shall have two coats of asphaltum paint applied or shall be coated with polyvinyl, polyethylene or other approved coatings. Where conduit symbol indicates conduit concealed in floor slab and concrete thickness is less than four (4) inches, conduits shall be installed below slab. Conduits shall be routed as required so as not to compromise the structural integrity of any concrete.

- D. Run conduits parallel and/or perpendicular to walls, ceilings or floors. Homerun conduits shall be combined to form a common routing path and supported from the building structure by trapeze style hangers.
- F. Couple conduits together and connect to boxes, fittings and cabinets so as to provide effective electrical continuity. Do not use couplings dependent on screws bearing on conduit.
- G. Conduits **Shall Not** be routed horizontally on roof without specific approval from Architect. All roof penetrations shall be weatherproofed by Division 7 Contractor. Division 16 Contractor shall be responsible for procuring and coordinating with Division 7 Contractor to perform roof penetrations.
- H. Make field bends in conduits in accordance with table in Article 346 of the National Electrical Code.
- I. Plug upturned conduits to prevent entrance of moisture or debris and make certain that conduits are clear of same before pulling in wire.
- J. Use not to exceed six (6) feet of flexible metal conduit for connection to motors and/or recessed fixtures unless otherwise specified herein. Flexible conduit shall be steel. Flexible conduit used for connections subject to moisture under normal conditions or where specifically indicated or noted shall be liquid tight with proper liquid tight fittings. All flexible conduit shall have properly sized bonding jumper installed within and shall be sized in accordance with Article 250, Table 250-95 of the National Electrical Code.
- K. All final connections to motors, transformers or other vibrating equipment shall be with liquid tight flexible conduit.
- L. Amply support conduits in accordance with the NEC and as follows:
 - 1. By one-hole or two-hole straps.
 - 2. By at least three rounds of #14 B & S gauge galvanized wire twisted around concrete reinforcing rods.
 - 3. By one- or two-hole malleable iron clamps for exposed work held in place by machine screws in expanding lead anchors in concrete or masonry or by screws in wood.
 - 4. By conduit clamps for bar joists.
 - 5. Where groups of conduit occur or for feeder conduits where applicable, by trapeze hangers adequately supported by steel rods attached to concrete inserts, welded supports, bolted supports, etc.
 - 6. Bulb "T" clamps for conduits crossing bulb "T"s.
- M. Pull one (1) nylon pull string, minimum 1/8 inch diameter, into all empty conduits.
- N. Assure ground continuity on feeder and branch circuits as stipulated in Article 250 of NEC by two locknuts, one inside and one outside of all boxes, cabinets and gutters.
- O. Wiring gutters shall not be used to combine homeruns to panels unless specifically shown or noted on the drawings

P. Non-metallic raceway:

1. Installation shall follow the applicable provisions of paragraph 16110 "RACEWAYS AND FITTINGS" hereinbefore specified and manufacturer's recommendation unless exceeded by requirements shown on the drawings. All joints shall be made using approved solvent cement.
2. Where used for service conductors and where noted on the drawings, conduits shall be concrete-encased with a minimum of 3 inches coverage on all sides.
3. Rigid steel conduit shall be used where PVC conduits turn angles and/or are exposed.
4. PVC conduit shall not be stored nor have been stored in direct sunlight.
5. PVC boxes of equivalent dimension to those hereinafter specified under paragraph 16160 "BOXES AND FITTINGS" shall be used with PVC box connectors.
6. Where underground PVC conduits are shown and/or noted on the drawings to be used for communication systems and/or to be empty for future use, provide one # 8 copper conductor in each conduit for full length of conduit for future locating purposes.

END OF SECTION

SECTION 16130

CONDUCTORS

PART 1 - GENERAL

1.01 SUMMARY

- A. Conductors shall be standard annealed copper rated 600 volts with mechanical strength, insulation, temperature and carrying capacity adequate for the particular conditions under which they are used.

PART 2 - PRODUCTS

2.01 COMPONENTS

- A. In wet or dry locations type "THWN" unless shown on drawings or specified herein to be other type.
- B. In unwired fixtures where required by National Electrical Code, use approved heat-resistant wire sized for current, voltage and temperature at which fixture operates.
- C. Branch circuit conductors within 3 inches of a ballast within the ballast compartment of fluorescent fixtures shall be recognized for use at temperatures not lower than 90EC. Asbestos wire shall not be used for this application.
- D. Conductors entering the self-contained ballast compartment of gaseous vapor discharge fixtures shall be rated 600 volts, silicone rubber, fixture wire, #10 AWG, stranded copper conductor, silicone rubber insulation, glass outer-braid, 200EC. rated conductor temperature.
- E. Wire sizes #8 AWG and larger shall be of the stranded type, Class B stranding, and sizes #10 AWG and smaller shall be of the solid type with the exception that all final connections to motors or other vibrating equipment shall be made with stranded wire regardless of size.
- F. Use Scotch 3M or approved equal plastic tape over mechanical and/or soldered splices applied in thickness equal to wire insulation.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Make splices and connections in accessible boxes, gutters or cabinets only. Wire sizes #8 and larger to be spliced only with specific approval of Architect.
- B. Use soldered and taped or approved mechanical splice connections on solid wire and pressure type solderless connectors well-taped on stranded conductors. Wire sizes #8 and larger to have irreversible compression-type splice.
- C. Use approved lubricants which are non-injurious to insulation when pulling conductors into raceways.
- D. Use #12 AWG minimum wire size with exceptions as noted on the drawings or as stated herein. Homeruns of 20 ampere circuits in excess of 50 feet shall be #10 AWG minimum size even if not shown on the drawings.

- E. Use stranded conductors for final connections to motors and all vibrating equipment.
- F. The following conductor color coding shall be observed:
 - 1. 120/240 Volts, three phase, four wire, delta connected:
 - a. Phase A - Black.
 - b. Phase B - Orange.
 - c. Phase C - Blue.
 - d. Three way and four way travelers - Yellow.
 - e. Neutral - White.
 - f. Equipment ground - Green.

END OF SECTION

SECTION 16160

BOXES AND FITTINGS

PART 1 - GENERAL

1.01 SUMMARY

- A. All boxes to be accessible after construction is complete. Accessible to be as defined by NEC.

PART 2 - PRODUCTS

2.01 COMPONENTS

- A. Only galvanized stamped steel boxes and covers.
- B. Bar hangers or other approved structural supports for all boxes and a 3/8" steel fixture stud if required by the fixture type.
- C. Junction or pull boxes as required by field conditions whether or not shown on the plans. Use Columbia screw cover pull boxes indoors and Hope cast iron boxes out of doors or approved equal. Consult Architect for size and locations. All junction or pull boxes shall be labeled with plastic impression tape indicating system being served, feeder and/or circuit number(s). Junction or pull boxes for fire alarm system(s) shall be painted Ared@ in color.
- D. Use boxes in accordance with the following schedule and/or in accordance with Article 370 of the National Electrical Code (table below based on use of #12 AWG) whichever is the larger box required.:
 - 1. Switch box, 3 inches by 2 inches by 2 1/2 inches, 5 conductors.
 - 2. 4 inch octagon box, 1-1/2 inches depth, 6 conductors.
 - 3. 4 inch square box, 1-1/2 inches depth, 9 conductors.
 - 4. 4 inch square box, 2-1/8 inches depth, 13 conductors.
 - 5. 4-11/16 inch square, 2-1/8 inches depth, 18 conductors.
- E. Watertight junction boxes with hubs in outdoor or damp locations.
- F. Boxes as manufactured by Steel City, Appleton, Raco or approved equal.
 - 1. Suspended ceiling or wall outlet: 4 inch octagon, 1-1/2 inches depth, cat. no. 54151.
 - 2. Suspended ceiling or wall outlet: 4 inch square, 1-1/2 inches depth, cat. no. 52151.
 - 3. Suspended ceiling or wall outlet: 4 inch square, 2-1/8 inches depth, cat. no. 52171.
 - 4. Susp ceiling or wall outlet: 4-11/16 inch square, 2-1/8 inches depth, cat. no. 72171.
 - 5. Switch box: 2-1/2 inches depth cat. no. CL.
 - 6. 4 inch octagon concrete box, depth as required: Cat. no. 54500 Series with CBP plate and stud.
- G. Plates: Plates as manufactured by Hubbell, Pass and Seymour, Arrow Hart, or Leviton shall be stainless steel, satin finish, Type 302, 8% nickel -18% chrome on all flush outlets.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Close all unused knockout holes and install galvanized blank covers on surface boxes and stainless steel covers on flush boxes having no fixture or device.
- B. Mount boxes flush to surface. Install plaster rings or special square corner raised covers for tile or block walls so that fixtures or devices will be perfectly flush mounted. Outlet boxes shall not be installed back to back. Boxes shall not be installed more than 1/4" behind finish face of wall. Boxes installed in masonry walls shall be embedded in masonry.
- C. Location of outlets is approximate unless dimensioned. See architectural or shop drawings for greater accuracy. Any box may be moved up to ten (10) feet by direction of the Architect if so directed before box has been installed.
- D. Plates and/or covers on all boxes and outlets with or without devices. Plates to have all corners in contact with finish wall and shall be horizontal and/or vertical to building surfaces.

END OF SECTION

SECTION 16200

ELECTRICAL SERVICE SYSTEM

PART 1 - GENERAL

1.01 SECONDARY ELECTRICAL SERVICE

- A. Is existing at 120/240 volts, three phase, 4 wire, 60 HZ, delta connected.

1.02 ELECTRICAL METERING

- A. Electrical metering facility is existing and shall remain.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 16250

GROUNDING AND BONDING SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Bonding and grounding of electrical service equipment enclosures, raceways and ground terminals as shown on the drawings and in accordance with Article 250 of the National Electrical Code. All cubicles and conduit of the service equipment shall be bonded together.

PART 2 - PRODUCTS

2.01 COMPONENTS

- A. Ground rods shall be 5/8 inch x 10'-0" copper clad sectional, solid rods. They shall be installed with top 12 inches below finish grade. Resistance to ground shall not exceed 25 ohms. Connections to ground rods to be by exothermic weld. Where multiple ground rods are indicated or required, they shall be driven six (6) feet apart in a straight line and connected with ground conductor sized as shown and/or per N.E.C. Article 250.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Service equipment system neutral bus and equipment ground bus shall be grounded to electrodes meeting the requirements of Article 250-52 of NEC. Where available and of proper characteristics, the incoming cold water line shall be one of the electrodes.
- B. Equipment grounding terminal (green) of all grounding type receptacles shall be bonded to its enclosure with a properly sized bonding conductor (green) unless the receptacle is approved for self-bonding.
- C. Pull into all non-metallic raceways and other raceways where shown on drawings one green equipment grounding conductor, sized the same as the branch circuit conductors or as noted on the drawings and bond this conductor to box ground terminal, receptacle ground terminal (green), ground bus of panel, cabinet and/or enclosures.
- D. Where conduits enter an enclosure, use bonding type bushing on conduits through 1-1/4 inches trade size with #10 AWG copper conductors bonded to all conduits thence to equipment enclosure or ground bus. Conduits in excess of 1-1/4 inches trade size shall have bronze ground clamps with bonding conductors sized in accordance with National Electrical Code requirements and/or as shown on the drawings.

END OF SECTION

SECTION 16300

ELECTRICAL DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide circuit breaker panelboards as described in Contract Documents.

PART 2 - PRODUCTS

2.01 COMPONENTS

- A. Manufacturers shall be General Electric types AQ and SCP or equal in Square D Company, Siemens or Cutler Hammer.
- B. Shall be dead front construction with solderless pressure terminals.
- C. Main and neutral busses of capacity shown or indicated herein to be completely tin and/or silver plated copper based on 1000 amps per square inch current density.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Securely mounted with through bolts anchors or other approved means. Contractor shall provide proper mounting surface if wall of insufficient strength. All wood or other flammable mounting surfaces shall be painted with two coats of flame resistant paint.
- B. Complete typewritten directory with transparent plastic cover inside of door. All panels shall be identified as they are designated on the drawings by 3/4" plastic nameplate, white with minimum 1/2" high black engraved letters, on front face if panel is surface mounted or inside of door if panel is flush mounted.
- C. Trim and door with lock and catch with two (2) keys. Keys common to all building panelboards.
- D. Mount panelboards with top breaker handle not more than 6'-6" above floor. Installation of flush panels shall not compromise fire rating of walls.
- E. Connect the phase wires of homeruns to breakers connected to separate phase busses of the panelboard and maintain approximately equal loads on each bus.
- F. Panelboard circuits shall be numbered in sequence vertically down the left side then vertically down the right side and all circuits shall appear in the panel exactly as they are shown on the drawings.
- G. Numbering to be consecutive for double or triple section panels. Neutral connections shall be identified by adhesive number tags to identify with their branch circuit phase conductors.
- H. Typed copy of circuit directory to be installed for each panelboard and shall be submitted with shop drawing submittal for approval.

- I. Where existing panelboards are shown and/or noted to be used for new branch circuits, existing adequate spare circuit breakers and/or spaces may be used for the new circuits.
- J. Circuit breaker(s) installed in existing panelboards shall be of the same manufacturer and K.A.I.C. rating as existing breakers. Where space is inadequate for new circuit breaker(s), provide new panel section with sufficient pole capacity and same ratings as existing panel and serve by tapping the bus of the existing panel.
- K. Provide all required hardware and accessories necessary for installation of the new circuit breaker(s) and/or panel sections. Contractor shall be responsible for visiting the site and verifying the existing conditions prior to bidding.

END OF SECTION

SECTION 16340

WIRING DEVICES

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide wiring devices as described in Contract Documents. Provide disconnects for all loads except where disconnect furnished with equipment.
- B. Provide proper NEMA enclosure for the environment where device is located.

PART 2 - PRODUCTS

2.01 WALL SWITCHES

- A. Switches to be as manufactured by Hubbell, as stated, or approved equal in Pass and Seymour (P&S), Arrow Hart or Leviton. Contractor shall verify device color with Architect prior to ordering devices.
 - 1. Single pole, 20A, 120/277V: Hubbell Cat. No. HBL1221, P&S Cat. No. 20AC1, Arrow Hart Cat. No. 1991, Leviton Cat. No.1221-2.
 - 2. Three way, 20A, 120/277V: Hubbell Cat. No. HBL1223, P&S Cat. No. 20AC3, Arrow Hart Cat. No. 1993, Leviton Cat. No.1223-2.
 - 3. Four way, 20A, 120/277V: Hubbell Cat. No. HBL1224, P&S Cat. No. 20AC4, Arrow Hart Cat. No. 1994, Leviton Cat. No.1224-2.

2.02 MISCELLANEOUS SWITCHES

- A. The following miscellaneous switches/contactors with manufacturer as stated or equal in Square D, Allen Bradley, General Electric or equal approved by Architect:

<u>Item</u>	<u>Mfg.</u>	<u>Cat. No.</u>
Manual motor switch, single pole	Square D	Class 2510, type FO-1
Safety switch, heavy duty with ground lug	Square D	H200-H300 Series

- B. All motor starters shall have thermal overload elements sized to actual motor nameplate amperes or as provided in Article 430, Part C of the National Electrical Code.
- C. All safety switches shall be heavy duty as defined by NEMA and shall be of voltage as required by the particular circuit on which they are installed. Each switch shall have indented plastic tape label identifying load served with voltage, horsepower, panel and circuit number. All fused switches shall be fused with Bussman Fusetron dual element type fuse as appropriate to the circuit voltage with size fuse indicated on the drawings.

2.03 RECEPTACLES

- A. Convenience outlets and receptacles as manufactured by Hubbell, as stated or equal in Pass and Seymour (P&S), Arrow Hart or Leviton. Contractor shall verify device(s) color with Architect prior to ordering

- B. Furnish to Owner at job acceptance a number of plugs (Hubbell Cat. No. 1447) for each duplex device equal to 10% of the number of those devices installed (1 plug minimum). Plugs to be in cartons properly prepared for storage.
- C. Duplex grounding receptacle (construction grade), 20A, 125V: Hubbell Cat. No. CR5362, Pass & Seymour Cat. No. 5362, Arrow Hart Cat. No. 5352, Leviton Cat. No. 5362.
- D. Duplex grounding receptacle, ground fault interrupter type (construction grade), 20A, 125V: Hubbell Cat. No. GF5352, P&S Cat. No. 2091, Arrow Hart Cat. No. GF5342, Leviton Cat. No. 6899.
- E. Duplex grounding receptacle, weatherproof, ground fault interrupter type (construction grade), 20A, 125V, mount in type FD box with plate: Hubbell Cat. No. GF5352, P&S Cat. No. 2091, Arrow Hart Cat. No. GF5342, Leviton Cat. No. 6899. Plates shall be equal to Hubbell Cat. No. 5206WO or Cat. No. WP8MHP for permanent or Ain-use@ outdoor cord and plug connections.

PART 3 - EXECUTION

3.01 WALL SWITCHES

- A. Flush A.C. tumbler-type ganged together under one non-sectionalized plate in gangable boxes where two or more switches occur at one point. Provide metal barrier within box between all adjacent switches served by circuit conductors of different phases or conductors of a different system.
- B. Install switches to cut ungrounded conductors.
- C. Wall switches shall be mounted 48" above finished floor to center of operating handle or as noted on the drawings. Mounting heights may be adjusted slightly to permit cutting of masonry block to the top or bottom of the block course nearest the specified height. All mounting heights shall be consistently cut above or below block coursing such that switches will be the same height above the finished floor. First switch of single or ganged switch bank shall be mounted within 12 inches of door frame and/or edge of door.
- D. Lighting control switches shown at door ways shall be mounted adjacent to door ways on opposite side of door from hinges unless prohibited by wall space. Where switches must be mounted on same side of door as hinges, mount switches so as not to be located behind opened door.
- E. Safety switches and lighting contactors shall be mounted 54 inches to center of operating handle above the finished floor or finished grade where mounted unless shown or noted otherwise on the drawings. Where safety switch is located behind equipment screen walls, mount switch such that top of the enclosure is 6 inches below top of screen wall and bottom of enclosure is a minimum of 18 inches above the finished grade or slab.

3.02 RECEPTACLES

- A. Convenience outlets and receptacles shall be mounted center line up 16 inches above finished floor unless shown or noted on the drawings otherwise. Convenience outlets and receptacles located at counters shall be mounted center line up 4 inches above counter top or backsplash unless shown or noted on the drawings otherwise. Mounting heights may be adjusted slightly to permit cutting of masonry block to the top or bottom of the block course maintaining the minimum specified height. All mounting heights shall be consistently cut above or below block coursing such that receptacles/outlets will be mounted the same height above the finished floor. Adjacent devices to be mounted at same height unless otherwise directed.
- B. Carefully review Architectural drawings for furniture, casework or millwork. Do not rough-in receptacles behind equipment except where specifically noted. Where receptacle is shown behind equipment, verify proper mounting height with the Architect prior to rough-in.

END OF SECTION

SECTION 16400

LIGHTING FIXTURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all lighting fixtures as shown on the drawings by symbols and as defined in the lighting fixture schedule(s). Fixtures shall be provided with all necessary mounting accessories. The installation of all fixtures shall be complete, safe and in full accordance with manufacturer's recommendations and these specifications. This contractor shall provide additional 1-1/2 inches by 1-1/2 inches by 12 gage channel bridging where necessary to mount lighting fixtures governed by the conditions encountered.

PART 2 - PRODUCTS

2.01 COMPONENTS

- A. Lighting fixture lenses specified by catalog number and/or by descriptive reference shall be virgin acrylic plastic and shall equal or exceed IES-SPI-NEMA test for yellowing factor of not to exceed 3 after 2000 hours exposure in a Fade-o-meter for the standard test conditions. The flat portions of all lenses shall be not less than .125 inches thick and shall weigh not less than 8 ounces per square foot.
- B. Lighting Fixture Lamps.
 - 1. Provide lamps of proper size and type in each lighting fixture. Lamps shall be as manufactured by Phillips, General Electric, Sylvania, Venture or equal approved by Architect.
 - a. Incandescent/Quartz/Halogen Lamps, 120V
A lamp, 60W thru 200W, inside frosted
 - b. Fluorescent Lamps, 3500K, CRI 82 minimum
T8, rapid-start, 32 watts, 2850 lumens.
 - c. High Intensity Discharge (HID) Lamps
Metal Halide, Clear, 3200K, CRI 70 minimum
- C. Fluorescent Lighting Fixture Requirements
 - 1. Fluorescent Lighting Fixture Ballasts. Fluorescent lighting fixtures shall be provided with integral electronic ballasts of the full light output type unless specifically noted otherwise on the drawings. Provide number of ballasts as indicated or as required for lighting fixture switching configurations per the drawings. Ballasts shall be as manufactured by Howard Industries or equal in Magnetek, Advance or Motorola and shall meet the following specifications:

a. Listing:	U.L. listed, Class P
b. Lamp Current Crest Factor:	< 1.7
c. EMI & RFI Limits:	EMI & RFI emissions shall be minimal and shall comply with the limits of FCC Part 18C for non-consumer equipment.
d. Transient Protection:	Withstand voltage transients in accordance with ANSI C62.41, Category A2.
e. Operating Frequency:	> 20kHz without visible flicker

- f. Starting Temperature: 0 degrees F
- g. Circuit Configuration: Instant Start with parallel circuit configuration
- h. Sound Rating: Class A or better
- i. Power Factor: > 95%
- j. K-Factor: < 2.0
- k. Input Voltage Range: +/- 10% of specified voltage
- l. Total Harmonic Distortion (THD): < 10%
- m. Ballast Factor (BF) (avg.): 0.88

2. All ballast serving lighting fixtures utilizing compact fluorescent type and T5 type lamps shall have auto-resetting, end-of-life circuitry to shut off lamp to prevent lamp damage.

D. HID Lighting Fixture Requirements:

1. HID Lighting Fixture Ballast. All HID ballast serving lamps 100W or greater shall have constant wattage autotransformer (CWA) or SCWA circuit types. All HID ballasts shall have a minimum power factor of 90% and of proper voltage for branch circuit encountered or be multi-tap type. All HID ballast shall be U.L. listed and shall meet all requirements of the N.E.C.
2. All fixtures containing HID lamps shall be equipped with protection to prohibit excessive UV radiation should outer globe of lamp be broken. Protection shall be in the form of extinguishing mechanisms or protective shield on base of fixture.

- E. Emergency Fluorescent Battery Packs. Provide emergency battery packs for fluorescent fixtures as required by the drawings. Battery packs for troffers and surface mounted fluorescent fixtures shall be installed by the fixture manufacturer within the fixture housing unless otherwise noted on the drawings. Installation of all battery packs shall maintain accessibility from below regardless of ceiling type in which mounted. Battery packs shall be sealed, maintenance-free, high temperature nickel-cadmium type and provide minimum lighting lumen output as listed below for ninety (90) minutes after interruption of normal power to the fixture. Battery packs shall be as manufactured by Bodine or approved equal.

<u>Lamp Type</u>	<u>Battery Lumen Output</u>
Linear and U-Tube Fluorescent (T8 & T12)	1100
42 watt Compact Fluorescent	750
32 watt Compact Fluorescent	575
26 watt Compact Fluorescent	450
18 watt Compact Fluorescent	300

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Procure fixtures completely factory wired for proper operation in the application shown on the drawings. All fixtures shall be furnished with proper fittings and accessories for installation in the area encountered. This Contractor shall review the Architectural plans and specifications and provide fixtures compatible with the ceiling specified in each area.
- B. Substituted fixtures shall meet the performance and functional characteristics and the general appearance and dimensions (+/- 10%) of the specified fixtures. Approval of submitted substitute fixture(s) shall not eliminate the Contractor's responsibility to provide fixtures similar in characteristics to the specified fixture(s).

- C. Recessed fixtures in accordance with Article 410 of the NEC. All recessed fixtures in accessible ceilings shall be connected with 1/2" flexible conduit from accessible junction box with sufficient length to allow fixture to be relocated to any adjacent ceiling panel without disconnecting. 3/8" flexible conduit may be used if furnished with the fixture by the manufacturer. All recessed fixtures in non-accessible ceilings, unless otherwise indicated, shall be pre-wired from the factory with junction box for terminating branch circuit conduit.
- D. Fixture mounting shall be rigid and independent of the ceiling tile(s) and shall be supported from the major structural elements of the ceiling system. Recessed fluorescent fixtures requiring a ceiling opening in excess of nine (9) square feet shall be supported independent of the ceiling system. Fixtures mounted to concrete shall be anchored with concrete inserts or other means of similar strength as approved by the Architect.
- E. Surface fixtures mounted on combustible ceilings or low density acoustical tile ceilings shall be UL approved for such mounting. Where surface fixtures are served by exposed raceway, fixture shall have surface conduit collar furnished by manufacturer. Surface fixtures mounted on LAT ceiling shall be supported from the major tees and connected via flexible conduit similar to recessed fixtures.
- F. Recessed fixtures shall be furnished to properly coordinate with the fire rating of the ceiling. Where fire rating requires covering over fixture housing, ballast of proper temperature rating as recommended by manufacturer shall be furnished.
- G. Luminaires mounted with bottom edge above finished floor as indicated on the drawings unless specifically noted otherwise. The catalog numbers of recessed luminaires, where applicable, are for use in an exposed grid suspension type ceiling system. The Contractor is responsible for providing luminaires with the proper hardware and/or accessories for installation in the ceiling type encountered.

END OF SECTION

SECTION 16500

TELEPHONE/DATA SYSTEM - RACEWAY ONLY

PART 1 - GENERAL

1.1 INSTRUCTIONS

- A. Applicable requirements listed under paragraphs Title 16110 "RACEWAYS AND FITTINGS", 16160 "BOXES AND FITTINGS" and "Plates" shall apply.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Verify telephone requirements with Telephone Company before installation. Assume responsibility for failure to do so. Report any recommendation for changes to the Architect.
- B. Conduit system without conductors, including boxes, backboards and plates as shown on the drawings.
- C. Mount boxes with center at same height as nearby receptacles, as noted on the drawings, or at 16" to centerline. Boxes shall be 4" square with appropriate depth single gang raised cover.
- D. Telephone/Data conduits and rough-in provisions not less than six (6) inches from any source of alternating current, unless separated by grounded metallic partition.
- E. Telephone/Data backboards sized as shown on the drawings of 3/4" plywood long dimension vertical. Backboards shall be painted with two (2) coats of good quality fire retardant black enamel paint. Each backboard shall have double duplex receptacle properly located and connected to dedicated circuit.
- F. Each telephone / data backboard shall have a #6 AWG minimum or size as noted on the drawings stranded ground wire installed. Ground wire shall originate from the service equipment ground bus and shall be installed in 3/4" conduit. Bond conduit to grounding conductor at all wire exit points and install bushing. Bonding conductor may be installed from backboard to backboard or radially from service equipment. Splices if required shall be made with compression fittings.

END OF SECTION

SECTION 16700

ELECTRICAL POWER CONNECTIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. Shall be installed in conduit in accordance with SECTION 16110 "RACEWAYS AND FITTINGS".
- B. Review architectural drawings and specifications and provide adequate service for and make proper connection to all equipment furnished by General Contractor requiring electrical service.
- C. Carefully review plumbing and HVAC drawings and Division 15 of the specifications for mechanical equipment requiring electrical service. Provide adequate service for and make proper connection to all such mechanical equipment requiring electrical service.
- D. Electrical connections to equipment shall follow the equipment manufacturer's recommended method. Where equipment furnished exceeds the circuit capacity or requires different characteristics than that shown on the drawings, this information shall be brought to the attention of the Architect, prior to rough-in, or this Contractor shall be responsible for correction.
- E. The Division 16 Contractor shall immediately upon notice to proceed and after verification of service with Utility Company, notify in writing the General Contractor and all other affected Contractors the characteristics of the electrical service including voltage and phase. A copy of this notification shall be sent to the Architect.
- F. All equipment connections to include a maintenance disconnect of the type indicated or, if not specifically indicated, as recommended by the equipment manufacturer in compliance with the NEC.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Where power connections are made out of doors from safety switches and where there is no wall or proper equipment frames to which the switches may be mounted, Contractor shall furnish and install a galvanized angle iron frame independent of the equipment for support of the switches. Frames shall consist of the steel frame sufficient to support all of the switches and a concrete footing not less than 12 inches deep and of sufficient width to assure that 6 inches of concrete surround all of the framing members.
- B. On multi-motor equipment connections (i.e. condensing units, roof-top A/C units, etc.), Division 16 Contractor shall verify with Division 15 Contractor and obtain in writing the manufacturer's requirements for equipment overcurrent device. Where fuses or HACR breakers are permitted, furnish HACR rated breaker of size required by manufacturer of equipment. Where fuses only are permitted, furnish fusible disconnect with fuse size required by manufacturer of equipment. Obtain written approval of Division 15 Contractor of overcurrent size before energizing equipment.

- C. Manual motor switch control and final connections to all ventilating fans. Where fans are furnished with speed controls, the Division 16 Contractor shall mount the control where directed in addition to the manual motor switch. Where fans control or are controlled by other equipment such as timers, motorized louvers, firestats, EMCS control panels, etc., the Division 16 Contractor shall coordinate with the supplying Contractor and make connection to the fan through or with this device as required for proper operation.
- D. Set disconnect switch near (within 5') or other approved device if disconnect switch not indicated, and make final connection to equipment as required in accordance with SECTION 16110, "RACEWAYS AND FITTINGS". Connections to include power wiring to line voltage control device such as magnetic starter, contactor, etc., and from load side of control device through motor terminals. The control devices shall be furnished by the Division 15 Contractor and installed, where directed, by the Division 16 Contractor. Control devices which are integral pre-wired parts of equipment require connection to line side of control device only by Division 16 Contractor unless otherwise indicated. All additional wiring including control wiring shall be furnished and installed by the Division 15 Contractor. Line voltage thermostats and other temperature control devices regardless of voltage shall be furnished, installed, wired and connected by the Division 15 Contractor.
- E. Division 16 Contractor shall obtain approved rough-in drawing for each item of equipment requiring connection and follow manufacturer's recommendation as to location and method of connections. Additional requirements are as follows:
 - 1. Kitchen equipment: The information shown on the drawings is for estimating use only. The Division 16 Contractor shall be responsible for connecting to the equipment installed with proper service at the correct location shown on the approved kitchen equipment shop drawings. The Division 16 Contractor is responsible for providing electrical work as shown on the electrical drawings and the food service equipment drawings.
 - 2. Laboratory equipment: Connection location and specific wiring requirements to be taken from lab equipment drawings if available or architectural drawings. Connection shall include mounting and connection of accessory items furnished with equipment including but not limited to receptacles, switches, lighting, and motors. The Division 16 Contractor is responsible for connecting to the equipment installed with proper service at the correct location shown on the approved equipment shop drawings.

END OF SECTION