PROPOSAL AND CONTRACT DOCUMENTS

FOR THE CONSTRUCTION OF

(EXEMPT)

1
Construction necessary to build a new District Headquarters Building at McComb, known as Maintenance Project No. BWO-7116-57(001) / 501416, in the County of Pike, State of Mississippi.
Project Completion: June 30, 2006

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

BIDDER CHECK LIST
(FOR INFORMATION ONLY)

_____ All unit prices and item totals have been entered in accordance with Subsection 102.06 of the Mississippi Standard Specifications for Road and Bridge Construction.

_____ If the bid sheets were prepared using MDOT's Electronic Bid System, proposal sheets have been stapled and inserted into the proposal package.

_____ First sheet of SECTION 905--PROPOSAL has been completed.

_____ Second sheet of SECTION 905--PROPOSAL has been completed and signed.

_____ Addenda, if any, have been acknowledged. Second sheet of Section 905 listing the addendum number has been substituted for the original second sheet of Section 905. Substituted second sheet of Section 905 has been properly completed, signed, and added to the proposal.

_____ DBE/WBE percentage, when required by contract, has been entered on last sheet of the bid sheets of SECTION 905 - PROPOSAL.

_____ Form OCR-485, when required by contract, has been completed and signed.

_____ The last sheet of the bid sheets of SECTION 905--PROPOSAL has been signed.

_____ Combination Bid Proposal of SECTION 905--PROPOSAL has been completed for each project which is to be considered in combination (See Subsection 102.11).

_____ Equal Opportunity Clause Certification, when included in contract, has been completed and signed.

_____ Subcontract Certificate, when included in contract, has been completed and signed.

_____ The Certification regarding Non-Collusion, Debarment and Suspension, etc. has been executed in duplicate.

_____ A certified check, cashier's check or bid bond payable to the State of Mississippi in the principal amount of 5% of the bid has been included with project number identified on same. Bid bond has been signed by the bidder and has also been signed or countersigned by a Mississippi Resident Agent for the Surety with Power of Attorney attached or on file with the Department's Contract Administration Engineer.

_____ Non-resident Bidders: ON STATE FUNDED PROJECTS ONLY, a copy of the current laws regarding any preference for local Contractors from State wherein domiciled has been included. See Subsection 103.01, Mississippi Standard Specifications for Road and Bridge Construction, and Section 31-7-47, MCA, 1972 regarding this matter.

Return the proposal and contract documents in its entirety in a sealed envelope. DO NOT remove any part of the contract documents; exception - an addendum requires substitution of second sheet of Section 905. A stripped proposal is considered as an irregular bid and will be rejected.

Failure to complete any or all of the applicable requirements will be cause for the proposal to be considered irregular.

(09/2004)

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

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PROJECT NO.: BWO-7116-57(001) 501416

DATE: 8-10-04

DESCRIPTION A: The Department of Transportation shall clear and grub the site and have in place a building pad of compact select material within one foot of finish floor. This Work shall consist of minor site work and all construction work necessary in constructing the District Headquarters Building at McComb, Pike County, Mississippi in accordance with these Specifications and conforming with 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, October 26, 2004. 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, October 26, 2004, and shortly thereafter publicly opened for

Construction necessary to build a new District Headquarters Building at McComb, Pike County, Mississippi, known as Project No. BWO-7116-57(001) 501416.

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 McComb 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.

LARRY L."BUTCH" BROWN
EXECUTIVE DIRECTOR

(SPWP)

END OF DOCUMENT

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

PRE-BID MEETING
DOCUMENT 00150

PROJECT: **District Administration Building at McComb**
Pike County, Mississippi

PROJECT NO.: **BWO-7116-57 (001) 501416**

DATE: **August 12, 2004**

PART 1 GENERAL

1.01 DESCRIPTION

A. Bidders are hereby advised that this Project provides for a Pre-Bid Meeting.

B. This Meeting will be held in the Conference Room at the MDOT District 7 Office Building located between Highway 51 North and East Frontage at Smithdale Road Exit, McComb, Mississippi, telephone (601) 684-2111, at **10:00 A.M. on Tuesday, October 12, 2004.** Prospective bidders are encouraged to attend to discuss requirements of the Drawings and Specifications for this Project, to request clarifications or additional information to the Documents, and to visit the Project site.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION
Not Used

END OF DOCUMENT

INSTRUCTIONS TO BIDDERS
DOCUMENT 00200

Part 1 GENERAL

1.01 **QUESTIONS**: General questions should be directed to Jim Vinson, the MDOT Architect (601) 359-7292. 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 MDOT Architect. The MDOT Architect will send written instruction(s) or interpretation(s) to all known holders of the Documents. Neither the Owner, nor the MDOT Architect, 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 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 **SUBSTIUTIONS**: 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. When completing the Proposal Form. The Bidder shall list the Addendum number and the date received in spaces provided.

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.

Alternates
( ) Write in each alternates amount in words and numbers.

Addenda
( ) Acknowledge the receipt of each addendum by writing in the number of the addendum and the date received.

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	Contract Admin Engineer	(601) 359-7730
D.	Specifications	Jim Vinson – MDOT Architect	(601) 359-7292
E.	Drawings	Jim Vinson – MDOT Architect	(601) 359-7292

F. 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.

<u>IMPORTED FIRE AN QUARANTINES</u>

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 mils, 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 **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.

1.05 **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.

1.06 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.

1.07 CONTRACT TIME

A. I t is anticipated that the Notice to Proceed will be issued by not later than **November 29, 2004**, and the date for beginning of Contract Time will be **December 9, 2004.**

B. The calendar date for completion of this Contract shall be **June 30, 2006** 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 01310 of these Specifications will be required.

1.08 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
Masonry Items
Curtainwall Items
Sheet Metal Roofing
Terrazzo Items
Hydraulic Elevator
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
(Amount)_____ $_____) Dollars
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):

ADDENDUM NO._____DATED_____ADDENDUM NO._____DATED_____
ADDENDUM NO._____DATED_____ADDENDUM NO._____DATED_____
ADDENDUM NO._____DATED_____ADDENDUM NO._____DATED_____

TOTAL ADDENDA: _____
(Must agree with total addenda issued prior to opening of bids)

Respectfully submitted, _____
(Contractor)

BY_____
(Signature)

TITLE_____

ADDRESS_____
(Street Address)

ADDRESS_____
(City, State & Zip Code)

Date _____, _____

(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 CONSTRUCTION OF A DISTRICT HEADQUARTERS BUILDING AT McCOMB, KNOWN AS STATE PROJECT BWO-7116-57(001) 501416, IN THE COUNTY OF PIKE, 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) LOCATED AT THE END OF THE BID SHEETS IS SIGNED

REF. NO.	PAY ITEM NO.	UNIT	DESCRIPTION	ITEM TOTAL
(10)		lump sum	Construction of the District Headquarters Building in McComb, Pike County ……..$_____	

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-7116-57(001) 501416
DISTRICT HEADQUARTERS BUILDING AT MCCOMB

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

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)

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

_____

_____

MISSISSIPPI TRANSPORTATION COMMISSION

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: BWO-7116-57(001) 501416

LOCATED IN THE COUNTY OF: PIKE

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 plans, 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 statues 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_____	By_____
(Signature)	(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)

on Project No. BWO-7116-57(001) 501416, on Highway 51 North in McComb, Pike 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)

on Project No. BWO-7116-57(001) 501416, on Highway 51 North in McComb, Pike 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-7116-57(001) 501416**

COUNTY: **PIKE**

LOCATION: **HIGHWAY 51 NORTH AT McCOMB, MISSISSIPPI**

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.

1997 Edition - Electronic Format

AIA Document A201 - 1997

General Conditions of the Contract for Construction

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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).

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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

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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 and identified references to Paragraphs, Subparagraphs and Clauses in the document 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

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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.

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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 Subparagraph 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 Subparagraph 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

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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 Paragraph 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 Subparagraph 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.

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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 Subparagraph 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

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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 Subparagraphs 3.2.1 and 3.2.2, the Contractor shall make Claims as provided in Subparagraphs 4.3.6 and 4.3.7. If the Contractor fails to perform the obligations of Subparagraphs 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.

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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.

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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;

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.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 Clause 3.8.2.1 and (2) changes in Contractor's costs under Clause 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.

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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 Subparagraph 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

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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 Subparagraph 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 Paragraph 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

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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 Paragraph 3.18.

3.18.2 In claims against any person or entity indemnified under this Paragraph 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 Subparagraph 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.

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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 Paragraph 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 Subparagraph 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,

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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 Subparagraphs 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.

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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 Paragraphs 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 Paragraph 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

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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 Paragraph 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 Subparagraph 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 Paragraph 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

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proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Paragraph 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 Paragraph 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 Subparagraph 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 Paragraphs 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

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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 Subparagraphs 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.

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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 Subparagraphs 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 Paragraph 4.5.

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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 Subparagraphs 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 Paragraph 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.

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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

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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 Paragraph 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.

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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 Paragraph 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 Other 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

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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 Subparagraph 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 Subparagraph 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

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.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 Subparagraph 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 Subparagraph 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 Clause 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 Subparagraph 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.

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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.

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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 Paragraph 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.

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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 Paragraph 4.3.

8.3.3 This Paragraph 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 Subparagraph 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

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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 Subparagraph 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 Subparagraph 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 Subparagraph 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 Subparagraph 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;

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.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 Subparagraphs 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

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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 Clause 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 Subparagraph 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.

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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 Subparagraph 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

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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;

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.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.

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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 Clauses 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 Clauses 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 Paragraph 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.

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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.

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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 Subparagraph 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 Paragraph 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 Paragraph 4.3 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

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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 Paragraph 3.18.

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11.1.2 The insurance required by Subparagraph 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 Paragraph 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 Subparagraph 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 Clauses 11.1.1.2 through 11.1.1.5.

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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 Paragraph 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 Paragraph 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 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.

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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 Paragraph 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

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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 Subparagraph 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.

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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 Paragraph 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 Paragraph 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 Subparagraph 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

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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 Paragraph 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 Paragraphs 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.

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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 Paragraph 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 Subparagraph 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

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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 Paragraph 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 Paragraph 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 Paragraph 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 Subparagraph 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 Subparagraph 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

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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 Subparagraph 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 Subparagraph 13.5.3, shall be at the Owner's expense.

13.5.3 If such procedures for testing, inspection or approval under Subparagraphs 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.

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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 Paragraph 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Paragraph 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.

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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 Subparagraph 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 Subparagraph 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 Paragraph 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.

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14.1.3 If one of the reasons described in Subparagraph 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 Subparagraph 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 Paragraph 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 Subparagraph 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.

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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 Subparagraph 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.

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SUPPLEMENTARY CONDITIONS
Document 00800

Part 1 GENERAL

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 / MDOT Architect, 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 / MDOT Architect, 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.

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. Except as otherwise provided in Subparagraph 4.2.1, the Architect does not have such authority. 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 Director of Architectural Services 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

7.2 CHANGE ORDERS

7.2.3 Add a new Subparagraph as follows:

The maximum cost included in a Change Order for profit and overhead is limited to twenty-five percent (25%) 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.

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 / MDOT Architect, 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 / MDOT Architect determines may justify the delay, then the Contract time may be extended by Change Order for such reasonable time as the Architect 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 and/or the MDOT Architect'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 ½%) 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.

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, under the advisement of the MDOT Architect, 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 / MDOT Architect 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 11.3.1 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

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 under one (1) Contract to improve the Mississippi Department of Transportation site to construct the District Headquarters Building at McComb, Pike 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 6 copies to the Project Engineer 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 6 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. Submit original to Contract Administration Division and one copy to the Project Engineer and to the MDOT Architect CAD-720 form - REQUEST FOR PERMISSION TO SUBCONTRACT for each subcontractor before they are allowed to perform any Work.

10. 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.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION
Not Used

END OF SECTION

SECTION 01210 ALLOWANCES

PART 1 GENERAL

1.01 DESCRIPTION

A. Related work specified elsewhere:

1. Sections of specifications as listed under Schedule of Allowances.

B. Allowances for products:

1. Purchase products under each allowance as directed by Project Engineer.

2. Amount of each allowance includes:

a. Net cost of product
b. Delivery and unloading at site
c. Applicable taxes

3. In addition to amounts of allowance, include in bid for inclusion in the Contract Sum, Contractor's cost for:

a. Handling at site, including uncrating and storage
b. Protection from elements; from damage
c. Labor, installation, and finishing
d. Other expenses required to complete installation
e. Overhead and profit.

C. Selection of products:

1. MDOT Architect's duties: Consult with contractor in consideration of products and suppliers; make selection, designate products to be used and notify Contractor in writing.

2. Contractor's duties: Assist MDOT Architect in determining qualified suppliers'; obtain proposals from suppliers when requested by MDOT Architect; and make appropriate recommendations for consideration of MDOT Architect. Upon notification of selection, enter into purchase agreement with designated supplier.

D. Delivery: The Contractor is responsible for arranging all delivery and unloading and should promptly inspect products for damage or defects and submit claims for transportation damage.

E. Installation: Comply with requirements of referenced Specification Section.

F. Adjustment of costs: Should actual purchase cost be more or less than specified amount of allowance, Contract Sum will be adjusted by Change Order equal to amount of difference.

1.02 SCHEDULE OF ALLOWANCES

A. Include in the Contract Sum the amount of $30,000.00 for Contingency Allowance to be used upon Owner's instruction.

1. Unforeseen changes or modifications to the Work that increase the aggregate total Contract Sum up to $30,000.00, including the Contractor's costs for taxes, bonding, insurance, overhead and profit shall be calculated in the Base Bid. These changes shall be shown on the Schedule of Values as an Allowance line item so that Change Orders (Supplemental Agreements) authorizing expenditure of funds from this amount will only include costs of materials and delivery, installation, equipment rental, and direct labor associated with installation.

2. After the total aggregate amount of changes to the Work has exceeded $30,000.00, the Contractor shall be allowed to include taxes, bonding, insurance, costs of materials and delivery, installation, equipment rental, labor, and payroll. Contractor shall also be allowed to include overhead and profit costs as stated in Supplementary Conditions of these Specifications for any additional Work.

3. Funds will be drawn from Contingency Allowance only by Change Order (Supplemental Agreements).

4. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order (Supplemental Agreements).

B. There are no other Allowances for this Project.

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 3 copies of each Application for Payment to the Project Engineer and one copy to the MDOT Architect.
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 BASIS OF PAYMENT

A. This Work will be paid for by Contract Sum for the construction of the District Headquarters Building at McComb in District Seven, Pike 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-7116-57(001) 501416	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 Project Engineer at least 10 days prior to submitting first Application for Payment. This Schedule will be reviewed and forwarded to the MDOT Architect. The MDOT Architect will review and forward to his Consultants and to Contract Administration. 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 multiplied by quantities equal material cost of that item in Schedule of Values.

E. Review and Re-submittal: After Project Engineer / MDOT Architect'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 by the Project Architect 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 it's 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. 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 using the Mississippi Department of Transportation's Change Order Form.

F. Types of Change Orders:

1. Stipulated Sum Change Orders: Based on Proposal Request and Contractor's fixed price quotation, or Contractor's request for a Change Order as approved by the Project Engineer and the MDOT Architect.

2. Unit Price Change Order: For pre-determined unit prices and quantities, the Change Order 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.
3. Time and Material Change Order: 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: The Project Engineer will issue Change Orders for signatures of parties as provided in the Standard Form of Agreement Between the Owner and the Contractor. Final execution of all Change Orders 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 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 Director with copies to the Construction Engineer, Office 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 dairy 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.
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 for transmittal to the MDOT Architect
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 within 10 days after Notice to Proceed.

B. Location: A central site, convenient for all parties, designated by the Contractor and approved by the Project Engineer and the MDOT Architect.

C. Attendance: Attending shall be the Project Engineer and MDOT representatives associated with the Project, the MDOT Architect (if requested by the District), his Consultants, 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: Contractor’s Field 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 (if requested by the District) and his Consultants, 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 / MDOT Architect within 15 days after date of Notice to Proceed.
2. Submit to the Project Engineer / MDOT Architect, periodically updated schedules accurately depicting progress to first day of each month.
3. Submit 2 copies, one to be retained by the Project Engineer and the other forwarded to the MDOT Architect.

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 Project Engineer 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: 7 Prints. Submit 8 prints if they are Plumbing, Mechanical or Electrical Submittals.
5. Shop Drawings shall be stamped and signed by the Contractor certifying accuracy, completeness and compliance with Contract requirements prior to submitting to the Project Engineer.

C. Product Data: Provide 7 copies each. Provide 8 copies if they are Plumbing, Mechanical or Electrical Submittals. 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 Project Engineer.

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 MDOT Architect until completion of construction of the Project.
3. Samples will not be required when specified product is submitted.
4. If a specified product color is discontinued, Contractor shall notify Project Engineer / MDOT Architect 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 / MDOT Architect.

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 / MDOT Architect. 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 Project Engineer / MDOT Architect's review of submittals.
5. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by MDOT Architect's review of submittals unless MDOT Architect gives written acceptance of specific deviations.
6. Notify MDOT Architect 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's stamp and initials indicating review.
8. After MDOT Architect's review, distribute copies.

G. Submission Requirements:

1. Schedule submission with ample time given to review submittals prior to being needed.
2. Submit 7, 8 if Plumbing, Mechanical or Electrical copies of Shop Drawings and number of copies of product data which Contractor requires 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. Submittals shall include the following:

    a. Date and revision dates.
    b. Project title and number.
    c. The names of Project Engineer, Architect/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 Project Architect’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 Architect / Engineer.
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 stamp to: Project Engineer's File, MDOT Architect's File, Architect's File (as required), Electrical / Mechanical Engineer's File (as required), Materials' File, Contractor's File, Job Site File, and Subcontractor, Supplier and/or Fabricator as necessary.
2. Distribute samples as directed. The Project Engineer / MDOT Architect shall retain one of each.

J. Architect / Engineer's 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 MDOT Architect, who will forward one copy to the Project Engineer, one copy to the Materials Engineer and the balance to the Contractor for distribution.
6. Retain one copy of accepted 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 MDOT Architect, 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 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 MDOT Architect'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 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.

B. Prepare reports of inspections and tests including:

1. Date issued.
2. Project title and number.
3. Testing laboratory, name and address.
4. Name and signature of inspector.
5. Date of inspection or sampling.
6. Record of temperature and weather.
7. Date of test.
8. Identification of product and Specification Section.
9. Location of Project.
10. Type of inspection or test.
11. Observations regarding compliance with Contract Documents requirements.

C. Distribute copies of reports of inspections and tests to Project Engineer and one copy to the MDOT Architect.

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. Provide facilities for laboratory's exclusive use for storage and curing of test samples.

D. 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 shall be responsible for construction of the field office. The Contractor shall provide, maintain, and remove when directed, suitable substantial and watertight temporary field office and storage shed(s), in locations on the site as directed by the Project Engineer, or his authorized representative and best suited for their respective uses, as follows:

A. Field Office (One Required): For the use of the Contractor, Project Engineer and his representative(s), MDOT Architect and his representative(s), and Consultants. Provide in office suitable furniture for plan layout, progress meetings and storage. Storage files and racks will maintain 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. Also, provide lights, heat, air-conditioning, fax machine and telephone. Maintain each office in a sanitary and usable condition. Contractor shall provide the Project Engineer and the MDOT Architect 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. Products selected by Architect.
2. Architect's Specifications.
3. Reference Standards.
4. Manufacturer's Instructions.
5. Industry Standards.

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.

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 MDOT Architect'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 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.

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.

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 Architect's judgment, is equal to the level of excellence established by the product(s) selected as Architect'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 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, 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 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 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.

Example: For whatever reason, the Architect 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 Architect 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.

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

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.

C. In addition to Contract requirements, upon MDOT Architect's written instructions:

1. Uncover work for observation of covered work.

2. Remove samples of installed materials for testing.

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 0wner'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 and Architect'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, Ref. Specification Section 15080 and 6 copies of a list prepared by the Contractor of deficiencies, which will be edited by the Project Engineer, MDOT Architect and Consultants. 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 MDOT Architect's judgment, the Project is not ready for an Inspection, the MDOT Architect may schedule another inspection.

B. Owner's Inspection: After the MDOT Architect has determined the Project to be Substantially 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 Architect's 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 to the MDOT Architect 2 copies 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 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, MDOT Architect 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. Project Manual (Proposal) and Addenda: Legibly mark up each Section to record manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.

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 name and address of each subcontractor and material supplier shall be listed in front of each binder along with the Project Manual (Proposal).

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 02220 SITE DEMOLITION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Demolition and removal of existing elements as delineated on the drawings and as described herein.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 GENERAL

A. Demolish/remove curb and gutter, asphalt paving, concrete paving, and miscellaneous structures/items as noted on the drawings.
   1. This shall include gravel, where used as a subbase for paving.

B. Do not remove trees or plant material unless so designated on the Contract Drawings.

3.02 DISPOSAL OF MATERIALS

A. Assume ownership and be responsible for disposing of waste material including, but not limited to, excavation materials, concrete, asphalt, or other waste material which is required to be removed from the site.

END OF SECTION

SECTION 02230 SITE CLEARING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Perform clearing and grubbing operations in the immediate areas designated on Contract Drawings for construction of items or grading of the land within the project limits.
   a. Primary clearing and grubbing has been performed by Owner's forces. Provide additional clearing and grubbing as necessary to implement the grading plan as shown.

PART 2 PRODUCTS

2.01 STORM WATER CONSTRUCTION GENERAL PERMIT

A. MDOT has applied for and obtained a Storm Water Construction General Permit as issued by the Mississippi Department of Environmental Quality (MDEQ), Office of Pollution Control (OPC) Water Pollution Control.

B. This Contractor shall maintain/ erect those items required of the SWPPP during the construction period with materials as noted on the Drawings.

C. Minimum requirements for elements required for the Storm Water Construction General Permit shall be in accordance with the standards set forth in the "Planning and Design Manual for the Control of Erosion, Sediment, and Storm Water", MDEQ, MSSNCC, U. S. Dept. of Agriculture SCS, Jackson, MS, 1994, or other design manuals recognized by the approving agency.

PART 3 EXECUTION

3.01 GENERAL

A. Clear and remove visible obstructions within the areas of work as asphalt, concrete, bricks, rubbish, etc. so as to have at least 6 inches of earth over any deep obstructions in the project area.

B. The Storm Water Construction General Permit shall be followed, and erosion control measures in place prior to the start of work required by this section.

3.02 EROSION CONTROL BARRIERS

A. Prior to clearing and grubbing, erect erosion control barriers in areas noted on the drawings in strict accordance with the details and manufacturer's written instructions.
   1. Provide barriers around or downstream of drainage structures once piping to those structures has been installed and pipes are functional.

B. Weekly maintenance of barriers shall be required until a stand of grass has been accepted in the upland or downstream areas (as situation requires). Remove temporary barriers when grassing has been accepted. Permanent barriers shall be in full working order during the construction period and when the project is accepted as complete.

3.03 BURNING

A. Burning of cleared materials will not be allowed at the project site. Remove materials completely from the site.

3.04 STRIPPING

A. Prior to excavation, strip and stockpile topsoil from the site in areas of excavation, fill, buildings, roads or other improvements.
   1. Strip to a depth sufficient to remove objectionable rubbish, humus and vegetative matter with a minimum depth of 2 inches.
   2. Depths greater than 6 inches shall be approved by the Project Engineer prior to stripping.

B. Stripped materials shall be stockpiled and subsequently used as topsoil, if acceptable as determined by the Project Engineer. Store in no more than 4 locations for future use.

C. Roots, floatable, and otherwise undesirable materials shall be disposed of as per Paragraph 3.03 of this Section.

3.05 UNDESIRABLE SOILS

A. Remove undesirable soils as soft and boggy earth if found within the areas of work, and backfill with acceptable fill materials as identified in Section 02300.
   1. Should the Contractor note any soft or boggy areas requiring muck excavation, he shall notify the Project Engineer immediately.
   2. Muck shall include materials which will decay or produce unsatisfactory subsidence in the embankment, pipe or structural bedding as decaying stumps, roots, logs, humus, or other unsatisfactory material.
   3. The Project Engineer will verify same and be present during excavation so as to measure amount of excavation. Measurement and Basis of Payment shall be negotiated by the Contractor and Project Engineer.

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, and walks 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 Architect 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 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 Architect's approval. Transmit copy of instructions to the Applicator.

B. Submit sample copies of the Termite Soil Treatment Guarantee form prior to application for Project Architect's approval.

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. 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.

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. Fuel oil will not be permitted as a diligent. Provide a working solution of one of the following chemical elements and concentrations:

1. Chlorpyrifos, 1.0 percent in water emulsion.
2. Aldrin, 0.5 percent in water emulsion.

B. Other solutions may be used as recommended by Applicator and if acceptable to local and state governing authorities. Use only 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 as follows:

1. Apply 4 gallons of chemical solution per 20 linear feet to the soil critical areas under the slab, such as along the inside of foundation walls, along both sides of interior partition walls, and around plumbing.
2. Apply one gallon of chemical solution per 10 square feet as an overall treatment under the slab and attached slab areas where fill is soil or unwashed gravel. Apply one & one-half gallons of chemical solution to those areas where fill is washed gravel or other coarse absorbent material.
3. Apply 4 gallons of chemical solution per 10 linear feet of trench, for each foot of depth from grade to footing, along the outside edge of the building. When the outside edge of the exterior grade beam is formed with other than earth, treat 6 inches to 8 inches wide along the outside of the foundation to a depth of not less than 12 inches. Punch holes to top of footing at not more than 12 inches on center and apply chemical solution. Mix the chemical solution with the soil as it is being replaced in the trench.
4. In absorbent soil or fill (sand, sand and gravel mix, etc.) increase the application rate to one & one-half gallons per 10 square feet where one gallon to 10 square feet is specified.
5. 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: 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 02630 STORM AND SUBSURFACE DRAINAGE

PART 1 GENERAL

1.01 WORK INCLUDED

A. Sub-surface drains, storm sewers, piping, catch basins, culverts, headwalls, junction boxes and related items.

1.02 RELATED WORK

A. Excavation, backfill, and materials are specified in Earthwork - Section 02315

B. Materials, manufacture, and placement of concrete are specified in Division 3

1.03 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. Submitted for requested material in accordance with Section 01330.

1.04 AS-BUILT DRAWINGS

A. Provide "as-built" drawings at completion of job in accordance with Section 01785. The actual location of piping, apparatus and equipment shall be indicated.

1.05 STANDARDS

A. The following publications form a part of these Specifications and where referred to by basic designation only, are applicable to the extent indicated.
   1. American Concrete Institute (ACI)
      a. ACI 301 Specifications for Structural Concrete for Buildings
      b. ACI 318 Building Code Requirements for Reinforced Concrete.
   2. American Society for Testing and Materials (ASTM): C76 Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.

PART 2 PRODUCTS

2.01 PLASTIC PIPE (PL Pipe)

A. Smooth interior corrugated polyethylene storm sewer pipe and fittings shall be made of polyethylene compounds which meet or exceed the requirements of Type III, Category 4 or 5, Grade P33 or P34, Class C per ASTM D 1248, with the applicable requirements defined in ASTM D 1248. Clean reworked material may be used. Pipe shall be Advanced Drainage Systems N-12 pipe as manufactured by ADS, Inc., Columbus, OH., or approved equal.

2.02 CASTINGS

A. Catch Basin “A” - Manufactured by C. L. Dews Foundry, Hattiesburg, MS., or approved equal. Items located adjacent to or within paved areas shall be traffic grade, otherwise, standard duty required. SUBMITTALS REQUIRED.

B. Grate Inlet “B” - Manufactured by Neenah Foundry, Neenah, WI. 54597, or approved equal. SUBMITTALS REQUIRED.

2.03 CONCRETE

A. 3,000 psi @ 28 days in accordance with Section 03300.

2.04 MASONRY BRICK

A. Conform to the standard specifications for building brick (made from clay or shale) AASHTO Designation M114.

2.05 MORTAR

A. Portland Cement Mortar type M.

2.10 GRATE INLET “B”

A. Constructed of smooth interior corrugated polyethylene storm sewer pipe and fittings made of polyethylene compounds, as Advanced Drainage Systems N-12 pipe as manufactured by ADS, Inc., Columbus, OH or approved equal.

B. Provide select fill backfill material compacted to 95 percent standard proctor density for 12 inches around tee and riser. Select backfill shall be Clay Gravel - select natural or artificial mixture of gravel and clayey sand which meet or exceed the Mississippi Department of Transportation Specifications for Class 9, Group C materials.

PART 3 EXECUTION

3.01 CONTRACTOR'S RESPONSIBILITY

A. Be responsible for the condition of excavations made. Remove slides and cave-ins without extra compensation, at whatever time and under whatever circumstances they may occur. The use of, or installation of sheeting and shoring, shall not entitle the Contractor to extra compensation.

B. Failure of the Project Engineer to order the use of bracing or sheeting, or failure to order it be left in place, does not relieve the Contractor of responsibility concerning the condition of excavation(s) or of delay(s), resulting in the keeping of an excavation open longer than would otherwise have been necessary. Said delays do not relieve the Contractor from the necessity of proper and adequate protection of the excavation from caving or slipping, nor from obligations under the Contract relating to injury of persons or property.

3.02 TRENCH AND STRUCTURE EXCAVATION AND BACKFILL

A. General:
1. Perform excavations as described, through substances encountered, and to the depths indicated, or as otherwise specified.
2. During excavation, pile suitable material for backfilling in an orderly manner a sufficient distance from the banks of trench to avoid overloading and prevent slides or cave-ins.
3. Remove excavated materials not required or suitable for backfilling and waste as directed by the Project Engineer.
4. Grade to prevent surface water from flowing into trenches or other excavations. Water accumulating therein shall be removed by pumping or by other approved method.

B. Trenches:
   1. Width shall be as necessary for the proper laying of pipe, with banks as vertical as practicable (safe).
   2. Grade bottoms of trenches accurately to provide uniform bearing and support for each section of pipe on undisturbed soil along its entire length, except where necessary to excavate for pipe joints.
      a. Dig depressions for joints of such length, depth and width as required for properly making the particular type of joint, after trench bottom has been graded.
   3. Remove wet, unstable soil encountered in the trench bottom to the depth required by the Project Engineer and backfill to the required grade with gravel, sand, or other suitable material.
   4. When the trench is excavated below the required grade, backfill the over excavated space with firmly tamped material shaped to receive the pipe.
   5. Where piping enters or leaves a junction at different elevations, avoid undercutting the foundation of the high level sewer.

C. Tunneling: Employed to prevent cutting where pipe is required to pass under. Height, width, and cross – section shall be approved by the Project Engineer.

D. Dewatering: Perform pumping and well pointing necessary to perform the excavation and to maintain excavation in dry state during the work.

E. Backfilling:
   1. Do not backfill until the system as installed conforms to the requirements specified.
   2. Backfill with excavated, approved materials as earth, loam, sandy clay, sand and gravel, or other approved materials, free from large clods of earth or stones. Maintain, a ratio of not more than two shovelers to one tamper.
   3. Compact backfill to finish grade elevations shown on the grading plan. Grade surface to conform with the surrounding ground. Spread out excess or undesirable material over the area or dispose of as directed by the Project Engineer.
   4. Trenches improperly filled, showing settlement, or erosion, shall be refilled, smoothed off, and made to conform with the surrounding ground surface, not only at the time of acceptance of the work, but also for the duration of the guarantee period.

3.03 PIPE LAYING

A. General:
   1. Lay true to line and grade and in such manner as to form a close concentric joint with the adjoining pipe, avoiding sudden off-sets of the flow line.
   2. As work progresses, clear interior of pipe of dirt and superfluous material.
   3. Keep trenches free of water, as pipe shall not be laid when the condition of the trench or the weather is unsuitable for such work.

B. Pipe: Laying shall be true to line and grade as established on the drawings.
   1. Positive slope of a minimum 1/2 percent (0.005) required on all pipe.

C. Joints: Joints shall be in accordance with manufacturer's directions.

3.04 HEADWALLS, GRATE INLETS/ JUNCTION BOXES AND CURB INLETS

A. General:
1. If acceptable to the Project Architect, Contractor may substitute poured in place concrete for brick structures or visa-versa on curb inlets and grate inlets/ junction boxes. Refer to Division 3 - Concrete for specific requirements of concrete construction.
2. When concrete is substituted for brick on grate inlets, the Project Architect may require the top 12 inches (4 courses) to be constructed of brick, dependant upon location.
3. Construct concrete, or brick and mortar around the inlet and outlet pipes to prevent leakage and form a neat connection.
4. Brick construction:
   a. Place irons or other fittings as the work is laid up, thoroughly bonded, accurately spaced and lined.
   b. Plaster the inside and outside surfaces with mortar to a thickness of 1/2 inch upon completion of the masonry and setting of castings and fittings. Finish plastering to a uniform, smooth surface, neatly pointed to fittings.
5. Exposed concrete surfaces shall receive a light broom finish.

B. Curing: Cure for 5 days by the use of wetted burlap or with membrane curing compound.

C. Backfilling: Backfill to a density at least that of the surrounding ground. Conform finish grades to existing grades (if applicable) or proposed grades as designated on the drawings.

3.05 CLEAN-UP

A. Following backfill of pipe and structures, grade areas to conform with the surrounding ground or to grade indicated. Dispose of surplus material and rubbish. Deposit surplus dirt at locations and in a manner as directed by the Project Engineer.

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 Architect.

2.03 REINFORCING BARS: Deformed steel bars, ASTM A 615, Grade 40, unless otherwise indicated.

2.04 JOINT DOWEL BARS: Plain steel bars, ASTM A 615, Grade 40 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 have 3000-psi minimum compressive strengths at 28 days, unless noted otherwise. Maximum slump for normal weight concrete shall be 4 inches.

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 l/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 l2 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 l/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 l/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 Project 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 02820 FENCES AND GATES

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section includes temporary construction/ security chain link fencing where indicated on the drawings with related items, complete. See Drawings for specifics.

1.02 RELATED WORK:

A. Requirements for concrete manufacture, transportation, and installation are specified in Division 3 - Concrete.

1.03 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:

A. Submit product data required in this Section in accordance with Section 01330.

PART 2 PRODUCTS

2.01 GENERAL

A. Dimensions and gauges of material are subject to accepted industry tolerance standards.

B. If necessary, field touch-up shall be in compliance with manufacturer's instructions.

2.02 CHAIN LINK FABRIC

A. Woven from 11 gauge finished size wire. 2 inch mesh required throughout.

B. Steel core wire shall have a minimum 80,000 PSI tensile strength with a 1.20 ounce zinc coating per square foot.

C. Fabric shall be knuckled at one selvage and twisted and barbed at the other selvage.

2.03 TENSION WIRE

A. Required at bottom of fencing, tension wire shall be No. 6 gauge spring coil tension wire, fastened to chain link fabric with 9 gauge hog rings on 24 inch centers.

2.04 FRAMEWORK

A. Schedule 40 galvanized pipe, with heights as noted on the drawings and in the following diameters:
   1. Line Post - 2 1/2 inch O.D., and
   2. Brace Rail – 1 5/8 inch O.D. where indicated herein and on the drawings, and
   3. Mid Rail – 1 5/8 inch O.D. continuous, required on fences and gates 8 feet in height and greater, and
   4. Corner, Gate, Terminal posts - 3 inch O.D.

2.05 POST TOPS

A. Constructed of malleable iron or pressed steel, and galvanized.
   1. Line post caps shall allow the passage through of the top rail.

2.06 BRACES

A. Provided for each gate, corner, pull and end post.

B. Constructed of 1 5/8 inch O.D. galvanized steel pipe. With each brace provide:
   1. A 3/8 inch diameter truss rod with turnbuckle for adjustment, and
   2. Malleable iron or pressed steel clamps, galvanized, for fastening braces to posts.

2.07 TENSION BARS

A. 1/4 inch by 3/4 inch, galvanized, one piece, one inch in length shorter than the full height of the fabric.
   1. Fasten to posts with 11 gauge galvanized steel bands and 3/8" diameter nuts and bolts.

2.08 GATES

A. Frames - 2 inch O.D. galvanized pipe manufactured by projection welding or pressed steel cornerwells riveted with 4 rivets per corner.
   1. Internal bracing:
      a. Widths less than 5 feet - single horizontal 2 inch O. D. galvanized pipe located midway (vertically) in the gate (or leaf).
      b. Widths 5 feet and greater - same as fencing braces complete with adjustable truss rods.

B. Gates shall be complete with padlocking device, center rest, and semi-automatic hold back catch, as detailed on the drawings.

2.09 POST FOOTINGS

A. 3,000 PSI. concrete at 28 days.

PART 3 EXECUTION

3.01 GENERAL

A. Installation shall be by skilled and experienced fence erectors on lines and grades designated on the drawings.

3.02 POSTS & FABRIC

A. Posts:
   1. Install plumb and vertical.
      a. Locate end, corner and gate posts where noted on the drawings.
      b. Locate line posts at a maximum distance of 10 feet on center.

B. Top rail shall generally be horizontal, but it can flow to a certain degree the contour of the ground, except at drop offs. Install continuous with sleeve or other suitable connectors.

C. Fabric:
   1. Tighten fabric between corner, end, and gate posts by mechanical means to minimize flexibility or "play".
   2. Install tension bars and connect to posts.
   3. Tie fence fabric to line posts on 14 inch centers using 9 gauge galvanized steel wire ties, or comparable aluminum ties.
   4. Install bottom tension wire.

3.03 CLEAN-UP

A. Site shall be cleared of excess spillage of concrete, cut wires, etc., and post hole excavation scattered uniformly away from posts.

B. Completely remove temporary construction/ security fencing and gates upon Substantial Completion or when directed by the Project Engineer.

END OF SECTION

SECTION 02920 GRASSING

PART 1 GENERAL

1.01 SCOPE

A. Areas disturbed by grading or improvements and those areas noted on the drawings shall receive a permanent stand of warm season grass established with warranty as specified herein.

B. Should the Contractor fail to establish a warm season grass during the Contract period and a cool season grass be necessary, regrassing with a warm season grass as specified in paragraph 3.09 of this Section shall be required.

C. The Contractor shall provide and maintain cool and/ or warm season grassing throughout the construction period in order to minimize on site erosion and off-site siltation, which are both goals of the SWPPP (refer to Section 02230).

1.02 REQUIREMENTS

A. Meet the requirements and recommendations of the applicable portion of the following standards:
   1. Mississippi Fertilizer Law: Rules and Regulations - Mississippi Department of Agriculture and Commerce.
   2. Mississippi Pure Seed Law and Regulations: Mississippi Department of Agriculture and Commerce.
   3. Other governing Federal, State and Local Laws, Rules, Regulations and Ordinances applicable to this project and the Work described herein and on Contract Drawings.

1.03 PLANTING OPERATIONS

A. Performed by a licensed Landscape Contractor.
   1. In the state of Mississippi a licensed Landscape Contractor shall hold a valid Landscape Gardeners license from the Bureau of Plant Industry, Mississippi Department of Agriculture and Commerce.

1.04 FIELD INVESTIGATIONS

A. Contractor shall visit the job site and familiarize himself with the nature and location of the work, existing conditions and conditions that will exist under which he will be obligated to operate in the performance of the work.

1.05 RELATED WORK

A. Grading of the site and topsoil requirements are specified in Earthwork - Section 02315.

PART 2 PRODUCTS

2.01 DELIVERY AND STORAGE

A. Damaged materials will not be accepted.

B. Deliver packaged materials to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis.

C. Store materials delivered to site prior to actual usage in a place so as not to interfere with other trades or construction operations and protect from damage by weather or other elements as needed.

2.02 WATER

A. Obtained as specified in Division 1, General Requirements, under Temporary Services. Water shall not contain elements toxic or harmful to plant life.

2.03 FERTILIZERS AND LIME

A. Commercial fertilizers:
1. Complete formula manufactured standard products complying with local, state, and Federal regulations and laws.
2. Uniform in composition, dry and free flowing, and
3. Contain not less than the percentage by weight of ingredients set out in the following table:

GRADE	NITROGEN	PHOSPHORUS P-2-0-5	POTASH K-2
13-13-13	13	13	13
Ammonium Nitrate	34	0	0

An allowance of 4 percent variation or tolerance of the above proportions will be permitted based on relative commercial value.

4. Application rates:
   a. 13-13-13 at rate of 7 pounds per 1,000 square feet initially.
   b. Ammonium Nitrate applied twenty-one days after planting, or when new growth is evident, at the rate of 2 pounds per 1,000 square feet.

B. Ground Agricultural Limestone: Apply to grassing areas at the rate of one ton to the acre, or forty-six (46) pounds per 1,000 square feet.

2.04 VEGETATIVE MATERIALS

A. Substitutions: In plant species shall be made only with the written approval of the Project Architect.

B. Seed:
1. Best grade and of known vitality, purity and germination.
2. Delivered in bags as required by law, with each bag being tagged showing the percentage of germination, purity of the seed, and the percentage of noxious weeds and inert litter.
3. Free of wild onion, Canada thistle and Johnson grass. One pound of seed shall not contain more than 300 noxious seeds.

4. Seed more than one year old not accepted.
5. Perform seeding with grasses which germinate in the season planted, as shown in the following table:

May 1 - August 15	* Bermuda Grass
August 15 - Sept. 15	Mix. Bermuda/Rye
Sept. 15 - Feb. 15	Ryegrass
February 15 - May 1	Mix Bermuda/Rye

* Bermuda grass is the desired warm season grass.

Bermuda grass seed shall be hulled; mixtures shall be 1:1 ratio by weight.

2.06 MULCH/ EROSION CONTROL

A. Mulch: Vegetative straw material, either clean wheat, oat, rye or rice straw, free from Johnson grass and other noxious grasses or weeds. Material shall be bright in color, not musty, moldy, caked or otherwise low quality, at the time of application. Use on areas to be seeded.

B. Hydromulching: With wood cellulose fibers or paper chips may be utilized in place of the mulch/bituminous material method. Process may simultaneously apply seed and fertilizer along with the mulch, however, methods, and rates of application, shall be approved by the Project Architect.

C. Erosion Control Fabric: Provide the following materials according to their use, as manufactured by North American Green, Evansville, IN., or an approved equal:
1. Slopes of 4:1 and less - Blanket S75
2. Slopes of 2:1 and less to 4:1; Swale liner - Blanket SC150
3. Ditch and Channel liner - Blanket C125

2.07 TOPSOIL (natural)

A. General:
1. Both stockpiled onsite, and offsite topsoil shall be approved by Project Architect.
2. If off-site topsoil is necessary, a representative sample may (at the option of the Project Architect) be tested in accordance with paragraph 3.02.
3. Project Architect reserves the right to approve or reject topsoil site if the material does not meet the requirements of paragraph ‘B’, below.

B. Quality:
1. Friable loam, typical of cultivated topsoils locally, containing at least 2 percent of decayed organic matter (humus).
2. Taken from a well drained, arable site and reasonably free of subsoil, stones, earth, clods, sticks, roots or other objectionable extraneous matter or debris.
   a. Topsoil shall not be taken from a site containing Nutgrass (Purple or Yellow Nutsedge, or related species.)
3. Shall not contain toxic materials.
4. Do not deliver in a frozen or muddy condition.

PART 3 EXECUTION

3.01 GENERAL

A. Conduct planting operations in weather conditions which provide favorable temperature, moisture and soil conditions.

3.02 SOILS ANALYSIS

A. When offsite topsoil is required, provide soils analyses prepared from samples taken from the excavation site. Collect and have analyzed by the local County Extension Service. Provide 2 samples per 1,000 cubic yards. Analysis is for the purposes of determining the pH of the soil and nutrient deficiencies.

3.03 SOIL PREPARATION

A. Includes tillage of soil, application of topsoil, application of fertilizer, and lime as required.

B. Spread topsoil to a depth of 2 inches (to the grades specified) throughout areas to be grassed.
   1. Note - an additional 2 inches of topsoil is not required in areas of earthwork operations which received topsoil as per the requirements of Section 02315.

C. Ground preparation shall consist of:
   1. Plowing and pulverizing of the area to be planted or seeded to a depth of not less than 4 inches.
   2. Following plowing, thoroughly disk and harrow the area until well pulverized to the full depth and present a smooth, uniform, loose, well-broken, and fine grained soil with large clods, earth balls, boulders, stumps, large roots, or other particles which will interfere with the work removed.
   3. When topsoil is to be applied to the area under preparation, the depth of the preparation may be reduced to 2 inches or when permitted by the Project Architect, the necessary disking and harrowing may be performed after the topsoil has been placed.
   4. Final result - ground pulverized and cultivated to provide a suitable bed for planting or seeding operations, with grades true to the lines as established.

D. Do not commence planting operations if the ground is in such condition that it can not hold persons or equipment without damaging the finish grade.

3.04 PLANTING OPERATIONS

A. Seeding:
   1. Sow type(s) of seed between the dates as set out herein uniformly at the rate of 60 pounds per acre.
   2. Do not sow seeds during windy weather or when the ground is frozen, wet or otherwise in a non-tillable condition.
   3. Full advantage shall be taken of time and weather conditions best suited for seeding. Such timing shall be subject to the approval of the Project Architect.
   4. Sow uniformly in the specified amount, preferably by approved mechanical seeders, and immediately roll with a culti-packer or covered lightly with soil by the use of garden rakes or other approved methods.

B. Overseeding: (Note- Soil Preparation, paragraph 3.03 IS NOT REQUIRED WHEN OVERSEEDING)
   1. Initial Preparation:
      a. Mow and rake areas to be regrassed to a height not to exceed 1 inch. Additional mowings required every 10 days until an acceptable stand of grass is achieved in order to keep existing cool season grasses in control and not shade out the young warm season grass.
      b. Exercise care to preserve the existing cool season grass root system to minimize erosion.
      c. Following initial mowing, apply fertilizer and seed as specified herein.
   2. Seeding: Conform to paragraph 3.04 A. above. Additional mulch not required if the root systems of existing grass are preserved and clippings from the mowing operation are used.

3.05 PLANTING OPERATIONS - GENERAL

A. Compaction: Following completion of planting operations, compact areas planted, except overseeded areas, to the satisfaction of the Project Architect with rollers, cultipackers, or other approved equipment used for this purpose.

B. Mulching: Thoroughly water seeded areas prior to mulching except (1) when asphalt mulch is used, or (2) when a frost is evident within 7 days of sowing the seed. Apply mulch within twenty-four hours of completion of the seeding operations for the area involved.

C. Placement of Mulch:
   1. Begin placement on the windward side of areas and from top slopes.
   2. Mulch shall be loose enough to allow air to circulate, but compact enough to partially shade the ground and reduce erosion in its final position.
   3. Use of wet vegetative material not permitted. Brake and loosen baled material thoroughly before application.
   4. Application Rate of Straw - 1-1/2 tons per acre.

D. Erosion Control Fabric: Install over the seeded areas within swales between catch basins as per the manufacturers' recommendations.

3.06 PLANT ESTABLISHMENT

A. Seeding and Overseeding: Consists of protection of areas and operations of maintenance including watering, mowing, weeding, repairing, and reseeding of areas damaged or eroded as a result of the Contractor's operations, negligence, or by normal rains or storm, prior to acceptance.

3.07 PROJECT COMPLETION

A. Clean-Up: Refer to Section 01770.

B. Maintenance:
   1. Begins immediately after each plant and/or seeding is planted and continues until planting has passed final inspection and acceptance.
   2. Includes watering, weeding, cultivating, mowing, removal of dead materials, resetting plants to proper grades and other necessary operations.
   3. Mowing shall begin twenty-one days after planting and continue every fourteen days until Final acceptance. Perform mowing with rotary or reel mowers- no bushhogs or flail mowers allowed.
   4. Provide protection to lawn areas. Repair damage resulting from construction operations promptly.

C. Maintenance By Owner:
   1. Owner will provide adequate maintenance during the guarantee period, however, Contractor shall fully explain the watering, and mowing needs of the work to the Owner in writing, submitted with the closeout documents.
   2. Contractor is responsible for planting until the guarantee period is up, unless the Owner is grossly negligent in his maintenance of the work.
   3. Maintenance by Owner shall not begin until final acceptance.

3.08 GUARANTEE, INSPECTION AND ACCEPTANCE

A. Inspection:
   1. Notify Project Architect:
      a. Prior to the days on which grassing operations are performed, and
      b. To request final inspection.
   2. Made by Project Architect at the conclusion of planting to determine completion, exclusive of replacement of plants.

B. Final Acceptance:
   1. Made by Owner following final inspection and approval by the Project Architect.
   2. Where seeding is included, will not be made for a minimum period of 21 calendar days after permanent grass seeding and until seed have germinated and are growing in a satisfactory stand.
   3. A satisfactory stand of grass is a cover of living grass (limited to the species of seed which is expected to germinate in the current season), in which no gaps greater than 12 inches occur.
   4. If an acceptable stand of grass is not established within 45 calendar days from date of planting, the area shall be reseeded or repaired (at no cost to the Owner) until an acceptable stand is established. Deficiencies in the work must be corrected before final acceptance will be made.

C. Guarantee:
   1. Period - 60 days, BEGINNING at the time of FINAL acceptance of the project.
   2. Grass shall be alive, in a satisfactory condition, and growth for each specified species of plant at the end of the guarantee period, unless the plant material has suffered from direct damage or negligence by the Owner.
   3. Grass damaged directly or indirectly as a result of the Work prior to final acceptance of the complete project, shall be replaced.

D. Reports by Landscape Contractor:
   1. Beginning at final acceptance and during the guarantee period, make periodic inspections of the work to verify minimal maintenance by Owner.
   2. Inspections shall be made once every 30 days. File a written report with the Owner and the Project Architect.
   3. Failure to do so shall relieve the Owner of his maintenance requirements during the guarantee period.

E. Replacement - Warranty:
   1. Grassing required under this contract which is dead or not in satisfactory condition during, or at the end of the guarantee period, as determined by the Project Architect, shall be removed and replaced, at the Contractor's expense, provided that:
      a. Owner has complied with the instructions for maintenance provided by the Contractor, and
      b. The 30-day reports by the Contractor are on file with the Project Architect.

2. Notify the Project Architect when planning to replace the grass so that the Project Architect or Owner may be present.
3. Replacement plants shall be of the same variety and species installed, unless directed otherwise by the Project Architect.

3.09 RE-GRASSING REQUIREMENT

A. This requirement is for the purpose of installing the desired stand of warm season grass, which could not be established if planted in the period of August 16 to May 1.

B. This requirement is not covered under the specified construction period and does not provide for liquidated damages, however the Owner reserves the right to assess applicable damages to the Contractor if the re-grassing operation has not been completed by June 1 of the succeeding grassing season, following the completion of other components of this project.

C. Grassing operations performed in the period beginning August 16, and continuing to May
1. Re-seed and re-fertilize project area designated to be seeded, if an acceptable stand of warm season grass has not been achieved, as determined by the Project Architect on or around May 1.
2. Re-grassing operations shall require fill as required due to erosion, scarifying, fertilization, and grassing, all as per this Section. Mulch bare areas greater than 3 feet by 3 feet.

END OF SECTION

SECTION 03100 CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

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

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Section 03300 - Cast-In-Place Concrete: Supply of concrete accessories for placement by this section.

1.03 RELATED SECTIONS

A. Section 03200 - Concrete Reinforcement.

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

1.04 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 318 - Building Code Requirements for Reinforced Concrete.

C. ACI 347 - Recommended Practice For Concrete Formwork.

D. PS 1 - Construction and Industrial Plywood.

1.05 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing to conform to code requirements; resultant concrete to conform to required shape, line and dimension.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 347.

B. Maintain one copy of document on site.

1.07 QUALIFICATIONS

A. Design formwork under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Mississippi.

1.08 REGULATORY REQUIREMENTS

A. Conform to Standard Building code for design, fabrication, erection and removal of formwork.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site.

1.10 COORDINATION

A. Coordinate this Section with other Sections of work which require attachment of components to formwork.

B. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Project Engineer.

PART 2 - PRODUCTS

2.01 WOOD FORM MATERIALS

A. Softwood Plywood: PS 1, B Grade, Group 1, Exterior.

B. Softwood Plywood: PS 1, HDO, Group I Exterior.

C. Lumber: No. 2 grade; with grade stamp clearly visible.

2.02 PREFABRICATED FORMS

A. Preformed Steel Forms: Tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces. Special care shall be used at areas of exposed concrete.

2.03 FORMWORK ACCESSORIES

A. Form Ties: Snap-off type, adjustable length, free of defects that could leave holes larger than 1/2 inch in concrete surface.

B. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.

C. Corners: Chamfer type; 3/4 x 3/4 inch.

D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

PART 3 - EXECUTION

3.01 EXAMINATION

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

3.02 EARTH FORMS

A. Earth forms are permitted for footings.

3.03 ERECTION - FORMWORK

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

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

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Formwork ties for grade beams with exposed exterior shall be uniformly spaced horizontally and vertically.

F. Obtain approval before framing openings in structural members which are not indicated on Drawings.

G. Provide chamfer strips on external corners of beams, columns and walls.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are effected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

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

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

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

D. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.07 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301.

3.08 FIELD QUALITY CONTROL

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

B. Do not reuse wood formwork more than 6 times for concrete surfaces to be exposed to view.

3.09 FORM REMOVAL

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

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

3.10 SCHEDULE

A. Grade B plywood for areas not exposed.

B. HDO plywood for Grade Beams and wall to be exposed.

C. Steel column forms for exposed concrete columns.

END OF SECTION

SECTION 03200 CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel bars and accessories for cast-in-place concrete.

1.02 RELATED SECTIONS

A. Section 03100 - Concrete Forms and Accessories.

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

C. Section 01455 - Testing Laboratory Services.

1.03 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 318 - Building Code Requirements For Reinforced Concrete.

C. ACI SP-66 - American Concrete Institute - Detailing Manual.

D. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.

E. ANSI/AWS D1.4 - Structural Welding Code for Reinforcing Steel.

F. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

G. AWS D12.1 - Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.

H. CRSI - Concrete Reinforcing Steel Institute - Manual of Practice.

I. CRSI 63 - Recommended Practice For Placing Reinforcing Bars.

J. CRSI 65 - Recommended Practice For Placing Bar Supports, Specifications and Nomenclature.

1.04 SUBMITTALS

A. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and wire fabric, bending and cutting schedules, and supporting and spacing devices.

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

1.05 QUALITY ASSURANCE

A. Contractor Quality Assurance:

1. Perform Work in accordance with CRSI 63, 65 and Manual of Practice, ACI 301, ACI SP-66, and ACI 318.

2. Maintain one copy of each document on site.

3. Submit certified copies of mill test report of reinforcement materials analysis.

B. Testing Laboratory Quality Assurance: Contractor shall coordinate and schedule in a timely manner with the testing laboratory to perform the following inspections and tests:

1. Verify reinforcing steel for size, spacing, location and support.

2. Verify proper reinforcing steel concrete coverage.

1.06 QUALIFICATIONS

A. Welders' Certificates: Submit Certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.07 COORDINATION

A. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615, 60 ksi yield grade; deformed billet steel bars.

B. Fiber Reinforcement: Similar and equal to Fibermesh InForce as manufactured by Synthetic Industries. Application rate shall be 1.5 pounds per cubic yard.

2.02 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions.

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type; size and shape as required.

2.03 FABRICATION

A. Fabricate concrete reinforcing in accordance with ACI 318.

B. Weld reinforcement in accordance with ANSI/AWS D1.4 and ANSI/AWS D12.1.

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

PART 3 EXECUTION

3.01 PLACEMENT

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

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings. Do not cut bars.

D. Maintain concrete cover around reinforcing as per ACI 318.

END OF SECTION

SECTION 03300 CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cast-in-place concrete building members, floors, foundation walls, grade beams, footings and etc.

B. Floors and slabs on grade.

C. Control, expansion and contraction joint devices associated with concrete work, including joint sealants.

D. Site concrete.

1.02 RELATED SECTIONS

A. Section 01455 - Testing Laboratory Services.

B. Section 03100 - Concrete Forms and Accessories.

C. Section 03200 - Concrete Reinforcement.

D. Section 09400 – Terrazzo.

1.03 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 302 - Guide for Concrete Floor and Slab Construction.

C. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

D. ACI 305R - Hot Weather Concreting.

E. ACI 306R - Cold Weather Concreting.

F. ACI 308 - Standard Practice for Curing Concrete.

G. ACI 318 - Building Code Requirements for Reinforced Concrete.

H. ANSI/ASTM D1190 - Concrete Joint Sealer, Hot-Poured Elastic Type.

I. ANSI/ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

J. ASTM C33 - Concrete Aggregates.

K. ASTM C94 - Ready-Mixed Concrete.

L. ASTM C150 - Portland Cement.

M. ASTM C260 - Air Entraining Admixtures for Concrete.

N. ASTM C494 - Chemicals Admixtures for Concrete.

O. ASTM C618 - Fly Ash and Raw or Calcinated Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.

1.04 SUBMITTALS

A. Product Data: Provide data on joint devices, attachment accessories and admixtures.

B. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent Work.

1.05 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of embedded utilities and components which are concealed from view.

1.06 QUALITY ASSURANCE

A. Contractor Quality Assurance:

1. Perform Work in accordance with ACI 301.

2. Maintain one copy of each document on site.

3. Acquire cement and aggregate from same source for all work.

4. Conform to ACI 305R when concreting during hot weather.

5. Conform to ACI 306R when concreting during cold weather.

B. Testing Laboratory Quality Assurance: Contractor shall coordinate and schedule in a timely manner with the testing laboratory to perform the following tests and inspections. Tests shall be performed in accordance with ACI 301.

1. Perform a slump test as deemed necessary for each load of concrete. Record if water or admixtures are added to the concrete at the jobsite. Perform additional slump tests after job site adjustments.

2. Mold four specifications per set for compressive testing; one set for each 100 or less cubic yards of each class concrete placed per day. Test one at 7 days, 2 at 28 days, and hold one as a spare to be broken as directed by the Project Engineer if compressive strengths do not appear adequate.

3. For each set of molded specimens record the following:
   a) Slump
   b) Temperature, ambient and concrete
   c) Air content
   d) Location of placement
   e) Verification of correct design mix

C. The ready-mixed concrete plant shall be certified for conformance with the requirements of the National Ready Mix Concrete Association.

1.07 COORDINATION

A. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

B. Coordinate all embedded items.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I or Type II.

B. Fine and Coarse Aggregates: ASTM C33.

C. Water: Clean and not detrimental to concrete.

2.02 ADMIXTURES

A. Air Entrainment: ASTM C260.

B. Chemical: ASTM C494 Type F - Water Reducing, High Range added at job site after slump tests have been performed.

C. Fly Ash: ASTM C618.

2.03 ACCESSORIES

A. Vapor Barrier: Type recommended for below grade application. Refer to Section 07260 – Vapor Retarders.

B. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 5,000 psi in 28 days.

2.04 JOINT DEVICES AND FILLER MATERIALS

A. Joint Filler: ASTM D1751; Asphalt impregnated fiberboard or felt.

B. Sealant for Pavements, Sidewalks, Curb and Gutter: Refer to Section 07920 – Joint Sealants.

2.05 CONCRETE MIX

A. Mix and deliver concrete in accordance with ASTM C94, Alternative No. 2.

B. Select proportions for normal weight concrete in accordance with ACI 301 Method 1 or Method 2. Submit proposed mix design to Project Engineer in accordance with ACI 301.

C. Provide concrete to the following criteria:
   1. Compressive strength: As noted on drawings or other specification sections.
   2. Slump: 3 to 5 inches.
   3. Water/Cement Ratio shall be .5 or below for all concrete.

D. Use accelerating admixtures in cold weather only when approved by the Project Engineer. Use of admixtures will not relax cold weather placement requirements.

E. Do not use calcium chloride.

F. Use set retarding admixtures during hot weather only when approved by the Project Engineer.

G. Add air entraining agent to normal weight concrete mix for work exposed to exterior.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify site conditions.

B. Verify requirements for concrete cover over reinforcement.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.02 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI 318 and ACI 301.

B. Notify Architect/Engineer minimum 24 hours prior to commencement of operations.

C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.

D. Install joint devices in accordance with manufacturer's instructions.

E. Construction joints in floor slabs and floor beams shall be located in the middle third of the span.

F. Construction joints for grade beams shall be located at one third of the span beyond the support.

G. Place concrete continuously between predetermined expansion, control, and construction joints.

H. Do not interrupt successive placement; do not permit cold joints to occur.

I. Slab on Grade Floor Surface: F_F 25/F_L 18 minimum overall and F_F 18/F_L 13 minimum local.

3.04 SEPARATE FLOOR TOPPINGS

A. Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.

B. Apply bonding agent to substrate in accordance with manufacturer's instructions.

C. Place concrete floor toppings to required lines and levels.

3.05 CONCRETE FINISHING

A. Provide formed concrete surfaces to be left exposed with smooth rubbed finish.

B. Finish concrete floor surfaces in accordance with ACI 301.

C. Wood float surfaces which will receive tile with full bed setting system.

D. Steel trowel surfaces which will receive carpeting, resilient flooring, or seamless flooring.

E. Steel trowel surfaces which are scheduled to be exposed.

F. Pavements and sidewalks - light broom finish.

3.06 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

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

C. Cure floor surfaces in accordance with ACI 308.

3.07 PATCHING

A. Allow Project Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Project Engineer upon discovery.

C. Patch imperfections as directed in accordance with ACI 301.

3.08 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Project Engineer.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of the Project Engineer for each individual area.

END OF SECTION

SECTION 04200 MASONRY UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES: Brick veneer masonry work as shown on the Drawings and schedules.

1.02 RELATED SECTIONS: 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 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 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 ACCEPTABLE BRICK MANUFACTURERS

A. Equivalent products by the following manufacturers are acceptable:

1. Boral Brick, Hattiesburg, Mississippi
2. Columbus Brick, Columbus, Mississippi
3. Old South Brick & Supply Company, Jackson, Mississippi
4. Tri-State Brick & Tile Company, Inc., Jackson, Mississippi

B. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 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.

2.03 BRICK, GENERAL: Unless otherwise shown or specified, provide standard size brick (8 inches long by 2-l/4 inches high by 3-3/4 inches wide) for exposed vertical brickwork. At Contractor's option, provide solid or cored brick for vertical brickwork. Do not use cored brick with net cross-sectional area less than 75 percent of gross area in the same plane or with core holes closer than 3/4 inch from any edge. Provide solid units where indicated.

A. Face Brick: Brick exposed to view, ASTM C 2l6, Grade SW for exterior exposures.

B. Building (Common) Brick: Brick not exposed to view, ASTM C 62, Grade SW for exterior exposures and Grade MW for interior masonry which will be concealed by other work. Select from manufacturer's standard colors and textures.

2.04 CONCRETE MASONRY VENEER: (Synthetic Limestone)

A. Provide high density pre-finished concrete masonry units complying with ASTM C-90, Type I moisture controlled units.

1. Compressive strength 4000 PSI average as tested in accordance with ASTM C-140.
2. Density: 130 pounds per cubic foot average as tested in accordance with ASTM C-140.
3. Absorption: 6 pounds per cubic foot average as tested in accordance with ASTM C-140.
4. Freeze Thaw Durability: less than one percent average as tested in accordance with ASTM C-1262.

B. Tolerances: Overall dimensions for width, height, and length shall differ by not more than plus or minus 1/8 inch from the specified dimensions. The provisions of the ASTM C-90 Paragraph 8 apply with regards to imperfections.

C. Color and Texture: Color and texture shall be as indicated in Section 09050 – Color Design.

D. Sizes: Provide sizes as indicated on the Drawings. Provide custom shapes as indicated or required. Quirk miter corners.

E. Anchorage: Horizontal joint reinforcement and general detailing shall be as per NCMA TEK Note 36A. Control joint placement shall be as per NCMA Note 10-2A.

F. Acceptable Products: Subject to compliance with requirements, provide Prairie Stone units by Northfield Block Company, or approved equal.

2.05 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 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 l50 Type I, except Type III may be used for cold weather protection.

B. Hydrated Lime: ASTM C 207, Type S.

C. Sand: ASTM C l44, except for joints less than l/4 inches, use aggregate graded with 70 to l00 percent passing the No. 16 sieve.

2.06 MASONRY ACCESSORIES: Provide adjustable wire ties conforming to ASTM A 82 Specification for Steel Wire, Plain, for Concrete Reinforcement. The wire shall be a minimum of W1.7, 9 gage. Plate portions of adjustable ties shall be a minimum of 14 gage in thickness. Plate portion shall conform to ASTM A 366 Standard Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality. All tie components 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 l6 gage sheet metal or 3/8 inch diameter rod stock, unless otherwise indicated.

B. Concrete Inserts for Masonry:

1. Furnish dovetail shots with filler strips, where masonry abuts concrete. Fabricate from 24 gage galvanized steel unless otherwise indicated.
2. For installation of concrete inserts, see concrete sections of these Specifications. Advise concrete installer of specific requirements regarding his placement of inserts, which are to be used, by the masonry installer for anchoring of masonry Work.

C. Flashing for Brick Veneer Walls: Provide concealed flashing, shown to be built into masonry, as specified in Section 07650 - Flexible Flashing, unless otherwise indicated.

2.07 MASONRY MAT & WEEP VENTS

A. Manufacturer and Type: Products equal to CavClear Masonry Mat and CavClear Weep Vents as manufactured by Archovations, Inc., PO Box 241, Hudson, WI 54016. Telephone (888) 436-2620.

1. Description: Airspace maintenance and drainage system for masonry cavities to prevent mortar from making contact with the backup to ensure water management. The system shall be fluid conducting, non-absorbent, mold and mildew resistant polymer mesh consisting of 100 percent recycled polymer with PVC binder. Weep Vents shall have “M” notched bottom. Color to be selected by the Project Architect from full range of standard colors
2. Mat Size: 1-1/4 inch thick by 16 inches high by 8 feet long.
3. Weep Vent Size: 1/2 inch thick by 2-1/2 inches high by 3-1/2 inches wide.

G. Equivalent products by the following manufacturers are acceptable:

1. Advanced Building Products, Inc., P.O. Box 98, Springvale, ME 04083. Tel: (800) 252-2306.
2. Colbond Geosynthetics, P.O. Box 1057, Sand Hill Road, Enka, NC 28728. Tel. (800) 664-6638.

H. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

PART 3 EXECUTION

3.01 INSPECTION: Masonry installer must examine the areas and conditions under which masonry 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 masonry installer.

3.02 INSTALLATION: 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 brick 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. 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.

E. Pattern Bond: Lay masonry work in a running bond unless indicated otherwise.

F. 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 unless otherwise indicated at cut brick locations behind downspouts. Lay-up walls plumb and true and with courses level, accurately spaced and coordinated with other work.

G. Stopping and Resuming Work: Rack back l/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.

3.03 MORTAR BEDDING AND JOINTING: 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-l/2 hours has elapsed since initial mixing. Re-temper mortar during 2-l/2 hour period as required restoring workability.

A. 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.

B. 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 in slightly concave. Rake out mortar in preparation for application of caulking or sealant where shown.

C. 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 EXTERIOR BRICK VENEER WALLS: Keep cavity clean of mortar droppings during construction. Strike joints facing cavity, flush.

A. Tie exterior wythe to back-up with adjustable ties embedded in mortar joints at proper spacing, not more than l6 inches on center vertically and 24 inches on center horizontally. Fasten ties to wood frame with corrosion-resistant nails that penetrate the sheathing and are driven a minimum of 1-1/2 inches into the studs.

B. Place Masonry Mat continuously full height in exterior masonry cavity prior to construction of exterior wythe; follow manufacturer's installation instructions. Install horizontally between wall ties or joint reinforcement. Stagger end joints in adjacent rows. Butt adjacent pieces to moderate contact. Fit to perimeter construction and penetrations without voids. Use multiple layers at bottom of wall and above through-wall flashings when air space depth exceeds masonry mat thickness by more than 3/8 inch. Extend extra mat at least to top of base flashing.

C. Place Weep Vents in head joints at exterior wythe of cavity wall located immediately above ledges and flashing, spaced 24 inches on center, unless otherwise shown. Install with notched side down. Leave the side of the masonry units forming the vent space un-buttered and clear from mortar. Slide vent material into joint once the two masonry units forming the weep vent are in place. Install the Weep Vents as the wall is being erected so joints do not become filled with mortar or debris.

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:

B. Provide an open space not less than l/2 inch in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials. 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 30'-0" on center. 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: 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.

A. 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.

B. Clean exposed brick masonry surfaces as recommended by BIA Technical Notes 20 "Cleaning Clay Products Masonry".

C. Clean exposed CMU masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings.

END OF SECTION

SECTION 05120 STRUCTURAL STEEL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural steel, embedded items, and miscellaneous steel.

B. Fabrication shop coat painting.

C. Steel erection.

1.02 RELATED SECTIONS

A. Section 05500 - Metal Fabrications: Non-framing steel fabrications affecting structural steel work.

B. Section 09900 – Paints and Coatings: Field painting.

C. Section 01455 - Testing Laboratory Services.

1.03 REFERENCES

A. ASTM A36 - Structural Steel.

B. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.

C. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.

D. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.

E. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.

F. ASTM A325 - High Strength Bolts for Structural Steel Joints.

G. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.

H. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

I. AWS A2.0 - Standard Welding Symbols.

J. AWS D1.1 - Structural Welding Code.

K. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

L. SSPC - Steel Structures Painting Council.

1.04 SUBMITTALS

A. Shop Drawings:
   1. Indicate sizes, spacing, and locations of structural members.
   2. Connections.
   3. Indicate welded connections with AWS A2.0 welding symbols. Indicate net weld lengths.

B. Mill Test Reports: Submit indicating structural strength.

C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings. Provide ultrasonic testing reports for all complete penetration shop welds.

B. Maintain one copy of each document on site.

C. Testing Laboratory Quality Assurance: Contractor shall coordinate and schedule in a timely manner with the testing laboratory to perform the following tests and inspections:

1. Anchor bolts
   a) Anchor bolt size, configuration, and embedment shall be verified prior to placement of concrete.

2. Field welded connections
   a) Inspection shall be in accordance with AWS Structural Welding Code.
   b) Visually inspect all field welded connections. Provide continuous inspection for complete and partial penetration groove welds; multi-pass fillet welds; single-pass fillet welds greater than 5/16". Provide periodic inspection for fillet welds equal to or less than 5/16"; and joist, floor and deck welds.
   c) Provide ultrasonic inspection of all complete penetration welds.
   d) Verify welder qualifications.

3. Bolted connections
   a) Inspection and testing shall be in accordance with AISC specifications for Structural Joists using ASTM A325 or A490 Bolts.
   b) Provide periodic inspection of all bearing type bolted connections and continuous inspection of slip critical connections. Slip critical connections, if any, will be specifically noted on drawings.

PART 2 PRODUCTS

2.01 MATERIALS

A. Structural Steel Members:
   1. W Shapes: ASTM A992 (Grade 50).
   2. Angles, Channels, Plates: ASTM A36.

B. Structural Tubing: ASTM A500, Grade B.

C. Pipe: ASTM A53, Grade B.

D. Shear Stud Connectors: ASTM A108 forged steel, headed.

E. Bolts, Nuts, and Washers: ASTM A325; galvanized to ASTM A123 for galvanized members.

F. Anchor Bolts: ASTM A307.

G. Welding Materials: AWS D1.1; type required for materials being welded.

H. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 5000 psi at 28 days.

I. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.

J. Touch-Up Primer for Galvanized Surfaces: SSPC 20 Type I Inorganic.

2.02 FABRICATION

A. Provide shop workmanship equal to the best modern practice conforming to listed industry standard and in accordance with the latest requirements of the American Institute of Steel Construction.

2.03 FINISH

A. Prepare structural component surfaces in accordance with SSPC SP 2.

B. Shop prime structural steel members. Do not prime surfaces that will be field welded, in contact with concrete, and high strength bolted connections.

C. Galvanize to ASTM A123, structural stele members indicated on drawings. Provide minimum 1.25 oz/sq.ft.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 ERECTION

A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

B. Field weld components indicated on Drawings or shop drawings.

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

D. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.03 ERECTION TOLERANCES

A. All erection of steel, bracing and etc. should be as required by AISC.

END OF SECTION

SECTION 05210 STEEL JOISTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Open web steel joists, with bridging, attached seats, and anchors.

1.02 RELATED SECTIONS

A. Section 05120 - Structural Steel.

B. Section 05300 - Metal Deck.

C. Section 09900 – Paints and Coatings.

1.03 REFERENCES

A. ASTM A307 - Carbon Steel Threaded Standard Fasteners.

B. AWS D1.1 - Structural Welding Code.

C. FS TT-P-636 - Primer Coating, Alkyd, Wood and Ferrous Metal.

D. SJI - Standard Specifications for Open Web Steel Joists, K Series.

E. SSPC - Steel Structures Painting Council.

1.04 SUBMITTALS

A. Shop Drawings:

1. Indicate standard designations, configuration, sizes, spacing, locations of joists, joist leg extensions.

2. Bridging, connections.

3. Cambers.

B. Welder's Certificates: Submit manufacturer's certificates that welders employed on the Work have met AWS verification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with SJI Standard Specifications, Load Tables, and Weight Tables.

B. Maintain one copy of each document on site.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store and protect products to SJI requirements.

B. Protect joists from distortion or damage.

PART 2 PRODUCTS

2.01 MATERIALS

A. Open Web Joists Members: SJI Type K open web.

B. Nuts and Washers: ASTM A307.

C. Primer: FS TT-P-636.

D. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A36.

E. Welding Materials: AWS D1.1; type required for materials being welded.

2.02 FABRICATION

A. Provide bottom and top chord extensions as indicated.

2.03 FINISH

A. Shop prime joists. Do not prime surfaces that will be field welded.

PART 3 EXECUTION

3.01 EXAMINATION

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

B. Beginning of installation means erector accepts existing conditions.

3.02 ERECTION

A. Erect and bear joists on supports.

B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment until completion of erection and installation of permanent bridging and bracing.

C. Coordinate placement of anchors in masonry.

D. After joist alignment and installation of framing, field weld joist seat to bearing plates.

E. Position and field weld joist chord extensions and wall attachments after dead load is applied.

F. Do not permit erection of decking until joists are braced, bridged, and secured.

G. Do not field cut or alter structural members without approval of joist fabricator.

H. After erection, prime welds, abrasions, and surfaces not shop primed.

3.02 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Alignment: 1/2 inch.

END OF SECTION

SECTION 05300 METAL DECK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal deck and accessories.

1.02 RELATED SECTIONS

A. Section 05120 - Structural Steel.

1.03 REFERENCES

A. AISI - Specification for the Design of Cold-Formed Steel Structural Members.

B. ASTM 36 - Structural Steel.

C. ASTM A466 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

D. ASTM A525 - Steel Sheet, Zinc-Coated, Galvanized by the Hot Dip Process.

E. ASTM A611 - Steel, Cold-Rolled Sheet, Carbon, Structural.

F. AWS D1.1 - Structural Welding Code.

F. SDI - Design Manual for Composite Decks, Form Decks, Roof Decks.

1.04 PERFORMANCE REQUIREMENTS

A. Design metal decking in accordance with SDI Design Manual for Composite Decks, Form Decks, and Roof Decks.

1.05 SUBMITTALS

A. Shop Drawings: Indicate decking plan, support locations, projections, openings and reinforcement, pertinent details, and accessories.

B. Product Data: Provide deck profile characteristics and dimensions, structural properties and finishes.

C. Manufacturer's Installation Instructions: Indicate specific installation sequence.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store and protect products from damage.

B. Cut plastic wrap to encourage ventilation.

C. Separate sheets and store decking on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sheet Steel: ASTM A446, Grade A Structural Quality; with G90 galvanized coating conforming to ASTM A525.

B. Bearing Plates: ASTM A36 steel.

C. Welding Materials: AWS D1.1.

D. Touch-Up Primer: Zinc chromate type.

2.02 FABRICATION

A. Metal Decking: Sheet steel, configured as follows:

Span Design:	Multiple
Minimum Metal Thickness (Excluding Finish):	as shown on drawings
Nominal Height:	as shown on drawings

B. Metal Closure Strips, Cover Plates, and Related Accessories: 20 gage galvanized sheet steel; of profile and size as required.

C. Fasteners: Galvanized hardened steel, steel-tapping.

D. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter.

PART 3 EXECUTION

3.01 EXAMINATION

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

B. Beginning of installation means installer accepts existing conditions.

3.02 INSTALLATION

A. Erect metal decking in accordance with SDI Design Manual for Composite Decks, Form Decks, and Roof Decks.

B. Bear decking on steel supports with 1-1/2 inch minimum bearing. Align and level.

C. Fasten deck to steel support members at ends and intermediate supports with fusion welds through weld washers at 12 inches on center maximum, parallel with the deck flute and at each transverse flute.

D. Weld in accordance with AWS D1.1.

E. Mechanically fasten male/female side laps at 24 inches on center maximum.

F. Install sheet steel closures and angle flashings to close openings between deck and walls, columns, and openings.

G. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

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 lightgage 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 lightgage 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 and both lobby walls at gage as indicated by manufacturer's calculations, unless shown or specified otherwise.

2. Provide 8" studs with 2" Flange, 12 Gage at 16 inches on center maximum at walls of Auditorium Rm. 151 as indicated on the drawings and as required by manufacturer's design calculations.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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

3.01 INSPECTION

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

3.02 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.

3.03 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 l8" 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.

3.04 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 05401 LIGHT GAUGE STEEL PRE-ENGINEERED/MANUFACTURED TRUSSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal roof trusses.

B. Anchorage, bracing, and bridging.

1.02 REFERENCES

A. ASTM:
1. ASTM A653 and A525.
2. ASTM A780-93a "Repair of Damages and Uncoated Areas of Hot-Dip Galvanized Coatings.

B. American Welding society (AWS):
1. AWS D1.1 "Structural Welding Code - Steel."
2. AWS D1.3 "Structural Welding Code - Sheet Steel."

1.03 PERFORMANCE REQUIREMENTS

A. AISI "Specifications": Calculate structural characteristics of cold-formed metal framing according to AISI's "Cold Formed Steel Design Manual" March 1987 edition.

B. Structural Performance: Design, engineer, fabricate and erect cold-formed metal framing to withstand design loads within limits and under conditions required:
1. Design Loads:
a) Live Load: 20 psf.
b) Added Dead Load: Top chord: 10 psf
Bottom chord: 10 psf
c) Wind Loads: 100 mph (ASCE-7)
2. Design framing systems to withstand design loads without deflections greater than L/360.
3. Design framing systems to provide movement of framing members without damage or over stressing, sheathing failure, connection failure, undue strain of fasteners and anchors, or other detrimental effects when subject to a maximum temp. change (range) of 120 deg. F (67 deg. C).

1.04 SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each type of cold-formed metal framing and accessory required.

B. Submit shop drawings showing member, type, location, spacing, size and gauge of members, method of attachment to supporting members and all necessary erection details. Responsibilities:
1. Truss Manufacturer to submit shop drawings showing:
a) member, type, location spacing, size and gauge of members.
b) location of required lateral web compression bracing.
c) all truss to truss connection details.
d) detailed roof truss layouts.

e) submit structural calculations, sealed and signed by a qualified registered Professional Engineer, verifying framing assembly's ability to meet or exceed local code and design requirements.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Fabrication shall be performed by experienced cold-formed metal framing truss fabricator with not less than two years experience designing and fabricating cold-formed metal trusses equal in material, design, and extent to the systems required for this project. Primary fabrication shall be conducted in permanent facility dedicated to the manufacturing of cold-formed metal trusses. Job site fabrication is strictly prohibited.

B. Erectors Qualifications: Truss erection shall be performed by a qualified installer experienced in structural light gauge steel framing and recommended truss installation practices.

1.05 DELIVERY, STORAGE AND HANDLING

A. Trusses to be delivered to job site individually labeled to match information in layout drawings. Exercise extreme care to avoid damage during unloading, storing and erection.

B. Store trusses on blocking off of ground and in an upright position when possible to avoid damage from bending and over stressing. Protect metal from corrosion, deformation, damage, and deterioration when stored on job site. Keep trusses free of dirt and other foreign matter.

1.06 PROJECT CONDITIONS

A. During construction, distributed concentrated loads applied to trusses adequately so that carrying capacity any one truss or other component is not exceeded.

PART 2 PRODUCTS

2.01 MATERIALS

A. Materials
1. Fabricate truss components of commercial quality steel, ASTM A653 galvanized finish with a minimum yield point of 45 ksi.
2. Bracing, bridging and blocking members: Fabricate components of commercial quality steel sheet, ASTM A653 galvanized finish with a minimum yield of 33 ksi.

B. Metal framing components: Provide sizes, shapes and gauges indicated:
1. Design Uncoated-Steel Thickness: 20 Ga. .0360 in (0.91 mm)
2. Design Uncoated-Steel Thickness: 18 Ga. .0470 in (1.20 mm)
3. Design Uncoated-Steel Thickness: 16 Ga. .0580 in (1.52 mm)
4. Design Uncoated-Steel Thickness: 14 Ga. .0750 in (1.90 mm)

C. Finish: Provide components with protective zinc coating complying with ASTM A653, minimum G60 coating.

D. Fastenings:
1. Hilti self drilling screws, bolts, nuts and washers with corrosion-resistant plated finish. Fasteners shall be of sufficient size to ensure the strength of the connection.
2. Welding: Comply with AWS D1.1 when applicable and AWS D1.3 for welding base metals less than 1/8" thick.

2.02 FABRICATION

A. Factory fabricate trusses and accessories plum, square, true to line and with connections securely fastened.
   1. Fabricate truss assemblies in jig templates.
   2. Cut framing members by sawing or shearing; do not torch cut.
   3. Fasten cold-formed metal framing members by screw fastening.
   3. Locate mechanical fasteners and install according to cold-framed to cold-formed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.
   4. Splicing:
      a) Splicing of webs is not permitted
      b) The following procedure must be followed when splicing of chord members is necessary:
         1. Splice chord members by using a 24 inch (typ.) piece of chord material the same size and gauge of the chord material being spliced.
         2. Attach splice with a minimum of 4 screws each side of the splice. The screw count of the splice is calculated by dividing the forces in the member (see individual truss engineering drawing), by the appropriate screw shear value.

20 GA - 243 lbs/screw	18 GA - 419 lbs/screw
16 GA - 513 lbs/screw	14 GA - 519 lbs/screw

B. Reinforce, stiffen, and brace trusses to withstand handling, delivery, and erection stresses. Lift trusses to prevent damage or distortion.

C. Fabricate Tolerances: Fabricate assemblies to a maximum allowable tolerance variation from plumb, level, and true to a line of 1/8 inch in 10 feet (1:960) and as follows:
   1. Spacing: Space individual web members no more than plus or minus 1 inch from plan location. Vertical webs located directly over bearing points shall be located plus or minus 1/8 inch (3mm) from plan location.
   2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine structure, substrates and installation conditions. Do not proceed with truss erection until unsatisfactory conditions have been corrected. Trusses should be installed so as to allow complete and adequate contact with truss connection member at all bearing locations as indicated.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 INSTALLATION, GENERAL

A. General:
   1. Erection of trusses, including proper handling, safety precautions, temporary bracing and other safeguards or procedures are the responsibility of the Contractor and Contractor's installer.
   2. Exercise care and provide erection bracing required to prevent toppling or dominoeing of trusses during erection.

B. Erect trusses with plan of truss webs vertical and parallel to each other accurately located at design spacing indicated.

C. Provide proper lifting equipment suited to sizes and types of trusses required, applied at lift points recommended by truss fabricator. Exercise care to avoid damage to truss members and joints during erection and to keep horizontal bending of trusses to a minimum.

D. Provide framing anchors as indicated or accepted on the engineering design drawings or erection drawings. Anchor trusses securely at bearing points.

E. Install truss framing and accessories plumb, square, true to line, and with connections safely fastened, according to manufacturer's recommendations.

F. Provide temporary bracing and leave in place until all permanent bracing, framing, and sheathing is in place and securely fastened.

G. Erection Tolerances: Install joist and truss framing to a maximum allowable tolerance variation from plumb, level and true to line of 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

H. Do not alter, cut or remove framing members or connections of trusses.

I. Align webs of bottom chords and load-bearing studs or continuously reinforce track to transfer loads to structure. Anchor trusses securely at all bearing points as indicated.

3.03 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanizing repair paint according to ASTM A780 and the manufacturer's instructions.

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, elevator pit ladder, steel plate at mechanical trench, safety nosings at concrete steps, catch basin system at roof downspouts, 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. All dimensions shall be shown, including every hole location, fastening, bearing member and the like. Include erection drawings, with plans, elevations, and details.

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, honeycomb 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 LADDERS: At elevator pit fabricate ladder using flat bar side rails, angle brackets and round solid structural steel bar rungs. Comply with the requirements of ANSI A14.3 and Pipe Railings section of these Specifications.

2.05 STEEL PLATE AT MECHANICAL TRENCH

A. At exterior mechanical trench, provide galvanized steel checker plate cover at thickness as indicated on Drawings.

B. At interior mechanical trench, provide smooth galvanized steel plate cover at thickness as indicated on Drawings

2.06 SAFETY NOSINGS: Provide abrasive stair nosings at exterior concrete steps equal to Wooster Products Model 241BF Supergrit 4 inches wide by 6 inches less than tread width with protective tape and continuous sure-hold anchors. Color to be selected by MDOT Architect from all available colors. Install nosings before "Initial Set" of the concrete. Remove protective tape after steps are complete. Equivalent products by American Safety Tread Company .and Balco, Inc. are acceptable.

2.07 CATCH BASIN SYSTEM: Provide catch basin at roof downspout locations and where indicated on the Drawings.

A. Basin: Equal to NDS Part No. 1882, 18 inches one-piece tapered catch basin 2 opening, black.

B. Grate: Equal to NSD Part No. 1815, 18 inches square, heavy duty galvanized steel bar grate. Open surface area – 291.00 square inches, 381.21 gpm.

2.08 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.

2.09 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 05722 STAINLESS STEEL RAILING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Component type, seamless weld stainless steel handrails, guardrails, and railing systems including connectors, fasteners, and system required accessories for interior stairs.

1.02 SUBMITTALS

A. Product Data: Submit product data for system and all component pieces.

B. Shop Drawings: Submit complete layout including plan views and elevations at ½"=1'-0" scale minimum, and sections and details at 3"=1'-0" minimum. Manufacturer's standard details shall be modified to reflect project conditions and design.

1.03 PERFORMANCE REQUIREMENTS

A. Rail tested per ASTM 894-88 Standard Test Method for Anchorage of Permanent Metal Railing Systems and Railing for Buildings.

B. Rail tested per E935-93 Standard Test Methods for Performance of Permanent Metal Railing Systems for Buildings

C. Rail tested per E985-93 Standard Specifications for Permanent Metal Railing Systems and Rails for Buildings.

D. Thermal Action and Corrosion Control:

1. Allow for thermal action resulting from the maximum range change in ambient temperature in design, fabrication, and installation of rail systems, to prevent opening of joints, buckling, and other detrimental effects, including over-stressing of connections and components.

2. Prevent galvanic action, and other forms of corrosion by isolating dissimilar metals to prevent them from being in direct contact with each other.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide handrails, guardrails, and railing systems from one manufacturer. Manufacturer shall be experienced in the manufacture and installation of specified railing systems for at least five years. Provide quality in appearance and physical properties, without delaying the work. All connection fittings must be bolted and clamped. The finish of handrail welds must be completely seamless and invisible.

B. Handrails, guardrails, and complete railing system and components shall installed by the manufacturer or the manufacturer's authorized and certified installer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver handrails, guardrails, and railing systems and related components in protective packaging and store components to avoid damage from moisture, abrasion and other construction activities. All materials shall be delivered, stored and handled by manufacturer's technicians or certified installers.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Drawings and specifications are based on products manufactured by Stainless Steel Railing System by P&P ARTEC, 705 Creel Drive, Wood Dale, IL 60191, Tel. 800-927-7346.

B. Equivalent products by the following manufacturers are acceptable:

1. Handrail Design, Inc., 1200 Corporate Blvd., Lancaster, PA 17601. Tel. (717) 285-4088.

2. Tri-Tech, Inc., 5710 Harrison Avenue, Austell, GA 30106. Tel.(770) 941-0020.

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 MATERIALS

A. Stainless Steel Railing System # 1 equal to “Double Baluster” as follows:

1. Material quality: Provide materials free from surface blemishes where exposed to view in the finished installation.

2. Handrails: 304 stainless steel pipe - 1.5 inches outside diameter with a 360-400 grit finish.

3. Double balusters: Two hard drawn stainless steel tubes per baluster, 7/8 inch outside diameter with a 360-400 grit finish.

4. Frame tubes: Hard drawn stainless steel tubes, 5/8 inch outside diameter with a 360-400 grit finish.

5. Connection Fittings: 304 stainless steel with #7 polished finish.

6. In-fill Panel: Glass lites, 3/8 inch clear tempered, all four sides polished.

7. Bolts, Screws & Nuts: Stainless steel. All visible surfaces shall have a #7 polished surface.

B. Stainless Steel Railing System #2 equal to “Modesto” as follows:

1. Material quality: Provide materials free from surface blemishes where exposed to view in the finished installation.

2. Handrails: 304 stainless steel pipe - 1.5 inches outside diameter with a 360-400 grit finish.

3. Balusters: One single baluster post, 304 stainless steel pipe 1-1/4" outside diameter with a 360-400 grit finish.

4. Frame tubes: Hard drawn stainless steel tubes, 5/8 inch outside diameter with a 360-400 grit finish.

5. Connection fittings: solid cast zinc; powder coated in colors per manufacturer's standard color chart to be supplied with shop drawings.

6. In-fill Panel: Horizontal frame tubes, hard drawn stainless steel tubes, 5/8 inch outside diameter with a 360-400 grit finish.

7. Bolts, Screws & Nuts: Stainless steel.

2.03 FABRICATION

A. Fabricate handrails and railing systems to comply with manufacturer's specifications for project design, details, dimensions, finish, and anchorage but not less than the structural requirements to support loading.

B. All fabrication by manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Examine system components, substrates and conditions where railing systems are to be installed. Field measurements shall be taken by manufacturer's representative prior to fabrication.

B. Review and coordinate setting drawings, templates, and related items that are to be embedded in concrete.

3.02 INSTALLATION

A. Railing installation shall be by manufacturer's authorized technicians or representatives per approved shop drawings and existing conditions.

B. Top rail shall terminate at a wall ending or as designed by manufacturer to meet design layout to achieve maximum stability.

C. Mount railing systems as follows:

1. Stainless Steel Railing System # 1: Side mount with baluster foot as detailed.

2. Stainless Steel Railing System # 2: Top mount with cover plate.

D. Where ever possible achieve equal spacing of balusters.

3.03 CLEANING AND PROTECTION

A. Immediately upon completion of installation, clean all railing system surfaces using silicon free stainless steel cleaner. Do not use abrasive agents or harsh chemicals. Provide plastic sheet protection for all surface of completed installations to prevent damage during remainder of construction activities.

B. No more than one week prior to Substantial Completion, clean all railing system surfaces using silicon free stainless steel cleaner.

END OF SECTION

SECTION 05730 ORNAMENTAL METALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stainless Steel Plate and Angles.

B. Perforated Steel Plate.

C. Light Cove.

1.02 SUBMITTALS

A. Product data for each product including finishing materials and methods.

B. Shop drawings showing fabrication and installation including plans, elevations and details of components and attachments to other units of work. Indicate materials, profiles of each metalwork member and fitting, joinery, finishes, fasteners, anchorages and accessory items. Include setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as unit of work of other sections.

C. Installer certificates signed by contractor certifying that welders comply with requirements specified under "Quality Assurance" article.

D. Qualification data for firms and person specified "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project name, addresses, names of Architects and Owners, plus other information specified.

1.03 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in successfully producing custom ornamental metalwork similar to that indicated for this project, with sufficient production capacity to produce required units without causing delay in the work.

B. Arrange for installation of metalwork specified in this section by same firm which fabricated them.

C. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel"

D. Certify that each welder employed in unit of work of this section has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification. Testing for recertification is contractor's responsibility.

1.04 PROJECT CONDITIONS

A. Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of metalwork. Do not delay job progress; allow for adjustments and fitting where taking of field measurements before fabrication might delay work

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store components and materials in clean, dry location, away from uncured concrete and masonry. Cover with waterproof paper, tarpaulin or polyethylene sheeting in a manner that permits air circulation within covering.

B. Handle metalwork on site to a minimum; exercise care to avoid damaging metal finishes.

PART 2 PRODUCTS

2.01 METALS

A. Provide ornamental metals of the forms and types which comply with requirements of referenced standards and which are free from surface blemishes where exposed to view in the finished unit. Exposed-to-view surfaces exhibiting pitting, seam marks, roller marks, stains, discolorations or other imperfections on finished units are **not** acceptable.

B. Steel: Provide stainless steel in the shapes indicated on drawings complying with the following requirements:

1. Tubing: ASTM A 554, Grade MT 304, Satin Finish No. 4.
2. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304, Satin Finish No. 4.
3. Bars and Shapes: ASTM A 276, Type 304, Satin Finish No. 4.

C. Cast Aluminum: Provide alloy and temper recommended by aluminum producer and finisher with strength and durability properties not less than that of alloy and temper designated below.

1. Extruded Bars and Shapes: ASTM B 221, Alloy 6063-T5/T52.
2. Plate and Sheet: ASTM B 209, Alloy 3003-H4.
3. Castings: ASTM B 26/B, Alloy A356.0-T6.

2.02 MISCELLANEOUS MATERIALS

A. Welding Electrodes and Filler Metal: Type and ally of filler metal and electrodes as recommended by producer of metal to be welded, complying with applicable AWS specifications, and as required for color match, strength and compatibility in the fabricated items.

B. Fasteners, Caps, Connectors and Turnbuckles: Of same metal and alloy as other metal components. Do not use metals which are corrosive or otherwise incompatible with metals joined.

1. Provide concealed fasteners for interconnection of ornamental metalwork components and for their attachment to other work, except where otherwise indicated.
2. Provide Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated or required.

C. Nonshrink Nonmetallic Grout: Pre-mixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with CE CRD C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

D. Anchors and Inserts: Provide anchors of type, size, and material required for type of loading and installation condition shown, as recommended by manufacturer, unless otherwise indicated. Use toothed steel or expansion bolt devices for drilled-in-place anchors.

2.03 FABRICATION

A. Form ornamental metalwork to required shapes and sizes, with true curves, lines and angles. Provide components in sizes and profiles indicated, but not less than required to comply with requirements indicated for structural performance.

B. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature, in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints and overstressing of welds and fasteners.

C. Provide necessary rebates, lugs and brackets for assembly of units. Use concealed fasteners wherever possible.

D. Comply with AWS for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded joints of all welding flux, and dress on all exposed and contact surfaces. Exposed welds to be ground smooth.

E. Mill joints to a tight, hairline fit. Cope or miter corner joints.

F. Finish exposed surfaces to smooth, sharp, well-defined lines and arises.

G. Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

2.04 WELDED CONNECTIONS

A. Fabricate materials indicated below for interconnections of members by welding. Use welding method which is appropriate for metal and finish indicated and develops strength required to comply with structural performance criteria. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surfaces. Provide mitered joints at elbow bends.

B. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors for interconnection of fabrications to other work, unless otherwise indicated.

C. Furnish inserts and other anchorage devices for connecting fabrications to concrete or masonry work. Fabricate anchorage devices which are capable of withstanding loadings imposed. Coordinate anchorage devices with supporting structure.

2.05 FABRICATED ITEMS

A. Stainless Steel Plate and Angles at Reception Desk: Fabricate to sizes and shapes as indicated on drawings.

B. Perforated Steel Plate: Provide 12 gauge perforated steel plate with 1/8" diameter holes, staggered, with 7/32" centers, 24 holes per square inch, 30% open as manufactured by Harrington & King Perforating Company, 800-251-6026.

C. Light Cove: Provide custom light cove in dimensions as indicated on the drawings equal to products as fabricated by Pittcon Industries, 800-637-7638. Light cove shall incorporate a self-aligning backplate at joints, without exposed fasteners or supports. Light coves shall be formed from 0.080 inches aluminum with factory finish. All fasteners are to be concealed. Fabricate in individually divided sections attached with a taping joint and fabricated in single length units of 10 feet where required with factory mitered corners.

PART 3 EXECUTION

3.01 PREPARATION: Coordinate and furnish anchorages and setting drawings, diagrams, templates, instructions and directions for installation of items having integral anchors which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the project site.

3.02 INSTALLATION, GENERAL

A. Provide anchorage devices and fasteners where necessary for securing metal items to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

B. Perform cutting, drilling and fitting required for installation of metalwork. Set products accurately in location, alignment and elevation, plumb, level and true, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.

C. Fit exposed connections accurately together to form tight, hairline joints or, where indicated, with uniform reveals and spaces for sealants and joint fillers. Where cutting, welding and grinding are required for proper shop fitting and jointing of ornamental metal items, restore finishes to eliminate any evidence of such corrective work.

D. Do not cut or abrade finishes which cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing or provide new units as required.

3.03 PROTECTION

A. Protect finishes from damage during construction period by use of temporary protective coverings approved by metalwork fabricator. Remove protective covering at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units as required.

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 07545 - Thermoplastic Membrane Roofing

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: (6 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); 500 psi. E (minimum modulus of elasticity); 1,500,000 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:
   Southern Pine (SPIB) No. 2 boards of 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 the Architect.

D. Exterior Plywood: Exterior type, medium density, C Grade for concealed faces.

1. Roof sheathing: 3/4 - inch thick.
2. 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.

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

A. The types of architectural woodwork in this Section include, but are not necessarily limited to the following:

1. Standing and Running Trim
2. Cabinets, Counters, and Shelving
3. Solid Surface Window Stools
4. Millwork Partitions
5. Miscellaneous work

B. The extent of each type of architectural woodwork is shown on the drawings and in 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.

1.02 RELATED SECTIONS

A. Section 05500 - Miscellaneous metals

B. Section 06100 - Rough Carpentry

C. Section 09050 - Color Design

D. Section 09250 - Gypsum Drywall

1.03 DEFINITIONS

A. Terms used in this section are in accordance with terminology of the Architectural Woodwork Institute, Architectural Woodwork Quality Standards, Seventh Edition.

1.04 SUBMITTALS

A. Submit shop drawings showing location of each item. 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 in panels, countertops, plastic laminates, brackets, hardware, metal finishes, attachment devices and other materials necessary for complete fabrication. Submit shop drawings for all work specified in this Section including but not limited to the following:

1. Lumber
2. Cabinets and Countertops
3. Millwork Partitions
4. Window stools
5. Miscellaneous work
6. Hardware and Accessory Materials

B. Submit samples of wood trim indicating wood species, cut, grain, stain and finish. Submit 1'-0" long full size pieces of each trim.

C. Submit samples of wood cabinet face and interior indicating core material, veneer species, cut, grain, stain and finish. Samples shall be a minimum of 2'-0" x 2'-0".

D. Submit samples of solid surface window stools showing finish and edge conditions.

E. Submit product data of each type of hardware.

F. Submit samples for color selection from manufacturer's appropriate line for plastic laminate and solid surfacing to comply with level of quality of specified color and finish.

1.05 QUALITY ASSURANCE

A. Comply with specified provisions of the Architectural Woodwork Institute (AWI) "Quality Standards." All construction, fabrications, finishes, and materials shall meet AWI Premium Quality standards.

B. The millwork manufacturer shall:

1. Have a minimum of five (5) years 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 fabrication and finishing to meet the level of quality for the manufacture of all fabrications 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.

C. 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

4. Finishing: AWI Section 1500

5. Installation of Woodwork: Section 1700

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. 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 has been completed in installation areas.

B. If woodwork must be stored in other than installation areas due to unforeseen circumstances, store only in areas meeting requirements specified for installation areas.

1.07 JOB CONDITIONS

A. 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. The Contractor shall 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

A. Coordinate the work of this section with the work of other sections that require penetrations, attachments, or support mechanisms for architectural woodwork.

PART 2 PRODUCTS

2.01 BASIC MATERIALS AND METHODS

A. Provide kiln-dried lumber and maintain optimum moisture content from 8 to 13 percent range (damp region) in solid wood (hardwood and softwood) during fabrication, installation, and finishing operations of interior work.

B. Provide plywood for concealed surfaces in accordance with AWI.

C. Wood for standing and running trim shall be subject to Architect's selection. Comply with AWI quality standards for Premium Grade for transparent finish and Custom Grade for opaque finish for selection of species, grade and cut.

D. For cabinets and shelving indicated to be stained wood, wood veneer for exposed and semi-exposed and interior surfaces shall be Plain Sliced Select Cherry subject to Architect's approval. Comply with AWI quality standards for Premium Grade for selection of species, grade and cut.

E. Plastic Laminate shall 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. Thermoset melamine resin impregnated paper shall be equal to Domtar at all interior surfaces of cabinets with exterior plastic laminate finish.

G. 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.

H. 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.

I. 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.

J. Woodwork in this Section shall be factory finished unless noted otherwise. Factory finishing shall meet the requirements of AWI Quality Standards Section 1500. Millwork indicated to be wood with a stain finish shall have a Premium Grade, Transparent Finish, TR-2, Catalyzed Lacquer sprayed finish, with a satin gloss. Field touch-up of factory finished woodwork shall be performed by woodwork manufacturer to match factory finishing.

2.02 WOOD VENEER CABINETS

A. Fabricate millwork in accordance with AWI Premium Standards, Section 400 Cabinets and as indicated on drawings. See Section 09050-Color Design for color and finish selections.

2.03 STANDING AND RUNNING TRIM

A. Wood base shall be fabricated in accordance with AWI Custom Standards, Section 300 for opaque finish. Base profile shall be 1x 6 nominal.

B. Wood base opaque finish may be field applied.

C. Miscellaneous trims shall be fabricated to sizes indicated on drawings in longest practical lengths. Finish shall conform to adjacent wood finish.

2.04 SOLID SURFACE WINDOW STOOLS

A. Fabricate window stools as detailed on drawings of 1/2 inch solid surface polymer acrylic sheets equal to Dupont Corian. See Section 09050, Color Design for color and finish selection. Individual window stools shall be fabricated in one piece. Exposed edges shall be radiused.

2.05 CABINET HARDWARE AND ACCESSORY MATERIALS

A. Provide cabinet hardware and accessory materials associated with architectural woodwork. Except as otherwise indicated, comply with ANSI A156.9 "American National Standard for Cabinet Hardware." Unless shown or noted otherwise, cabinet hardware and accessories shall comply with the following:

1. Hinges: Concealed type equal to Blum clip 125, 75M5550/75M5650 with cover caps.

2. Cabinet Pulls: Hafele, zinc handle, chrome plated polished, Cat. No. 103.18.200.

3. Drawer guides: Equal to Accuride model 2132, 20 inch, side mount, 75 pound rated, black zinc plated.

4. Adjustable shelf hardware (side support) AWI Quality Standards, 5mm holes at 32mm on center upon approval of sample submitted. Shelf supports shall be equal to Knape and Vogt 331 ANO.

5. Wall cabinet hangers: Equal to Kingclip as manufactured by Brooklyn Hardware, LLC.

6. Metal Identification Tag Holders: Equal to: Hafele, sheet steel, nickle plated, size 69mm x 35mm, label size 57mm x 28mm, window size 52mm x 22mm, Cat. No. 168.02.761.

7. Edge molding: T-Edge rectangular profile, flexible, semi-soft, stain resistant, UV stable, and flame retardant edge molding by Edgemold (800-334-3665).

8. Grommet: 2" diameter molded plastic grommet liner with cap.

9. Work station support bracket: Equal to A&M Hardware, 18" x 24", 1/8" steel work station bracket, load limit to exceed 1,000 pounds. Finish shall match adjacent gypsum board wall finish.

PART 3 EXECUTION

3.01 INSPECTION

A. 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.

3.02 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.

3.03 INSTALLATION

A. All work shall be installed in strict accordance with the premium grade standards of Section 1700 - Installation of Woodwork of AWI Quality Standards.

B. 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'-0" 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.

C. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation and in accordance with AWI Premium Standards. Except where pre-finished matching fastener heads are required, use fine finishing nail for exposed nailings, countersunk and filled flush with woodwork, and matching final finish where transparent finish is indicated.

D. Install cabinets 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.

E. Anchor countertops and vanity tops securely to base units and other support systems as indicated.

3.04 ADJUSTMENT, CLEANING, FINISHING AND PROTECTION

A. 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.

B. 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.

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 07220 – Sloped Roof Deck Insulation, Section 07545 Membrane Roofing and 07610 Sheet Metal Roofing 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, 4010 Boy Scout Blvd, Tampa, FL 33607, Tel. (813) 873-4000.
2. Dow Chemical Company, 200 Larkin Center, Midland, MI 48674, Tel. (800) 441-4369.
3. Johns Manville Corp, 717 17 Street, Denver, CO 80202, Tel. (303) 978-2531.
4. Owens Corning, One Owens Corning Parkway, Toledo, OH 43659, Tel. (800) 438-7465.
5. UC Industries, Inc., 137 East Ave., Suite 64, Tallmadge, OH 44278, Tel. (330) 630-6134.
6. United States Gypsum Company, 125 S. Franklin St., Chicago, IL 60606, 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 full thickness of stud cavity or 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 at locations where indicated on the Drawings

END OF SECTION

SECTION 07220 SLOPED ROOF DECK INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Work of this section includes all labor, materials, equipment and services necessary to complete the building sloped roof deck insulation as shown on the drawings and specified in this section.

1.02 RELATED SECTIONS

A. Section 07610 Sheet Metal Roofing

B. Section 05300 Metal Deck

1.03 SUBMITTALS

A. Submit manufacturer's product data, technical information, material safety data sheets, test reports and installation instructions for each type of insulation and accessory.

B. Submit shop drawings showing location of insulations, extent of work, material used and method of fastening.

C. Submit 12 inch X 12 inch samples of each type of insulation.

D. Submit sample of each type of adhesive and fastener.

1.04 QUALITY ASSURANCE

A. Obtain insulation from one source.

B. Installers shall be experienced in the installation of insulation.

1.05 PRODUCT HANDLING

A. Store all products in dry areas inside and in accordance with manufacturer’s printed instructions and recommendations. Product must be kept dry at all times, both in storage and during application.

B. Use all means necessary to protect the materials of this section from physical damage and from deterioration due to moisture, soiling and other sources.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Provide insulation product Hy-Therm Nail-Line Sloped Roof Deck Insulation manufactured by Dow Chemical Compnay or approved equal.

2.02 MATERIALS

A. Sloped Roof Deck Insulation: composite polyisocyanurate board to ASTM C1289, Type V; rigid, closed cell type, with specially formulated organic / inorganic bottom facer and integrally bonded to a 7/16 inch thick APA- or TECO-rated oriented stand board (OSB).

1. Long Term Thermal Resistance (ASTM C518): R=6.0 per inch of insulation thickness.

2. Core Foam Compressive Strength (ASTM D1621): minimum 16 psi.

3. Core Foam Density (ASTM D1622): 2pcf.

4. Edges: Square.

5. Core Foam Dimensional Stability: less than 2 percent linear change.

6. Core Foam Flame Spread (ASTM E84): 25.

7. Nominal Product Thickness: 3 ½ inches.

8. Conditioned R-value: 23.0

B. Mechanical Fasteners: Screw-type, 3 ga. diameter self-tapping, stainless steel; sufficient length to securely anchor system into place and to withstand all super-imposed loads; complete with 1-1/2 inch diameter 14 ga. thick galvanized discs.

C. Adhesive: compatible with insulation boards and adjacent materials, as recommended by insulation manufacturer.

D. Metal roof deck shall be a minimum 22 ga.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions where sloped roof deck 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 by the Contractor in a manner acceptable to the Project Engineer and the Architect.

B. Verify that the insulation boards and adjacent materials are compatible.

C. Verify that substrate is flat, sound, clean, and free of oil, grease, irregularities, and materials or substances that may impede adhesive bond.

3.02 PREPARATION

A. Install vapor retarder membrane over metal roof deck.

3.03 INSTALLATION

A. 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.

B. 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.

C. Apply no more insulation that can be covered with roofing in the same day. Product must be kept dry at all times, both in storage and during application.

D. Mechanically fasten insulation boards to substrate at required spacing to comply with design loads.

E. Apply insulation boards parallel to roof perimeter edges.

F. Lay insulation boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

G. Keep insulation minimum 3 inches from heat emitting devices, and minimum 2 inches from sidewalls of Type A chimneys and Type B and L vents.

3.04 CLEAN UP

A. Properly clean up all materials and debris, sealants, etc. and leave project area in an acceptable condition.

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

A. Section 03300 – Cast-in-Place Concrete.

B. Section 07650 – Flexible Flashing.

C. Section 09400 – Terrazzo.

1.03 SUBMITTALS: Submit manufacturer's technical product data, installation instructions and recommendations for each product 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. Griffolyn ® Division, Reef Industries, Inc., 9209 Almeda Genoa Road, Houston, TX 77075. Tel: (800) 231-6074.
2. Grace Construction Products, 62 Whittermore Avenue, Cambridge, Ma 02140. Tel: (800) 444-6459.

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 VAPOR RETARDER: Membrane shall be a 12 mil polyolefin film meeting ASTM E-1745-97 Class B Test Method, equal to "Moistop Ultra".

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 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 barrier 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 or mastic 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 doubled in thickness and sealed as before specified for joints. 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 07412 ALUMINUM COMPOSITE PANEL SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES: The extent of the panel system is shown on the Drawings. Provide facia and soffit panels including perimeter extrusions, extruded stiffeners, gaskets, sealants, fasteners, related flashings, clip angles, furring and lightgage framing, sealants between wall panels and previously installed adjacent construction and other miscellaneous accessories required for a complete watertight and structurally sound, self-draining wall panel system with no water penetration.

1.02 SYSTEM DESCRIPTION

A. Performance Requirements: Work of the section shall conform to all applicable codes and regulations.

B. Design Criteria:

1. Make allowances for free and noiseless vertical and horizontal thermal movement due to the contraction and expansion of component parts, for an ambient temperature range of from 20 degrees F. to plus 150 degrees F. Buckling, opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to thermal movement of component parts will not be permitted. Fabricator, assembly and erection procedure shall take into account the ambient temperature range at the time of the respective operation.

2. Wind Loads: Assemblies herein specified shall be designed for flexural, shear and torsional stresses for the following positive and negative wind pressures acting normal to the plane of the assemblies. Design shall be based on Building Code with a 20 PSF Design Windload and allowances for elevation, corners and all upgrade areas.

3. Seismic Forces: Seismic lateral force requirements shall comply with Uniformed Building Code (UBC) and other applicable City, County, and State Codes and Regulations. The wall is to be designed to accommodate a floor structure displacement of 0.005 per inch of floor height, to satisfy the seismic loading requirements.

4. Pressure and Load:

a. Normal to the plane of the wall between supports, deflection of horizontal perimeter framing member shall not exceed 1/175 or span length or 3/4 inch, whichever is less.

b. At connection points of framing members to anchors, anchor deflection in any direction shall not exceed 1/16 inch. Where connection points are not clearly defined, maximum anchor deflection shall not exceed 1/16 inch.

c. Stresses must take into account interaction and in no case shall allowable values exceed the yield stress.

d. At 1.5 times design pressure, permanent deflections of framing members must not exceed 1/1000 of span length, and components must not experience failure or gross permanent distortion. At connection points of framing members to anchors, permanent set shall not exceed 1/16 inch.

e. Flatness Criteria: Maximum 1/32 inch in 2'-0" on panel in any direction for assembled units (non-accumulative).

5. General Approval: Panel manufacturer shall have in production a product having an SBCCI listing for use on non-combustible construction.

1.03 SUBMITTALS

A. Submit manufacturer's product data on all products including fasteners and sealants.

B. Submit installer qualifications including list of projects of similar size and scope of the work of this project, photographs of existing installations.

C. Submit 24 inch x 24 inch sample of panel system in specified finish complete with factory applied edge treatment, fabricated into units representative of the actual calculations.

D. Submit shop drawings showing location of panels in plan and elevation, profiles of panel units, details of forming, joint supports, anchorages, trim, flashing, furring and framing, sealants, accessories and details of weatherproofing at edge terminators. Drawings shall be stamped bu an engineer registered in the State of Mississippi.

E. Submit SBCCI listing and test report on product submitted.

F. Submit calculations for installed metal panel system indicating conformance with specifications stamped by an engineer registered in the State of Mississippi.

1.04 QUALITY ASSURANCE

A. Fabricator/installer shall assume responsibility for all components of the aluminum composite panel system. Fabricator/Installer shall have no less than five (5) years successful experience of metal panel work similar in scope and size to this project.

B. Installer's management and key personnel must have five (5) years experience and show three (3) projects successfully completed of similar magnitude and size using composite panels. Projects must have a record of successful in-service performance. The ability to secure men and equipment to do the job in a professional manner must be demonstrated.

C. Aluminum Composite Panel System: System furnished under this section shall have been tested by an independent testing laboratory. Test results shall meet or exceed the following:

1. Air Infiltration: When tested in accordance with ASTM E283-84, air infiltration at 6.4 psf must not exceed .1 cfm per square foot of wall area.

2. Water Infiltration: Water infiltration in this specification, is defined as the appearance of uncontrolled water in the wall. Provisions shall be made in the design to drain to the exterior face of the wall any leakage of water occurring at joints and/or condensation taking place within the construction. No water infiltration under static pressure with ASTM E331-83 at a differential static pressure of 6.24 psf, after 15 minutes.

3. Structural Performance: Shall be tested in accordance with ASTM E330-84 at design pressure. Deflection limitations are listed previously. After initial test, test at 150 percent of design pressure. No permanent deformation exceeding L/100 or failure to structural members allowed.

1.05 WARRANTY

A. Provide a five year warranty signed by both the manufacturer and installer. Include coverage for degradation of panel finish including color fading caused by exposure to weather, water tightness, integrity of seals, insulation and warpage.

PART 2 PRODUCTS

2.01 ACCPTABLE MANUFACTURERS

A. Drawings and Specifications are based on products manufactured by Alusuisse Composites, Inc. (formerly Alucobond Technologies, Inc.) 208 West 5th Street, Benton, Kentucky 42025. Tel. (270) 443-8471.

B. Subject to compliance with requirements, equivalent products by the following manufacturers are acceptable:

1. Mitsubishi Chemical America, Inc., 401 Volvo Pkwy., Chesapeake, VA 23320. Tel. (800) 422-7270.
2. Reynolds Metals Company, P.O. Box 27003, Richmond, VA 23261. Tel. (804) 281-3939.

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 MATERIALS

A. Aluminum Composite Panels equal to Alucobond 21 :

1. Thickness: 4 mm (0.157 inch)

B. Fire Performance:

1. ASTM E84-79 - Class A or I material having a maximum value of Flame Spread 15, Smoke Developed 40 when tested both as a composite panel and as the core element separately.

2. ASTM E162 - No surface flaming.

3. UBC 17-5 - No flame spread along interior face of penetration through the wall assembly.

C. Bond Integrity: When tested for bond integrity, in accordance with ASTM D1781-76 (simulating resistance to panel elimination), there shall be no adhesive failure of the bond: a) between the core and the skin nor, b) cohesive failure of the core itself below the following values:

1. Bond Strength: 861 psi (Vertical Pull) ASTMC – 297.

D. Peel Strength: 115N mm/mm (22.5 in lb/in) as manufactured

1. 115N mm/mm (22.5 in lb/in) after 8 hours in water at 200 degrees F.

2. 115N mm/mm (22.5 in lb/in) after 21 days soaking in water at 70 degrees Fahrenheit.

E. Finishes:

1. Coil coated KYNAR 500 or HYLAR 5000 based polyvinylidene fluoride (PVDF) resin in conformance with the following general requirements of AAMA 605.1-92.

2. Color: Refer to Section 09050 Color Design.

3. Coating Thickness: 1.0 mil (± 0.2 mil).

F. Hardness: ASTM D-3363; F minimum using Eagle Turquoise Pencil.

G. Impact: Test Method: ASTM D-2794: Gardner-SPI Modified Variable Height Impact Tester with 5/8 inch mandrel. Coating shall withstand reverse impact of 1/5 inch/pounds per mil substrate thickness. Coating shall adhere tightly to metal when subjected to number 6000 Scotch Tape pick-off test. Slight minute cracking permissible. No removal of film to substrate.

H. Adhesion: Test Method: ASTM D-3359. Coating shall not pick off when subjected to an 11 inch x 11 inch x 1/16 inch grid and taped with number 600 Scotch Tape.

I. Salt Spray Resistance: Test Method: ASTM B-117; expose coating system to 3000 hours, using 5 percent NAC1 solution. Corrosion creepage from scribe line: 1/16 inch max (1.6 mm). Minimum blister rating of 8 within the test specimen field.

J. Weather Exposure:

1. Outdoor: Five year exposure at 45 degree angle facing south Florida exposure. maximum color change of 5 Delta E units as calculated in accordance with ASTM D-2244. Maximum chalk rating of 8 in accordance with ASTM D-659. No checking, crazing, adhesion loss.

2. Accelerated Aging: ASTM D-822, 5000 hours in Atlas Type Weatherometer; using cycle of 102 minutes light and 18 minutes dimensioned light and demineralized water. No check, crazing, adhesion loss or objectionable color change or chalking.

K. Chemical Resistance: ASTM D-1308 utilizing 10 percent Muriatic Acid for an exposure of 15 minutes. ASTM D-1308 utilizing 20 percent Sulfuric Acid for an exposure time of 18 hours. No loss of adhesion or gloss and no color change.

2.03 ALUMINUM COMPOSITE PANELS

A. Stiffeners: Extruded aluminum sections secured to edge trim and bonded to rear face of aluminum composite panel with silicone, and of sufficient size and strength to maintain flatness of the panel within the specified tolerances. Stiffeners shall have a mill finish.

B. Sealant Systems: Sealants and gaskets within the panel system shall be per manufacturer's standards. Sealant color shall be similar to the panel finish.

C. Reveals at Panel: Joints shall be 1/2 inch to 3/4 inch wide nominal or as detailed on the drawings.

D. Fabrication flashing from .032 minimum thickness aluminum sheet where exposed to view finish to match adjacent panels. Provide lap strip under flashing at abutted conditions; with lapped surfaces sealed with a full-bed of non- hardening sealant.

2.04 FABRICATION

A. Fabricate panel units to dimensions indicated on the drawings based on an assumed design temperature of 70 degrees F. Allow for ambient temperature range of time of fabrication and erection.

B. Fabricate panels in sizes shown using composite aluminum panel material and perimeter extrusion so that the panel thickness at the joinery is 1-1/2 inch. Completed panel shall be properly fabricated and designed so that no restraints can be placed on the panel which might result in compressive skin stresses. The installation detailing shall be such that the installed panels shall remain flat due to temperature changes and at all times remain water and wind tight. Oil canning or oil pillowing of panel surface is not acceptable.

C. Where practical, shop fabricate units ready for erection. If not shop assembled, pre-fabricate components at the shop as required for proper and expeditious field assembly.

D. Design, fabricate, assemble and erect wall panel units, to be free of water leakage.

E. Provide stiffeners secure to rear face of panels mechanically retained to edge trim members, with spacing required by specific job wind loading.

PART 3 EXECUTION

3.01 DELIVERY AND STORAGE

A. Deliver fabricated units and component parts to site in manufacturer's unopened cartons.

B. Panels shall have strippable peel coating. Protect surfaces from damage during shipping and erection. Inspect work for damage upon delivery - no damaged work permitted on jobsite.

C. Coordinate with General Contractor and storage space indicated on the phasing plans.

3.02 PANEL PENETRATIONS

A. Penetrations, other than those shown on the architectural drawings, required by other trades shall be done either by the trade involved or as an add to this contract with the trade involved bearing the cost

3.03 INSPECTION

A. Examine supporting structure and conditions under which the work is to be erected, and notify the Contractor in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.04 INSTALLATION - ERECTION

A. Do not install component parts which are observed to be defective, including warped, bowed, dented, abraded and broken members.

B. Do not cut, trim, weld or braze component parts during erection, in a manner which would damage finish, decrease strength, or result in a visual imperfection or a failure in performance of wall panels. Return component parts which require alteration to shop for refabrication, if possible, or for replacement by new parts.

C. Metal Separation; Apply a coat of bituminous paint, concealed, on one or both surfaces wherever dissimilar metals would otherwise be in contact. Use gasketed fasteners where needed to eliminate the possibility of corrosive or electrolytic action between metals.

D. Install structural support system provided under this section. Align properly to receive wall system. Support system to be installed to the same tolerance as required of the panel system.

E. Anchor component parts of the metal wall securely in place, providing for necessary thermal structural movement.

F. No exposed fasteners except as shown on architectural drawings.

3.05 CLEANING AND PROTECTION

A. After installation of panels on a given elevation, any additional protection shall be the responsibility of the General Contractor. Deposit all trash from panel shipping crates in General Contractor's furnished debris boxes. Make sure weep holes and drainage channels are unobstructed and free of dirt and sealants. Remove protective film at time of panel installation. Touch up minor scratches.

END OF SECTION

SECTION 07545 THERMOPLASTIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES: Fully adhered roofing system utilizing a polyester reinforced, hot air welded thermoplastic KEE (Ketone Ethylene Ester) single ply membrane with a polyester felt backing, related accessories, miscellaneous flashing and attaching devices as indicated and / or required for a complete single ply roofing system.

1.02 RELATED SECTIONS: Refer to Section 06100 – Rough Carpentry for plywood deck and wood blocking. Refer to Section 07700 – Roof Specialties and Accessories for roof drains and roof drain outlet downspout nozzle.

1.03 SUBMITTALS

A. Prior to the start of any roofing work, the installer shall submit a list of materials he intends to furnish and installation specifications to be followed, along with the manufacturer's Project Approval Form. Any deviations from this specification or standard detail drawings shall also be submitted for review and approval.

B. Installer shall submit certification that the system proposed has been tested and has the minimum physical properties required. See Part 2 Products.

C. Before fabrication, delivery or installation of the Work, submit a letter of certification from the manufacturer accepting or approving the roofing installer who will perform work under this specification.

1.04 QUALITY ASSURANCE

A. Manufacturer: Company specializing in single ply roofing Products with 10 years minimum experience.

B. Installer: Company specializing in installation of single ply roofing systems, 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. Submit identification of at least 3 projects of similar scope and complexity along with name, address, and telephone number of the Architect, Owner and General Contractor.

C. Upon completion, the roofing system shall be inspected by the manufacturer's Technical Representative to verify that the system has been installed according to specifications and details.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials with manufacturer's labels intact and legible.

B. Upon receipt of materials, installer shall examine the shipment for damage and completeness.

C. Store roofing insulation, membrane and all other moisture sensitive materials indoors, or on raised platforms covered with suitable waterproof protective covering. All sealants and adhesives shall be stored to maintain a minimum temperature of 45 degrees.

1.06 WARRANTY: Manufacturer shall provide a written warranty, covering weather tightness of the roofing system and agreeing to replace or repair defective materials and workmanship, for a period of 15 years from the date of Maintenance Release.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Drawings and Specifications are based on products manufactured by Flex Membrane International, Inc., Bethlehem Drive, Morgantown, PA 19543. Tel: (800) 969-0108.

B. Equivalent products by the following manufacturers are acceptable:

1. Ecology Roof Systems, Inc., Santa Ana, CA, Tel. (800) 553-3833.
2. MPV Enterprises, LLC., Saint Louis, MO, Tel. (877) 621-3384.
3. Seaman Corp, Fibertite Div., Wooster, OH, Tel. (800) 927-8578.

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 MEMBRANE

A. Field and flashing membranes shall be equal to Flex's FB Elvaloy® adhered flexible sheet roofing system and have the following minimum physical properties:

PROPERTY	TEST PROCEDURE	PHYSICAL PROPERTIES
Color		White or Off White
Thickness	ASTM D751	0.045" Nominal
Breaking Strength	ASTM D751	235 lbs.
Elongation	ASTM D751	> 100%
Shore "A" Hardness	ASTM D2240	83
Heat Aging	ASTM D0573	90% of Original
Cold Resistance	ASTM D2136	-40 Degrees F
Water Vapor Permeability	ASTM E96	3,5g/m2/day
Wt. Change After Immersion	ASTM D570	1.5% Maximum
Seam Strength	ASTM D751	80% of Sheet
Dimensional Stability	ASTM D1240	0.5%
Accel. Weathering (Xenon Arc)	ASTM D2565	10M Hours (No Change)
Underwriters Laboratories		UL Class A
Factory Mutual		FM Class I-90

B. Membrane Sizes:

1. Full Width Sheets – 60 inches wide by 81 feet long or Custom Length.
2. MF Flashing – 30 inches wide by 60 feet long.
3. Trim Strips – 6 inches wide by 60 feet long.

2.03 ADHESIVE AND ACCESSORY MATERIALS

A. Substrate Adhesive: As provided by manufacturer to adhere field membrane to acceptable substrates. Approximate application rate for bonding the membranes are 1 1/2 to 2 gallons per roofing square.

B. Accessories: Manufacturer's standard accessories shall be used to form a complete roofing system. Only those accessories that are supplied or otherwise approved by manufacturer are acceptable. Accessories include, but are not limited to, the following:

1. Fasteners
2. Plates
3. Termination Bars
4. Trim and Flashing
5. Flashing Adhesive
6. Coated Metal
7. Pre-Formed Flashings – boots for pipe penetrations, inside & outside corners
8. Pipe Banding
9. Caulk

2.04 INSULATION

A. General Requirements as follows:

1. Insulation shall be Factory Mutual Class 1, I-90 Approved.
2. Insulation shall meet applicable code requirements.
3. Insulation shall be approved by insulation manufacturer for use in fully adhered roofing installations of the nature specified herein.
4. Insulation shall be compatible with Membrane and adhesive.
5. Insulation board size and thickness shall be as listed in the most current Factory Mutual Approval Guide.

B. Approved Insulation Type: Polyisocyanurate meeting the requirements of ASTM C1289, Standard Specification for Faced Rigid Cellular Polyiscocyanurate Thermal Insulation Board. Thickness shall be 1.5 inches minimum. Taper shall be 1/8 inch per foot.

C. Mechanical Attachment: Per manufacturer's recommendations using only Flex approved fasteners and plates.

2.05 UNDELAYMENT: Equal to G-P Gypsum Corp. 1/4" Dens-Deck Roof Board. Securely bond to the rigid insulation per manufacturer's recommendations.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine roof framing to ensure proper attachment to framing.

B. Inspect roof structure to verify deck is clean, dry and smooth with no excessive surface roughness, free of depressions, waves or projections, properly sloped to valleys or eaves.

C. Verify roof openings, curbs, pipes, sleeves, ducts or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.

D. Installer shall examine substrate and conditions under which Work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with installation until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION OF WOOD NAILERS AND BLOCKING: Install using methods recommended by manufacturer in accordance with local building code.

A. Nailers shall be anchored to resist a minimum force of 175 pounds per lineal foot in any direction. Fastener spacing shall be a maximum of 3 feet on center. Fasteners shall be installed within 6 inches of each end. Spacing and fastener embedment shall conform to Factory Mutual Loss Prevention Data Sheet 1-49.

B. Thickness shall be as required to match substrate or insulation height, with a maximum allowable variance of plus or minus 1/4 inch.

3.03 INSTALLATION OF INSULATION

A. Accomplish installation of insulation and roofing so that area covered will be completely watertight by the end of each workday.

B. The insulation shall be laid out with its longest dimension perpendicular to the long membrane direction. All end joints shall be staggered with no gaps greater than 1/4 inch.

C. Insulation shall be neatly cut to fit snugly around penetrations and projections.

D. Insulation shall be mechanically attached to deck in accordance with manufacturer's recommendations.

3.04 INSTALLATION OF MEMBRANE

A. Flex FB Elvaloy® rolls shall be placed in the maximum length possible. Position sheets as indicated on approved shop drawings.

B. Lap joints shall be done by lapping 2-inch selvedge edge over the non-selvedge edge of the previous roll. Roll ends shall be butted and capped with Flex 6 inch wide Trim Strip.

C. When bonding the membrane to the Dens-Deck underlayment the field sheet shall be firmly broomed into the manufacture's substrate adhesive and then rolled with a heavy roller (minimum 200 pounds) to proper adhesion.

D. Joints shall be made by the method of the hot-air welding tool.

E. All joints shall be checked with a needle probe and voids repaired with the hot-air welding tool the same day they are made.

3.05 CLEANING: Clean exposed surfaces, removing substances that may cause corrosion of metal or deterioration of the membrane.

3.06 PROTECTION: Installer shall advise Contractor of required procedures for surveillance and protection of flashings, sheet metal work, membrane and accessories during construction, to ensure that Work will be without damage or deterioration until acceptance by the Owner.

END OF SECTION

SECTION 07600 FLASHING AND SHEET METAL

PART 1 GENERAL

1.01 SECTION INCLUDES: Flashing and sheet metal work as indicated on the Drawings and provisions of this specification. The types of work include the following:

A. Metal flashing and counter flashing.

B. Special fabrication.

1.02 RELATED SECTIONS

A. Section 07545 – Thermoplastic Membrane Roofing.

B. Section 07700 – Roof Specialties and Accessories.

C. Section 09050 – Color Design.

1.03 REFERENCES

A. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), “Architectural Sheet Metal Manual”.

B. American Society for Testing and Materials (ASTM).

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's product data, technical specifications, installation instructions and general recommendations for each specified sheet material and fabricated product for MDOT Architect’s approval.

B. Shop Drawings: Submit shop drawings showing layout, joining, profiles, and anchorage of fabricated work, including major counter flashing and expansion joint systems, and roof accessories; layouts at l/4 inch scale, details at 3 inch scale.

C. Samples: Submit 3 samples, eight inch square, of specified sheet materials to be exposed as finished surfaces. Submit 3 twelve inches long, completely finished units of specified factory-fabricated products exposed as finished work. Submit 3 color charts of manufacturer’s complete line of standard colors available.

D. QUALIFICATION DATA: Submit 3 copies for firms and persons that demonstrate capabilities and experience. Include a list with ten completed Project names and addresses, and name and addresses of Architects and Owners.

1.05 PROJECT CONDITIONS: Coordinate with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of the work and protection of materials and finishes.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer, with 5 years minimum experience, who has completed sheet metal work similar to that indicated for this project and with a record of successful in- service performance.

B. Sheet Metal Flashing and Trim standard: Comply with SMACNA "Architectural Sheet Metal Manual". Conform to dimensions and profiles shown unless more stringent requirements are indicated.

C. Products: Obtain products for each type of flashing from one source.

D. Mock-Up: Prior to installing, construct mock-up to demonstrate aesthetic effects as well as qualities of materials and execution.

PART 2 PRODUCTS

2.01 FLASHING AND SHEET METAL MATERIALS: Shall be 24 gauge, G-90 Galvanized Steel, conforming to ASTM A 775 and ASTM A 755M, Z 275, fabricated in accordance with SMACNA standards to sizes and profiles shown on the drawings. Pre-finished steel, colors as selected, Kynar 500 (70% PVDF), 20 year coating. Equal to Petersen Aluminum Corp., Tel. (800) 722-2523. Use galvanized finish where concealed from view only.

2.02 SPECIAL FABRICATIONS: Fabricate galvanized steel blank off panels for louvers at locations indicated on the Drawings. Panels shall be formed to fit over inside of louvers and mechanically fastened to construction. Seal all edges and seams. Paint face of blank off panel exposed to view flat black.

2.03 MISCELLANEOUS MATERIALS

A. Provide sheet metal clips, cleats, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, fabricated of non-corrosive material and of size and gauge required for proper performance.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads. Fasteners shall be same metal as flashing / sheet metal or, other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.

1. Nails for Copper Sheet: 0.109 inch minimum and not less than 7/8 inch long copper or hardware bronze, barbed with large head.

2. Exposed Fasteners: Heads matching color of sheet metal by means of plastic cap or factory-applied coating.

3. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex head washers.

4. Blind Fasteners: High-strength aluminum or stainless steel rivets.

5. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

C. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.

D. Solder for Lead-Coated Copper: ASTM B 32, Grade Sn60, 60 percent tin and 40 percent lead.

E. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux type recommended by stainless steel sheet manufacturer.

F. Solder for Zinc-Tin Alloy-Coated Stainless Steel: ASTM B 32, 100 percent tin.

G. Solder for Lead: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.

H. Solder for Zinc: ASTM B 32, 60 percent lead and 40 percent tin with low antimony, as required by manufacturer.

I. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

J. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classification required to seal joints in sheet metal flashing and trim and remain watertight.

PART 3 EXECUTION

3.01 INSTALLATION REQUIREMENTS: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, and with SMACNA "Architectural Sheet Metal Manual". Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible and set units true to line and level as indicated. Install all sill and head flashing with concealed end dams properly laped and sealed as to prevent water intrusion around ends of flashing. Install work with laps, joints and seams which will be permanently watertight and weatherproof.

3.02 ACCESSORIES INSTALLATION

A. Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and with vapor barriers, roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.

B. Separate metal from incompatible metal or corrosive substrates by coating concealed surfaces with asphalt mastic as recommended by manufacturer.

3.03 FLASHINGS FOR MASONRY: Install in accordance with installation specifications in Division 4 sections and with manufacturers instructions with applicable materials approved by the manufacturer for the specific installation shown. Refer to Section 07650 – Flexible Flashing.

3.04 CLEANING: Clean exposed metal surfaces, removing substances, which might cause corrosion of metal or deterioration of finishes.

3.05 PROTECTION

A. Protection: Installer shall advise Contractor of required procedures for surveillance and protection of flashings, sheet metal work, and accessories during construction, to ensure that work will be without damage or deterioration, other than natural weathering, at time of substantial completion.

B. Flashings and sheet metal with any cuts, abrasions, or imperfections will not be acceptable and is to be replaced.

END OF SECTION

SECTION 07610 SHEET METAL ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES: Factory formed, prefinished standing seam metal roof panels with concealed fasteners and related accessories, valleys, hips, ridges, eaves, corners, rakes, miscellaneous flashing and attaching devices as shown and / or required for a complete metal roofing system.

1.02 RELATED SECTIONS: Section 09050 – Color Design.

A. Section 07220 – Sloped Roof Deck Insulation.

B. Section o7700 – Roof Specialties and Accessories

C. Section 09050 – Color Design.

1.03 REFERENCES

A. ASTM A-525 General Requirements for Steel Sheet, Zinc-Coated (Galvanized)

B. ASTM A-653 Steel Sheet, Zinc-Coated (Galvanized) by Hot Dip Process, Structural Physical Quality.

C. ASTM E-1646: Static Water Infiltration

D. ASTM E-1680: Static Air Infiltration

E. Spec Data Sheet - Galvalume Sheet Metal by Bethlehem Corp.

F. SMACNA - Architectural Sheet Metal Manual

G. UL 90 Rating: Wind Uplift Approval Conforming to Underwriters Lab. (UL) Section 580 Specifications.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for each type of roofing material and accessory required.

B. SHOP Drawings: Submit detailed drawings showing layout of panels, anchoring details, joint details, trim, flashing, and accessories. Show details of weatherproofing terminations, and penetrations of metal work. Indicate material type, Thickness, finish and color.

C. 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 the factory finish and color as specified.

D. Submit results indicating compliance with minimum requirements of the Water Infiltration - ASTM E-1646 performance tests.

E. Submit sample copies of the Paint Finish Guarantee and Weather Tightness Warranty prior to installation for MDOT Architect’s approval.

F. Submit materials and fasteners design to comply with wind uplift requirements of: 100 mile per hour winds with added importance factor of 1.5 with exposure C.

1.05 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. Submit identification of at least 3 projects of similar scope and complexity along with name, address, and telephone number of the Architect, Owner and General Contractor.

1.06 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 shall 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.

1.07 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).

B. Weather Tightness: The entire installation (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 / 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 products manufactured by Petersen Aluminum Corp., 1005 Tonne Road, Elk Grove Village, IL 60007. Tel: (800) 323-1960.

B. Equivalent products by the following manufacturers are acceptable:

1. Architectural Building Components, P.O. Box 52488, Houston, TX 77086. Tel: (800) 423-1105.
2. CENTRIA Roof Systems, 1005 Beaver Grade Road, Moon Township, PA 15108. Tel: (800) 759-7474.
3. Copper Sales, Inc., 1001 Lund Blvd., Anoka, MN 55303, Tel: (800) 426-7737.
4. Englert, Inc., 1200 Amboy Ave., Perth Amboy, NJ 08862 Tel: (732) 826-8614.
5. MBCI, 300 Highway 51 North, Hernando, MS 38632, Tel: (800) 206-6224.

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 SHEET MATERIALS

A. Materials: Sheet Steel shall be PAC-CLAD 24 gage G-90 Galvanized ASTM A 653, or (24 gage prefinished Galvalume ASTM 792 Grade 50B with an AZ-50 coating).

B. Finish: Finish shall be full strength (70% PVDF) Kynar 500 Fluorocarbon coating applied by the manufacturer on a continuous coil coating line. Top side dry film thickness of 0.70 to 0.90 mil over 0.25 to 0.35 mil prime coat, to provide a total dry film thickness of 0.95 to 1.25 mil. Bottom side shall be coated with primer with a dry film thickness of 0.25 mil. Finish shall conform to all tests for adhesion, flexibility, and longevity as specified by the finish supplier.

C. Color: Shall be as indicated in Section 09050 for color selection. Color design selected from standard colors of Peterson Aluminum. Substituted systems, if submitted, shall match selected color.

D. Film: Strippable film shall be applied to the top side of the painted coil to protect the finish during fabrication, shipping and field handling. This strippable film shall be removed before installation.

2.03 ACCESSORY MATERIALS

A. Concealed fastening clips: G-90 Galvanized steel, spaced 18-inches on center, minimum, as required by design wind loads.

B. Fasteners: 1-inch # 10 pancake head wood screw with a # 2 Phillips head size. Minimum 2 fasteners per clip.

C. Sealant: Extruded vinyl weatherseal

D. Roofing Felt: 30-pound asphalt saturated un-perforated organic felt, complying with ASTM D226, Type II.

E. Leak Barriers: Peel and Stick Membrane shall be installed at valley, ridge, hip and eave areas. Membrane shall be equal to Certainteed Wintergard, Grace Ice and Watershield, Henry Perma-Seal PE, Owen-Corning Deck-Dri, or Tamko Moisture Guard.

2.04 FABRICATION

A. Panels, 40 feet and less, shall be in one continuous length.

B. Panels fabricated by a portable roll former will require Architects prior approval.

C. All exposed adjacent flashing and accessories shall be of the same material and finish as the roof panels. All flashing, hem exposed edges on underside 1/2 inch. Fabricate in accordance with standard SMACNA procedures and details.

2.05 PREFORMED METAL ROOFING SYSTEM: Equal to Petersen Aluminum Corp. SNAP-CLAD panel system.

A. System shall include, but is not limited to the following components:

1. Standing Seam Metal Roof Panels with Striations.
2. Preformed Metal Valley Flashing.
3. Preformed Metal Hip Flashing.
4. Concealed fastening clips and fasteners.
5. Miscellaneous Metal Trim Necessary for a Complete System Installation.

B. SNAP-CLAD roof panels with striations shall have 16 inches on center seam spacing, roll-formed in continuous lengths from eave to ridge, with a minimum standing seam height of 1-3/4 inches.

C. Certification shall be submitted, based on independent testing laboratory, indicating no measurable water penetration or air leakage through the system when tested in accordance with ASTM E-1646 and ASTM E-1680.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine metal trusses to ensure proper attachment to framing.

B. Inspect roof structure to verify deck is clean and smooth, free of depressions, waves or projections, properly sloped to valleys or eaves.

C. Verify roof openings, curbs, pipes, sleeves, ducts or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.

D. Installer shall examine substrate and conditions under which Work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with installation until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION OF UNDERLAYMENTS: Install using methods recommended by manufacturer in accordance with local building code.

A. Eaves: Install Peel and Stick Membrane up the slope from eave edge a full 36 inches or 24 inches minimum beyond the interior “warm wall”; lap ends 6 inches and bond.

B. Valleys: Install Peel and Stick Membrane a minimum of 36 inches wide centered on valley; lap ends 6 inches minimum and seal.

C. Ridge / Hip: Install Peel and Stick Membrane a minimum of 36 inches wide centered on ridge / hip; lap ends 6 inches minimum and seal.

D. Roofing Felt: Install one layer of 30-lb. roofing felt lapped, staggered, and applied horizontally from eave to ridge over rigid insulation / deck board. Run sheets horizontally lapped so water sheds; nail in place. Lap horizontal edges 2 inches minimum and 2 inches minimum over Peel and Stick Membrane. Lap ends 4 inches minimum; stagger end laps of each layer 36 inches minimum. Lap underlayment over valley protection 6 inches minimum. Repair or replace any torn felt to maintain a continuous membrane ahead of installation of metal roofing.

E. Vent Pipes: At vent pipes, install a 24 inch minimum square piece of Peel and Stick Membrane lapping over roof deck underlayment; seal tightly to pipe.

F. Metal Drip Edge: At rake edges, install metal drip edge flashing over Peel and Stick Membrane and roof deck underlayment; set tight to rake boards; lap joints 2 inches minimum and seal with plastic cement; secure with nails.

3.03 INSTALLATION OF PANELS

A. Comply with Drawings, manufacturer’s instructions, and conform to standards set forth in the Architectural Sheet Metal Manual published by SMACNA, in order to achieve a 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 boards.

I. Protect installed roof panels and trim from damage caused by adjacent construction until completion of installation.

J. Thoroughly clean and touch-up any areas scarred during installation with a touch-up paint approved by panel manufacturer. Only minor scratches and fastener heads shall be touched-up; any other damaged material shall be replaced.

3.04 CLEANING

A. Clean any grease, finger marks, or stains from the panels per manufacturer's recommendations.

B. Remove all scrap and construction debris from the site.

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 exterior door and window heads and sills, brick ledges, copings at masonry walls, 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 Almeda 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 07700 ROOF SPECIALTIES AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal copings, fascia, drip edges and trim.

B. Gutters.

C. Downspouts.

D. Downspout Nozzles.

E. Roof Drains.

1.02 RELATED SECTIONS

A. Section 06100 – Rough Carpentry.

B. Section 07412 – Aluminum Composite Panel system.

C. Section 07545 – Thermoplastic Membrane Roofing.

D. Section 07600 – Flashing and Sheet metal.

E. Section 07610 – Sheet Metal Roofing.

F. Section 10534 – Translucent Canopies and Walkway Covers.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data, installation instructions and recommendations for each product specified.

B. Shop Drawings: Submit shop drawings showing layout, joining, profiles and anchorage as it pertains to this project; layouts at 1/4 inch scale, details at 3 inch scale.

C. Submit two 12 inches long, completely finished units of specified factory-fabricated products exposed as finish work.

D. Submit installers qualifications and experience record.

1.04 QUALITY ASSURANCE: Installer / subcontractor shall have a minimum of 5 years experience in the installation of products specified in this Section and shall have completed projects of similar size and scope of work of this Project.

1.05 COORDINATION: Coordinate work of this Section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of the work and protection of materials and finishes.

PART 2 PRODUCTS

2.01 METAL COPINGS, FASCIA, DRIP EDGES AND TRIM

A. Unless otherwise indicated, metal flashing, coping, fascia, drip edges and trim shall be fabricated from 24 gauge commercial quality galvanized steel, cold-rolled, conforming to ASTM A 775, G-90 (ASTM A 755M, Z 275), and shall be shop fabricated with high performance fluoropolymer coating, not less than 0.0336 thick.

B. Exposed flashing, sheet metal and fabricated materials shall have Kynar 500 (70% PVDF) finish or approved equal. Finish shall match adjacent metal surfaces. Fascia trim at outside edge of eave shall match color and finish of adjacent Aluminum Composite Panel System. Flashing at Translucent Canopies shall match metal canopy components finish and color.

C. Products shall be equal to:

1. MM Systems Corporation, 4520 Elmdale Drive, Tucker, GA. Tel. (800) 241-3640.
2. Petersen Aluminum Corp., 1005 Tonne Road, Elk Grove Village, IL 60007. Tel: (800) 323-1960.
3. Reynolds Metals Company, P.O. Box 27003, Richmond, VA 23261. Tel. (804) 281-3939.

D. Equal products by other manufacturers subject to compliance with specified requirements and Section 01630 - Product Options and Substitution Procedures.

E. Fabricate pieces in accordance with SMACNA standards to sizes and profiles shown on the Drawings.

F. Furnish all components, anchoring devices, splices, etc. necessary for a complete system.

2.02 GUTTERS

A. Gutters shall be not less than 24 ounce per square foot copper, built in gutter liner.

B. Copper: ASTM B 370; temper H00, cold rolled copper sheet, except where temper 060 is required for forming.

C. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, non-perforated, not weighing less than 30 pounds per 100 square feet.

D. Slip Sheet: Rosin-sized paper, minimum 5 pounds per 100 square foot.

E. Solder: Provide 50-50 tin / lead solder (ASTM B 32) with rosin flux.

F. Fasteners and Cleats: Non-corrosive metal as recommended by sheet metal manufacturer.

G. Metal Accessories: Provide clips, straps, anchoring devices, and similar accessory units as required for complete installation of work, non-corrosive, size and gauge required for successful performance.

H. Bituminous Coating: SSPC – Paint 12, solvent-type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.

I. Fabricate pieces in accordance with SMACNA (Sheet Metal and Air Conditioning Contractor's National Association, Inc., 703-803-2980) and CDA (Copper Development Association, Inc., 800-232-3282) standards to sizes and profiles as shown on the Drawings.

J. Furnish all components, anchoring devices, splices, etc. necessary for a complete system.

2.03 DOWNSPOUTS: Ten inches diameter X 1/4 inch wall thickness steel mechanical tubing with all joints continuously welded and ground smooth. All support plates and brackets shall be fully welded and ground smooth. All pipe, bolts, and plates for complete downspout construction shall be galvanized. Fabricate entire downspout assembly and shop paint prior to installation.

2.04 DOWNSPOUT NOZZLES: Provide downspout nozzle with all necessary components for successful installation equal to Zurn ZANB-SS-199 Downspout Nozzle, 4 inches pipe size, all nickel bronze body, stainless screen, threaded inlet 4IP, and decorative face of wall flange and outlet nozzle.

2.05 ROOF DRAINS: Provide a complete roof drain unit with all necessary components for successful installation equal to Zurn ZA-125 8 inches roof drain, DuraCoated cast iron body with combination flashing clamp/gravel guard and low silhouette aluminum dome, with 4 inches pipe, inside caulk outlet type 4IC.

PART 3 EXECUTION

3.01 GENERAL INSTALLATION

A. Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, and with SMACNA " Architectural Sheet Metal Manual".

B. Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible and set units true to line and level as indicated. Install Work with laps, joints and seams that will be permanently weathertight and waterproof.

3.02 ACCESSORIES INSTALLATION

A. Comply with manufacturer's instructions and recommendations.

B. Coordinate with installation of roof deck and other substrates to receive accessory units. And with vapor barriers, roof insulation, roofing and flashing; as required to ensure that each element of the Work performs properly, and that combined elements are weathertight and waterproof. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.

3.03 COPPER GUTTER INSTALLATION

A. Comply with manufacturer's installation requirements and recommendations, and with SMACNA "Architectural Sheet Metal Manual" and with CDA "Copper in Architecture Handbook".

B. Shop fabricate work to the greatest extent possible. Shop fabricate all corner units and splicing materials.

C. Anchor units of work securely in place by methods indicated, providing for thermal expansion of units; conceal fasteners where possible. Install with laps, joints, and seams that will be permanently watertight and weatherproof.

D. Wood subsurface shall be dry and free of projections before installation of copper.

E. The surface to receive the copper gutter shall be covered with a saturated roofing felt. Over the felt and directly under the copper, install slip paper to prevent bonding between the roofing felt and the copper.

F. The copper lining shall conform closely to the gutter profile.

G. The bottom of the wood frame shall be pitched to provide positive drainage to downspouts.

H. The inner edge of the lining shall be two inches minimum above the outside edge of the fascia trim.

I. All seams shall be locked, riveted, and soldered seam type.

J. Bed flanges in a thick coat of bituminous roofing cement where required for waterproof performance.

K. Copper lining shall be constructed of sheets 10 feet maximum in length without longitudinal seams. The ends of the sheets shall be pre-tinned 1-1/2 inches. Adjacent sheets are joined by locked, riveted, and soldered seams.

L. Expansion joints shall be placed at mid points between downspouts to accommodate thermal movement of the gutter lining.

M. Separations: Provide for separation of metal from non-combustible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer / fabricator.

N. Clearance between gutter outlet and downspout is 1/2 inch clear.

O. Install counterflashing by snap-in seal arrangement as indicated.

P. Nail flanges of expansion joint units to curb nailers, at maximum spacing of 6 inches on center.

3.04 CLEANING: Clean exposed surfaces, removing substances that may cause corrosion of metal or deterioration of finishes.

3.05 PROTECTION: Installer shall advise Contractor of required procedures for surveillance and protection of flashings, sheet metal work, and accessories during construction, to ensure that Work will be without damage or deterioration , other than natural weathering, until acceptance by the Owner.

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., P.O. Box 21148, Tulsa, OK 74121, Tel. (800) 879-8000.
2. International Protective Coatings Corp, 1330 Industry Road, Hatfield, PA 19440, Tel. (800) 334-8796.
3. 3M Fire Protection Products, P.O. Box 33225, Saint Paul, MN 55144, Tel. (800) 328-1687.
4. United States Gypsum Company, 125 S. Franklin Street, Chicago, IL 60606, 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 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, P.O. Box 994, Midland, MI 48686. Tel: (800) 322-8723
2. GE Silicones, Hudson River Rd. Building 25-73, Waterford, NY 12188. Tel: (518) 233-2639.
3. Sonneborn Building Products, 889 Valley Park Drive, Shakopee, MN 55379. Tel: (800) 433-9517.
4. Tremco, Inc., 3735 Green Road, Beachwood, OH 44122. 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 walk / floor 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 at masonry, and other materials: Pecora 864 (one-part Architectural Silicone Sealant). Color(s) to be selected by the Project 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: 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.

3.05 CURE AND PROTECTION: 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. 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. 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.

G. Section 16640 – Security Systems.

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, and glazing.

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, and glazing beads.

1.05 PRODUCT IDENTIFICATION: 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. Local Supplier is Glen Lewis with Thrasher Architectural Products Tel. (601) 981-9611

B. Equivalent products by the following manufacturers are acceptable:

1. Amweld Building Products, Inc., P.O. Box 267, Garrettsville, OH 44231. Tel. (330) 527-4385.
2. Ceco Door Products, 750 Old Hickory Blvd. Building 1, Suite 150, Brentwood, TN 37027. Tel. (615) 661-5030.
3. Republic Builders Products, 155 Republic Drive, McKenzie, TN 38201. Tel. (901) 352-3383.

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 FABRICATION: 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.

A. 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".

B. Locate finish hardware in accordance with approved shop drawings.

2.03 FRAMES: 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.

A. 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 on 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.

B. 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: 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 be18 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.

A. 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.

B. 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.

C. 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.

D. 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.

E. 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.

F. 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.

G. 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.

H. 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.

I. Flatness: Doors shall maintain a flatness tolerance of 1/16 inch maximum in any direction, including a diagonal direction.

2.05 HOLLOW METAL PANELS: 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.

5. All lead-lined doors or doors over 7’-0” tall shall receive two pair of hinges per leaf or continuous 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(J) 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. Louvers for wood doors, including furnishing and installation, are specified under this Section.

B. Types of doors required include solid core flush wood doors with veneer faces.

1.02 RELATED SECTIONS

A. Section 08710 – Door Hardware

B. Section 08800 – Glazing.

C. Section 09050 – Color Design.

D. Section 16640 – Security Systems.

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.

C. Samples: Provide two 8” x 8” minimum samples of factory finish in stain and species selected.

1.04 QUALITY ASSURANCE: Comply with the requirements of the following standards unless otherwise indicated.

A. Non-Fire Rated Wood Doors: AWI “Architectural Flush Doors” of the Architectural Woodwork Institute.

B. Fire-Rated Wood Doors: Where fire-resistance classifications are shown or scheduled for wood door assemblies, provide doors which comply with requirements of NFPA No. 80 "Standard for Fire Doors and Windows" and which have been tested and rated with single point hardware by UL. Provide UL Label on each door and panel.

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., PO Box 1647, Mason City, IA. Tel (641) 423-2444. Local Supplier is Glen Lewis with Thrasher Architectural Products Tel. (601) 981-9611

B. Equivalent products by the following manufacturers are acceptable:

1. Algoma Hardwoods, Inc., 1001 Perry Street, Algoma, WI 54201
   Tel. (920) 487-5221.
2. Buell Door Co., PO Box 97755, Dallas, TX 75397. Tel. (800) 556-0155.
3. Weyerhaeuser Architectural Doors, P.O. Box 7780, Marshfield, WI 54449.
   Tel. (715) 384-2141.

C. Substitutions shall fully comply with specified requirements and 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 7th Edition Version 1.2 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.

B. Fire-rated Doors: Provide exposed faces and edges to match non-fire-rated doors in the same area of the building, unless otherwise shown or scheduled. Provide trim for openings (if any) which have been tested and listed for the kind of door and rating indicated.

C. Wood Louvers: Door manufacturer's standard solid wood louvers of same species as face veneers, unless otherwise specified and of the size, type and profile shown.

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 7th Edition Version 1.2 of the following quality:

1. Custom Grade “A” face veneers of Plain Sliced Select Cherry.

2. Sharp contrast of shades shall **not** be permitted at veneer joints. Provide exposed edges and other exposed solid wood components of same species as face veneers.

C. Factory Finished Doors: Provide factory finishes complying with AWI finish standards after door is completed, including preparation of precision hardware. Finishes shall be applied in a dust-free, humidified environment. Reference AWI Section 1300, G-21 and Section 09050 Color Schedule.

D. Transom and Side Panels: Where transom panels or side panels of wood are shown in same framing systems as wood doors, provide panels that match quality and appearance of associated wood doors, unless otherwise indicated. Fabricate matching panels with same construction, exposed surfaces and finish as specified for associated doors.

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. Install fire-rated doors in corresponding fire-rated frames in accordance with the requirements of NFPA No. 80.

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.

1. For non-fire rated doors, provide following clearances:

a. 1/8 inch at jambs and heads.
b. 1/8 inch at meeting stiles for pairs of doors.
c. 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.

2. For fire-rated doors, provide clearances complying with limitations of authority having jurisdiction.

3.04 ADJUSTING AND CLEANING: 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.

B. Doors damaged before acceptance of the Work shall be repaired or replaced.

END OF SECTION

SECTION 08305 ACCESS DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES: Floor access doors as indicated on the Drawings including indications of sizes and locations.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for required products, including setting drawings, templates, instructions and directions for installation of anchoring devices, and compliance with fire ratings specified where applicable.

B. Shop Drawings: Submit Shop Drawings for the fabrication and installation of customized access doors and frames, including details of each frame type, elevation of door design types, anchorage and accessory items.

1.04 QUALITY ASSURANCE

A. Provide access door as manufactured by a company that has been in business for a minimum of five years and can provide all the certificates and fire rating information required.

B. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units which may vary slightly from size indicated.

C. Coordination: Furnish inserts and anchoring devices which must be built into other work for installation of access doors. Coordinate with other work to avoid delay.

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 construction operations

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Drawings and Specifications are based on products manufactured by The Bilco Company, P.O. Box 1203, New Haven, CT 06505. Tel. (203) 934-6363.

B. Equivalent products by the following manufacturers are acceptable:

1. Milcor, Inc., 1225 Corporate Drive, Suite B, Holland, OH 43528 Tel. (800) 528-1411.
2. Nystrom Building Products, 1701 Madison Street NE, Minneapolis, MN 55414. Tel. (800) 469-7876.

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures

2.02 MATERIALS AND FABRICATION: Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.

A. Access Door: Provide single leaf aluminum access floor door equal to Model T-1, 2'-0" by 2'-0", as manufactured by The Bilco Company.

B. Locking Devices: Furnish flush lock to hold door in flush, smooth plane when closed.

PART 3 EXECUTION

3.01 EXAMINATION: Installer shall examine areas and conditions under which access doors are to be installed and must notify the Project Engineer and the Contractor in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 PREPARATION: Coordinate setting drawings, diagrams, templates, instructions and directions for installation of anchorage. Coordinate delivery of such items to Project Site.

3.03 INSTALLATION

A. Comply with manufacturer's instructions for installation of floor access doors.

B. Coordinate installation with work of other trades. Building in of anchors and grouting of frames in included in other Sections of these Specifications.

C. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent surfaces.

3.04 ADJUSTING AND CLEANING: Adjust hardware and panels after installation for proper operation. Remove and replace panels or frames which are warped, bowed or otherwise damaged. Clean just prior to installation of floor covering.

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 REFERENCES

A. Coordinate with the following Sections for the installation of finish hardware:

1. Section 08100 – Metal Doors and Frames.
2. Section 08210 – Wood Doors.
3. Section 08415 – Aluminum Entrances and Storefronts.
4. Section 16640 – Security Systems.

1.03 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 Project 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 Project Architect for approval. Do not deliver hardware until approval is obtained.

1.04 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.

1.05 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 Architect. Furnish 3 change keys per lock and 6 masterkeys 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
Each Opening Shall Have:

2 – Each Cylinders	Corbin Russwin	1000/3000 CT7 626

(Balance of Hardware by Door Mfg.)

HW2
Each Opening Shall Have:

4 – Each Hinges	Hager	BB1279 4 1/2 X 4 1/2 X 652 (36” Leaf)
4 – Each Hinges	Hager	1250 4 1/2 X 4 1/2 X 652 (20” Leaf)
1 – Exit Device	Corbin Russwin	ED5600AL X N7N55 X 626 X CTT
2 – Auto Flushbolts	Trimco	3825 X 626
1 – Closer	Corbin Russwin	DC3210 X 689
1 – Kickplate	Trimco	8” X 2” LDW X 630 (MPS - 36” Leaf)
2 – Stops	Trimco	1270 Series X 626
1 – Co-ordinator	Trimco	3092 X 626
2 – Silencers		

HW3
Each Opening Shall Have:

8 – Each Hinges	Hager	BB1279 4 1/2 X 4 1/2 X 652
2 – Exit Devices	Corbin Russwin	ED5200A X N755 X 613 X CT7
1 – Rim Mullion	Corbin Russwin	707A
2 – Closers	Corbin Russwin	DC3210 X 689
2 – Kickplates	Trimco	8” X 2” LDW X 630 (Mounted push side)
2 – Stops	Trimco	1210/1270 Series X 626 (As required)
2 - Silencers		

HW4
Each Opening Shall Have:

3 – Each Hinges	Hager	BB1279 4 1/2 X 4 1/2 X 652
1 – Lockset	Corbin Russwin	ML2051 X NSM X 626
1 – Closer	Corbin Russwin	DC3210 X 689
1 – Kickplate	Trimco	8” X 2” LDW X 630 (Mounted push side)
1 – Stop	Trimco	1210/1270 Series X 626 (As required)
3 – Silencers		

HW5
Each Opening Shall Have:

3 – Each Hinges	Hager	BB1279 4 1/2 X 4 1/2 X 652
1 – Exit Device	Corbin Russwin	ED5200A X N755 X 626 X CT7
1 – Closer	Corbin Russwin	DC3210 X 689
1 – Kickplate	Trimco	8” X 2” LDW X 630 (Mounted push side)
1 – Stop	Trimco	1210/1270 Series X 626 (As required)
3 – Silencers		

HW6
Each Opening Shall Have:

3 – Each Hinges	Hager	BB1279 4 1/2 X 4 1/2 X 652
1 – Lockset	Corbin Russwin	ML2051 X 626 X CT7
1 – Stop	Trimco	1210/1270 Series X 626 (As required)
3 – Silencers		

HW7
Each Opening Shall Have:

3 – Each Hinges	Hager	BB1279 4 1/2 X 4 1/2 X 652
1 – Exit Device	Corbin Russwin	ED5200 X N755 X 626 X CT7
1 – Closer	Corbin Russwin	DC3210 X 689
1 – Kickplate	Trimco	8” X 2” LDW X 630 (Mounted push side)
1 – Stop	Trimco	1210/1270 Series X 626 (As required)
2 – Silencers		

HW8
Each Opening Shall Have:

3 – Each Hinges	Hager	BB1279 4 1/2 X 4 1/2 X 652
1 – Lockset	Corbin Russwin	DC3210 X 689
1 – Push Plate	Trimco	1001-3 X 630
1 – Pull Plate	Trimco	1015-3 X 630
1 – Kickplate	Trimco	8” X 2” LDW X 630 (Mounted push side)
1 – Mop Plate	Rockwood	6 X 1 LDW 0.050 X 613 (Mounted pull side)
1 – Stop	Trimco	1210/1270 Series X 626 (As required)
3 - Silencers		

HW9
Each Opening Shall Have:

6 –Each Hinges	Hager	BB1279 4 1/2 X 4 1/2 X 652
1 – Lockset	Corbin Russwin	ML2051 X NSM X 626 X CT7
2 – Flushbolts	Corbin Russwin	3913 X 626
2 – Stop	Trimco	1210/1270 Series X 626 (As required)
2 – Silencers		

HW10
Each Opening Shall Have:

3 – Each Hinges	Hager	BB1279 4 1/2 X 4 1/2 X 652
1 – Passage	Corbin Russwin	ML2010 X NSM X 626
1 – Stop	Trimco	1210/1270 Series X 626 (As required)
3 – Silencers		

END OF SECTION

SECTION 08800 GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES: Glass and glazing for doors, 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 08415-Aluminum Entrances and Storefronts.

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-45l.

B. Heat-Treated Glass Standard: FS DD-G-l403.

C. Safety Glass Standard: CPSC l6 CFR l20l.

D. Fire rated glass: Underwriters Laboratories.

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., 1600 Parkwood Circle, Suite 300, Atlanta, GA 30339. Tel. (800) 766-2343.
2. Guardian Industries Corp., 14600 Romine Road, Carleton, MI 48117. Tel. (800) 521-9040.
3. Pilkington Libbey-Owens-Ford, P.O. Box 799, Toledo, OH 43697. Tel. (419) 246-6078.
4. PPG Industries, Inc., One PPG Place, Pittsburgh, PA 15272. Tel. (800) 377-5267.
5. Visteon Float Glass Operations, 17333 Federal Drive, Suite 230, Allen Park, MI 48101. 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-white.
5. Desiccant: Manufacturer's standard, either molecular sieve or silica gel.
6. Corner Construction: Manufacturer's standard.
7. Exterior Pane: Tinted; color – equal to "Green" by Visteon.
8. Interior Pane: Clear.
9. Unit Performance Requirements as follows:
   a. Light Transmission (visible): 66 percent.
   b. U-Value, Summer: 0.57.
   c. U-Value, Winter: 0.48.
   d. Shading Coefficient: 0.56.
10. Warranty: Manufacturer's Ten year.

2.03 TEMPERED SAFETY GLASS: 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.

A. Provide clear 1/4 inch thick glass in doors and interior windows where not required to be fire rated.

B. At transaction counter of reception desk, provide clear 3/4 inch thick glass with radiused edge, type 1 (transparent glass flat), Class 1 (clear), quality Q3 (glazing select).

2.04 FIRE RATED GLASS: Clear, wireless, minimum 1/4 inch thick safety glass equal to "Firelite Plus" as manufactured by Technical Glass Products, conforming to applicable U.L. fire ratings as indicated or required for rated wall or adjacent door and frame assembly.

2.05 UNFRAMED MIRRORS: 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 l/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

l/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 DOOR LITES: Install glass in frames in sizes as shown on the Drawings. Where fire ratings are indicated for doors, frames shall comply with applicable U.L. fire rating standards.

3.06 MIRRORS: Install unframed mirrors with a combination of metal clips and construction adhesive securely attached to the wall studs and/or concealed blocking.

3.07 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.

3.06 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 General 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 General Contractor shall be held responsible for damages resulting from the use of other cleaning material.

END OF SECTION

SECTION 08916 ALUMINUM CURTAIN WALL AND ENTRANCES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Architectural Aluminum Curtain Wall Systems, including doors, hardware, perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of curtain wall framing.

B. Related Sections:
1. Section 07920 – Joint Sealants.
2. Section 08710 – Door Hardware.
3. Section 08800 – Glazing.
4. Section 16640 – Security Systems.

1.02 SYSTEM DESCRIPTION

A. Curtain Wall System Performance Requirements:
1. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft^2 at a static air pressure differential of 6.24 pounds per square foot.
2. Water Resistance, (static): The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a static air pressure differential of 12 pounds per square foot as defined in AAMA 501.
3. Water Resistance, (dynamic): The test specimen shall be tested in accordance with AAMA 501.1. There shall be no leakage at an air pressure differential of 12 pounds per square foot as defined in AAMA 501.
4. Uniform Load: A static air design load of 40 psf shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member at design load. At structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2 percent of their clear spans shall occur.
5. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than 73 for frame,
6. Seismic: When tested to AAMA 501.4, system must meet design displacement of 0.010 x the story height and ultimate displacement of 1.5 x the design displacement.
7. Sound Transmission Loss: When tested to ASTM E90, the Sound Transmission Class (STC) shall not be less than 34 based upon 1inch insulating glass (1/4”, 1/2” AS, 1/4”).

1.03 SUBMITTALS

A. Product Data: Submit manufacturer’s specifications for materials and fabrication of aluminum curtain wall and entrances, and instructions and recommendations for installation and maintenance. Include certified test reports showing compliance with requirements where a test method is indicated. Submit product data for door hardware and accessories.

B. Shop Drawings: Submit drawings showing adaptation of manufacturer's standard system to project; include typical unit elevations at l/2 inch scale and details at 3 inch scale, to show dimensioning, member profiles, anchorage system, interface with building construction, and glazing. Show section moduli of wind-load-bearing members, and calculations of stresses and deflections for performance under design loading. Show clearly on shop drawings where and how manufacturer's system deviates from contract drawings and these specifications.

C. Samples: Submit samples of each type and color of aluminum finish, on l2 inch long sections of extrusions of formed shapes and on 6 inch squares of sheet/plate. Include 2 or more samples in each set, showing near-limits of variations (if any) in color and texture of finish.

D. Quality Assurance/Control Submittals:

1. Test Reports: Submit certified test reports showing compliance with specified performance characteristics.

1.04 WARRANTY

A. Manufacturer's Product Warranty: Submit, for Owner's acceptance, manufacturer's warranty for curtain wall system as follows:

1. Warranty Period: Two (2) years from Date of Substantial Completion of the project.

1.05 QUALITY ASSURANCE

A. Qualifications:

1. Installer Qualifications: Installer experienced to perform work of this section who has at least five years experience in the installation of work similar to that required for this project and who is acceptable to product manufacturer.
2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.

B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect curtainwall material against damage from elements, construction activities, and other hazards before, during and after curtainwall installation.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Drawings and specifications are based on Series 1600 Wall System 1 as manufactured by Kawneer Company, Inc., 555 Guthridge Court, Norcross, GA 30092. Tel. (770) 449-5555. Local Supplier is Capital Glass Company, Inc. Tel. (601) 982-0328.

B. Equivalent products by the following manufacturers are acceptable:
   1. Traco, 71 Progress Ave., Cranberry Township, PA 16066. Tel. (724) 776-7000.
   2. Vistawall Architectural Products, 803 Airport Road, Terrell, TX 75160. Tel. (972) 551-6100.

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 MATERIALS

A. Aluminum (Curtain Wall and Components):
   1. Material Standard: Extruded Aluminum, ASTM B 221, 6063-T5 or 6063-T6 alloy and temper.
   2. Member Wall Thickness: Each framing member shall have a wall thickness sufficient to meet the specified structural requirements.
   3. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of curtain wall members are nominal and in compliance with AA Aluminum Standards and Data.

2.03 ACCESSORIES

A. Fasteners: Where exposed, shall be Stainless Steel.

B. Gaskets: Glazing gaskets shall comply with ASTM C 864 and be extruded of a silicone compatible EPDM rubber that provides for silicone adhesion.

C. Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

D. Thermal Barrier: Thermal separator shall be extruded of a silicone compatible elastomer that provides for silicone adhesion.

2.04 DOORS: Aluminum entrance doors shall be equal to Kawneer 500 Tuffline Doors with high bottom rail.

2.05 HARDWARE

A. Refer to Section 08710 – Door Hardware for requirements for hardware items other than those indicated herein to be provided by manufacturer of aluminum entrances.

B. Provide door manufacturer's standard heavy-duty hardware units as shown, schedule, or required for operation of each door, including the following items of size, number, and type recommended by manufacturer for service required, finish to match door, unless otherwise indicated:

1. Top, Bottom, and Intermediate Pivots: Cast aluminum ally with steel pins and oilite bearings (ball-bearing bottom pivots).
2. Overhead Closers: Equal to LCN 4040 Parallel Arm with Cush-N-Stop and custom powder coat metal cover.
3. Deadlocks: Mortised maximum security type, with 1 inch minimum length pivoted bolt, stainless steel strike box.
4. Keyed Cylinders: 5-pin tumbler, with cast aluminum face.
5. Magnetic Locks: Refer to Section 16640 – Security Systems.
6. Pull Handles: Equal to Kawneer style CO-12 stainless steel US 32D.
7. Panic Device: Equal to Dor-O-Matic RXEL 1690 NL, EPT-10 electric power transfer, PS 873-2B power supply.
8. Thresholds: Extruded aluminum in clear anodized finish, complete with anchors and clips, coordinate with pivots. Size and shape of thresholds as indicated on the Drawings.

2.06 FABRICATION

A. General:

1. Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
2. Accurately fit and secure joints and corners. Make joints flush, hairline and weatherproof.
3. Prepare components to receive anchor devices. Fabricate anchors.
4. Arrange fasteners and attachments to conceal from view.

2.07 FINISHES

A. Shop Finishing:

1. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight, complying with AAMA 605.2.
2. Color: Bone White

2.08 SOURCE QUALITY CONTROL

A. Source Quality: Provide aluminum curtain walls specified herein from a single source.

1. Building Enclosure System: When aluminum curtain wall are part of a building enclosure system, including entrances, entrance hardware, windows, storefront framing and related products, provide building enclosure system products from a single source manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive curtain wall system and sill plate is level in accordance with manufacturer's acceptable tolerances.

1. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

3.02 INSTALLATION

A. General: Install curtain wall systems plumb, level, and true to line, without warp or rack of frames with manufacturer's prescribed tolerances and installation instructions. Provide support and anchor in place.

1. Dissimilar Materials: Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points.
2. Glazing: Glass shall be outside glazed and held in place with extruded aluminum pressure plates anchored to the mullion using stainless steel fasteners spaced no greater than 9" on center.
3. Water Drainage: Each light of glass shall be compartmentalized using joint plugs and silicone sealant to divert water to the horizontal weep locations. Weep holes shall be located in the horizontal pressure plates and covers to divert water to the exterior of the building.

3.03 PROTECTION AND CLEANING

A. Protection: Protect installed product's finish surfaces from damage during construction. Protect aluminum curtain wall system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.

B. Cleaning: Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions. Clean units and glazing again no more than one week prior to Substantial Completion. Remove construction debris from project site and legally dispose of debris.

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 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
04200 – Brick	Boral Bricks 10-824 Pink
04200 – Concrete Masonry Veneer	Prairie Stone – Alabaster
04200 – Mortar	Custom color to match Prairie Stone exactly
04200 – Weep Vents	Match Mortar Color
05500 – Pipe Railing – exterior stair	Match paint color P7 – Gloss Fiinish
05500 – Pit Ladder	Match paint color P7 – Gloss Finish
05500 – Safety Nosings – exterior stair	to be selected when submitted
05730 – Perforated Steel Plate	Match paint color P3
05730 – Light Cove	Paint to match adjacent ceiling
06400 – Plastic Laminate Countertops	PL#1 – Formica; #7014-58 Colorado Slate; Matte Finish (General plastic laminate for all countertops for millwork w/ plastic laminate unless noted otherwise.)
06400 – General Plastic Laminate	PL#2 – Nevamar; #YSN002T Pure Spun Yarn; Textured (General Plastic Laminate for cabinet doors and fronts, open shelf units, millwork partitions, unless noted otherwise).

06400 – Countertops in Toilets	PL#4 – Nevamar; #FN6001T Charcoal Fusion Textured
06400 – Wood Veener	Plain Sliced Cherry Veneer with clear matte finish stain (All cabinets, countertops, shelving units indicated to be wood or wood veneer)
06400 – Wood Base	Match paint color P6
06400 – Window Stools	Solid Surface: SS#1: Corian; Canvas; Matte Finish
06400 – Architectural Millwork Hardware	All exposed metal components Chrome or silver colored, polished finish unless noted otherwise
06400 – Grommet	Dark Grey to match edgemold
06400 – Edgemold	Edgemold T-Edge; #30 Grey
06400 – Workstation Support Bracket	Paint to match adjacent wall finish
07412 – Aluminum Composite Panel System	To match Kawneer Bone White
07412 – All Trim Pieces	To match Kawneer Bone White
07600 – Metal Flashing	Match adjacent metal finishes
07610 – Metal Roofing	Petersen-Slate Gray
07610 – Metal Trim (at roof side of gutter)	Petersen-Slate Gray
07920 – Joint Sealants	Sonneborn-Match adjacent lighter color
08100 – Metal Doors and Frames	Paint color P6
08210 – Wood Doors	Graham Natural Solutions Pre-Finished doors; Veneer: Plain Sliced Select Cherry; Finish: #300 Medium Brown
08305 – Access Doors	VCT inserts to match specified floor finish in room; All hardware and trim to be silver colored
08416 – Curtainwall and Entrances	Kawneer- Bone White 391X035
08710 – Door Hardware	Brushed/Satin Chrome
08800 – Glazing	Interior Pane: Clear; Exterior Pane: “Green” by Visteon
09310 – Ceramic Wall Tile #1	American Olean; #317 CR, Almond (4 ¼” x 4 ¼”)
09310 – Ceramic Wall Tile #2	American Olean; #30 Olive (4 ¼” x 4 ¼”)
09310 – Grout (Walls)	Mapei; Color: #94 Straw (1/16” grout joint)
09340 – Paver Floor Tile	PT: Crossville Porcelain Stone; #VS51 Pietra Vecchia (12” x 12”); Unpolished
09340 – Paver Tile Base	PT Base: Crossville Porcelain Stone; #VS51 Pietra Vecchia, 6” x 12” Cove Base
09340 – Grout (Paver Tile)	Mapei; Color: #11 Sahara Beige
09400 – Terrazzo (poured in place & precast)	Refer to 09400 for Terrazzo matrix mix designs and divider strip material selection
09510 – ACT Ceilings	Armstrong; No. 770 Cortega, Square Edge; White
09549 – Metal Panel Ceilings	Color to be selected from manufacturer’s standard colors when submitted
09640 – Wood Flooring	Hartco Valenza Commerical Collection Engineered Hardwood by Armstrong; Species: Jatoba; JA 422NA; Finish: Low Gloss Satin
09650 – Resilient Floor – VCT#1	Armstrong Stonetex Excelon; #52128 Desert Dust
09650 – Resilient Floor – VCT#2	Armstrong Stonetex Excelon; #52132 Dusty Khaki
09650 – Resilient Floor – VCT#3	Armstrong Stonetex Excelon; #52153 Warm Green
09650 – Rubber Base	Johnsonite; #63 Burnt Umber (4”)
09650 – Resilient Edge Strips	Match adjacent floor tile
09655 – Rubber Floor Tile	Johnsonite; #726 Mud Pie
09655 – Rubber Stair Treads and Risers	Johnsonite; #726 Mud Pie; 2” Black Grit Tape at treads
09680 – Carpet	CPT#1 Shaw Contract; Pattern #50875 Movement Upat; #75500 Coral

09680 – Carpet	CPT #2 Lees Carpet (Modular Tile); Pattern #L8512 First Step T; Color: #524 Stepping Stone
09725 – Vinyl Wall Covering	VWC#1 – Refer to 09725, Data Sheet w/ selection
09728 – Fabric Wall Covering	FWC #1, FWC #2, and FWC #3 – Refer to 09728 for Data Sheets with selections
09900 – Paint – P1 (General Wall Paint)	Benjamin Moore; #HC-83 Grant Beige; Eggshell Finish
09900 – Paint – P2 (Accent Wall Paint)	ICI; #179 Gingerbread House; Eggshell Finish
09900 – Paint – P3	Benjamin Moore; #2141-40 Creekside Green; Eggshell Finish (Wall Paint and Perforated metal behind Reception Desk)
09900 – Paint – P4 (Wall Paint)	Benjamin Moore; #HC-23 Yorkshire Tan; Eggshell Finish
09900 – Paint – P5 (Building Exterior)	Benjamin Moore; #1132 Old Canal; Semi-Gloss Finish (color to match for Louver #1)
09900 – Paint – P6 (Wall Paint)	ICI; #152 Basic Beige; Semi-Gloss Finish
09900 – Paint – P7 (Ceiling Paint)	Benjamin Moore; China White; Interior Ready Mixed – Flat Finish
09900 – Paint - P8 (Steel paint in Stairs 1 & 2)	Sherwin Williams; #SW6149 Relaxed Khaki; Semi-Gloss
09900 – Paint – P9 (Accent Wall Paint)	ICI; #193 Ironstone Green; Eggshell Finish
09900 – Paint – P10 (Accent Wall Paint)	ICI; #156 pendulum; Eggshell Finish
10100 – Visual Display Board	All finishes to be selected when submitted
10170 – Toilet Partition	PL#3 – Wilsonart; #1787-60 Oxide
10200 – Louvers	Custom Kynar Coating to match paint color P5
10245 – Architectural Screen Wall	Custom Kynar Match Kawneer Bone White
10260 – Corner Guards	to be selected when submitted
10400 – Specialty Signs (Int)	to be selected when submitted
10400 – Specialty Signs (Ext)	to be selected when submitted
10420 – Plaques	Cast Aluminum, satin finish
10534 – Translucent Canopy	Panels: Ice White
10534 – Translucent Canopy	Metal components to match Kawneer Bone White
11455 – Appliances (Range)	GE - White
11455 – Appliances (Microwave)	GE - White
11455 – Appliances (Refrigerators)	GE - White
11455 – Appliances (Ice Maker)	GE – White
12492 – Horizontal Blinds	Skandia Window Fashions; Insprire 2” Faux Wood blinds (I-Flat slat); #805 White – Sandblast
14245 – Hydraulic Elevator	Plastic Laminate Walls: PL#3 – Wilsonart; #1787-60 Oxide
14245 – Hydraulic Elevator	Floor: Paver Floor Tile PT: Crossville Porcelain Stone; #VS51 Pietra Vecchia (12” x 12”); Unpolished; Grout - Mapei; #11 Sahara Beige

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 Architect upon written notification and subsequent submittals by the Contractor.

END OF SECTION

SECTION 09125 SUSPENDED GYPSUM BOARD SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES: The extent of the suspended gypsum board drywall system is shown on the Drawings and in schedules. The types of work required include the following:

A. Ceiling suspension systems.

B. Drywall system face-type gypsum board work.

C. Trim and accessories that are installed prior to or concurrent with gypsum board.

1.02 SUBMITTALS: Submit product data and installations instructions for each gypsum board drywall system required, including other data as may be required to show compliance with these specifications. Distribute a copy of each installation instructions to the installer.

1.03 QUALITY ASSURANCE

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 board, framing and fasteners, trim accessories, adhesives and joint treatment products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum board, by one of the following:

1. Georgia-Pacific Corp, Atlanta, GA, Tel. (800) 327-2344.
2. National Gypsum Company, Charlotte, NC, Tel. (800) 343-4893.
3. United States Gypsum Company, Chicago, IL, Tel. (800) 874-4968.

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 CEILING SUPPORT MATERIALS

A. Main Runners: 1-1/2 inch steel channels, either cold-rolled at 0.475 pounds per foot or hot-rolled at 1.12 pounds per foot, rust-inhibitive paint finish.

B. Furring Members: Screw-type hat-shaped furring channels of 25 gage zinc-coated steel; comply with ASTM C 645.

C. Furring Members: Screw-type "Cee" shaped studs of depth indicated, of 25 gage zinc-coated steel; comply with ASTM C 645.

D. Hanger Wire: Galvanized, soft-temper steel wire complying with ASTM A 641, Class 1 coating, prestretched; sized in accordance with ANSI A42.4 unless otherwise indicated.

E. Hanger Anchorage: Comply with ANSI A42.4 for concrete inserts, clips, bolts, screws and other devices applicable to the indicated method of structural anchorage for ceiling hangers. Size devices for 3 by calculated load supported, except size direct-pull concrete inserts for 5 by calculated load.

F. Furring Anchorage: Galvanized, 16-gage wire ties, manufacturer's standard wire-type clips. Bolts, nails or screws as recommended by furring manufacturer and complying with ANSI A42.4.

2.02 GYPSUM BOARD PRODUCTS: Specified in Section 09250 – Gypsum Board.

2.03 TRIM ACCESSORIES

A. Provide 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. Semi-Finishing Type: Manufacturer's standard trim units that are not to be finished with joint compound (non-beaded).

C. Plastic Edge Trim: Manufacturer's standard rigid or semi-rigid PVC moldings of the semi-finishing type, shaped to provide resilient contact of gypsum board edges with other work; friction-fit, or pressure-sensitive adhesive mounting.

2.04 JOINT TREATMENT MATERIALS: ASTM C 475; type recommended by the manufacturer for the application indicated, except as otherwise indicated.

A. Joint Tape: Perforated type.

B. Joint Compound: Provide chemical hardening type for bedding and filling, ready-mixed vinyl type or non-case in-type for topping.

2.05 MISCELLANEOUS MATERIALS

A. Laminating Adhesive: The type and grade of adhesive or compound recommended by the gypsum board manufacturer, for laminating gypsum board together in applications as indicated.

B. Fastening Adhesive: The type and grade of adhesive recommended by the gypsum board manufacturer for fastening board to structural supports or substrates as indicated.

C. Gypsum Board Fasteners: Comply with GA-216, and with gypsum board manufacturer's recommendations.

PART 3 EXECUTION

3.01 EXAMINATION: 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.

3.02 INSTALLATION REQUIREMENTS

A. Comply with ANSI A42.4 as applicable to the type of substrate and drywall support system indicated; and comply with the Gypsum Association GA-203 for installation of furring members.

B. Coordinate and integrate where possible, the installation of trim accessories with the installation of gypsum board. 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.

C. Secure hanger wires to structural supports by wire-typing directly to structure where possible, otherwise tie to inserts, clips and other anchorage devices or fasteners as indicated. Wire-tie hanger wires to main runners.

D. Space main runners 4 feet on center and space hangers at 4 feet on center along runners, except as otherwise indicated.

E. Level main runners to a tolerance of 1/4 inch in 12 feet, measured both lengthwise in each runner and transversely between parallel runners.

F. Wire-tie or clip furring members to main runners and to other structural supports as indicated.

G. Space furring members at 24 inches on center except as otherwise indicated.

3.03 PROTECTION OF WORK: 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 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 SUBMITTALS: 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 doorjambs and at door and opening headers.

1. 20 gage by 6 inches deep at north wall of Janitor Room #220.

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, 1/2 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. Extend partition stud systems to structural support or substrate above. Space studs 16 inches on center except as otherwise indicated or required.

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 l/4 inch to l/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-2l6 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 l/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: 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.

A. Apply joint tape at joints between gypsum boards, except where a trim accessory is indicated.

B. Apply joint compound in 3 coats (not including pre-fill of openings in base), and sand between last 2 coats and after last coat.

C. Base for Ceramic Tile: Do not install drywall finishing where ceramic tile and similar rigid applied finishes are indicated.

D. 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.

3.06 PROTECTION OF WORK: 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 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. Submit samples of trim and other units if requested by the 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. Florida Tile Industries, Lakeland, Florida.
4. United States Ceramic Tile Co., East Spatra, Ohio

B. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.04 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. External Corners: Bullnose shapes, with a radius of not less than 3/4 inch, unless otherwise shown.
2. Internal Corners: Field-butted square, except use square corner, combination angle and stretcher type cap.

2.06 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.

2.07 GROUT: ANSI A 118.3, with Tile Contractor’s Association certification of conformance. Proprietary compound composed of 100 percent Solid Epoxy for a more flexible and less permeable grout. Equal to Laticrete Type LATAPOXY SP-100 Stainless Epoxy Grout. Equivalent products by Mapei and Bostik are acceptable. Color of grout to be selected by the 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 behind 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.

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. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of 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.

END OF SECTION

SECTION 09340 PAVER TILE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile includes ceramic surfacing units made from clay or other ceramic materials. Extent of tile work is indicated on the Drawings and schedules.

B. Types of tile work in this section include Unglazed Paver Tile - Thin set.

1.02 RELATED SECTIONS

A. Section 07260 – Vapor Retarders (Floor protection paper).

B. Section 09050 – Color Design.

1.03 SUBMITTALS

A. Product Data: Submit manufacturers' descriptive literature and installation instructions for all materials used in the work of this section. Provide color charts consisting of actual tiles or sections of tiles showing full range of colors available for each type of tile specified. Include samples of grout and accessories requiring color selection.

B. Shop Drawings: Verify project conditions and submit a scaled layout of tile including all details, locations of thresholds, equipment, grid and expansion joints (if any).

C. Samples: For each type of tile and each color required, submit one panel not less than 24 inches square on plywood or hardboard backing with joints grouted.

D. Quality Control: Reports from an independent testing laboratory indicating that each type of tile furnished meets the performance requirements specified above.

1. Certificates: Submit Master Grade Certificate for each type of tile, signed by the manufacturer and the installer.
2. Certified Test Reports: Submit certified test reports from a qualified independent testing laboratory evidencing compliance of tile and tile setting products with requirements specified based on comprehensive testing of current products. Include in reports testing laboratory's interpretation of test results relative to specified requirements.

E. Contract Closeout: Provide Maintenance Data and Manufacturer's recommendations on cleaning.

1.04 QUALITY ASSURANCE:

A. Provide materials obtained from one source where possible for each type and color of tile, grout, and setting materials.

1. Performance Requirements:

a. Coefficient of Friction: Slip resistant in accordance with the Ceramic Tile Institute, i.e. a static coefficient of friction of not less than 0.60 when tested in accordance with ASTM C 1028-89 as modified by the Ceramic Tile Institute.

b. Water Absorption: Impervious when tested in accordance with ASTM C 373-88.
c. Bond Strength: 50 psi or greater when tested in accordance with ASTM C 482-81 (1986).
d. Breaking Strength: Average of 250 lbs. or greater when tested in accordance with ASTM C 648-84 (1989).
e. Abrasive Hardness: Index of 100 or greater when tested in accordance with ASTM C 501-84.

1.05 DELIVERY, STORAGE AND HANDLING: Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.

1.06 PROJECT CONDITIONS: Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup. Maintain temperatures at not less than 50 degrees F. (10 degrees C.) in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions. Maintain a minimum lighting level of 50 fc during installation.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Tile: Subject to compliance with requirements, provide Crossville Porcelain Tile, Pompeii Series, or equal. Refer to 09050 Color Design for Color Selection.

B. Manufacturers of Dry-set and Latex-Portland Cement Mortars:

1. Laticrete International
2. Hydroment/Bostik Const. Products
3. C-Cure Corporation

C. Manufacturers of Grouts:

1. Laticrete International
2. Hydroment/Bostik Const. Products
3. C-Cure Corporation

D. Manufacturers of Waterproof Membranes:

1. Laticrete International
2. Hydroment/Bostik Const. Products
3. C-Cure Corporation

2.02 PRODUCTS, General: Comply with ANSI A137.1 "American National Standard Specifications for Ceramic Tile" for types and grades of tile indicated.

A. ANSI Standard for Tile Installation Materials: Comply with ANSI standard referenced with products and materials indicated for setting and grouting.

B. Colors, Textures and Patterns: For tile, grout and other products requiring selection of colors, surface textures or other appearance characteristics, provide products to match characteristics indicated. Provide tile trim and accessories which match color and finish of adjoining flat tile.

C. Unglazed Paver Tile: Provide flat tile complying with the following requirements:

1. Type: Porcelain Ceramic
2. Nominal Facial Dimensions: 12" x 12"
3. Nominal Thickness: 5/16"
4. Face: As selected with modified cushion edges

D. Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with following requirements:

1. Size: Coordinated with sizes and coursing of adjoining flat tile, where applicable.
2. Shapes: As follows, selected from manufacturer's standard shapes for thinset installations:

   a. Base: Coved.
   b. External Corners: Surface bullnose.
   c. Internal Corners: Field-butted square corners, except use coved base and cap angle pieces designed to member with stretcher shapes.

E. SETTING MATERIALS: Provide Latex-Portland Cement Mortar complying with ANSI A118.4 having a latex additive (water emulsion) of styrene butadiene rubber serving as a replacement for part or all of gauging water, added at job site to prepackaged dry mortar mix supplied or specified by latex manufacturer, for thin set floor tile applications on each type of substrate indicated. Provide primer-sealer as recommended by mortar manufacturer.

1. Waterproof Membrane: Provide trowel applied liquid waterproofing membrane, extra heavy duty type, consisting of cold applied liquid latex-rubber and reinforcing fabrics or urethane and reinforcing fabrics to form a seamless integral membrane at the substrate at the floor and base.

F. LATEX-PORTLAND CEMENT GROUT: Manufacturer’s standard latex portland cement grout complying with ANSI A 118.6, with Tile Contractor's Association Adhesive and Sealant Council certification of conformance, for floor tile.

G. Mixing Mortars and Grout: Mix mortars, grouts, and waterproof membrane to comply with requirements of referenced standards and manufacturers for accurately proportioning of materials, water or additive content, mixing equipment and mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortars and grouts of uniform quality with optimum performance characteristics for application indicated.

H. ORGANIC ADHESIVE: Manufacturer’s standard organic adhesive bond coat, complying with ANSI A 136.1, with Tile Contractor's Association Adhesive and Sealant Council certification of conformance, for base tile set on each type of substrate indicated. Provide primer-sealer as recommended by adhesive manufacturer.

2.03 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. Furnish white, polished marble, minimum of 2" wide, length (one piece) to fit opening, beveled both sides for thresholds, unless otherwise indicated. Provide thickness as required to comply with ADA requirements and to flush out with adjacent tile surface.

2.04 METAL PROTECTIVE EDGE TRIM: Provide a metal edge trim equal to Schluter-Scheine metal systems Item # MS-58 at all areas where carpeting meets paver tile. Size shall be in accordance with materials used. Finish as selected by Architect. Install according to manufacturer's instructions.

PART 3 EXECUTION

3.01 EXAMINATION: Examine surfaces to receive tile work and conditions under which tile will be installed. Do not proceed with tile work until surfaces and conditions comply with requirements indicated in referenced tile installation standard.

3.02 Pre-installation meeting between Project Engineer, Architect, Contractor and tile Subcontractor shall be held prior to installation to verify tile patterns, jointing, and other items.

3.03 INSTALLATION, General: Comply with applicable parts of ANSI A108 series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile".

A. TCA Installation Guidelines: TCA "Handbook for Ceramic Tile Installation"; comply with latest TCA installation methods indicated or, if not otherwise indicated, as applicable to installation conditions shown.

B. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.

C. Install metal protective edge trim in accordance with approved layouts where carpeting meets paver tile. Install according to manufacturer's instructions.

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, fixtures and other penetrations so that plates, collars, or covers overlap tile.

E. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are same size. Layout tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, 1/4" wide and as allowable by applicable TCA standards and manufacturers printed instructions.

F. Grout tile to comply with the requirements and installation standards of ANSI A108.10, ANSI A108.6 as applicable, and to provide an even, uniform grout surface between units. Grout shall be uniform and consistent in color and appearance.

3.04 FLOOR INSTALLATION METHODS

A. Paver Tile: Install tile to comply with requirements indicated below for setting bed method, TCA installation method related to types of subfloor construction and grout types.

1. Latex-Portland Cement Mortar: Method F113-95
2. Concrete Subfloor, Interior: TCA F113 and TCA F115
3. Grout: ANSI A108.6

B. For installations indicated, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards.

3.05 CLEANING AND PROTECTION: Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but no sooner than 14 days after installation. Protect metal surfaces, cast iron and vitreous plumbing fixtures form effects of acid cleaning. Flush surface with clean water before and after cleaning.

A. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.

B. Protection: When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile floors. Protect installed tile work with floor protection paper during construction period to prevent staining, damage and wear. Prohibit foot and wheel traffic from using tiled floors for at least 7 days after grouting is completed. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION

SECTION 09400 TERRAZZO

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnish necessary materials, labor and equipment required to prepare designated areas and install Epoxy Terrazzo Flooring System.

B. The Work of this Section shall include but not be limited to the following:

1. Thin-set epoxy terrazzo.
2. Thin-set, precast epoxy terrazzo tread and riser units.
3. Thin-set, precast epoxy terrazzo wall base units.
4. Cast stair nosing.
5. Related accessories.

1.02 RELATED SECTIONS

A. Section 03300 - Cast In Place Concrete (note: the concrete substrate shall not exceed 1/4 inch in a 10 foot span. When placing a 10 foot straightedge anywhere on the substrate, at no point should the gap between the straightedge and substrate exceed 1/4 inch. Specify minimum cement factor of 5.5 bags per yard with w/c ratio of 0.45 or lower. Cure with moisture retaining cover or wet cure per ACI recommendations.

B. Section 04200 – Masonry Units

C. Section 05500 – Metal Fabrication

D. Section 07260 – Vapor Retarder (Note: Any concrete slabs on or below grade shall have an efficient vapor retarder placed directly under and In intimate contact with the concrete slab with no granualar fill on top. at a minimum, vapor retarder shall meet ASTM E-1745 Class A or B and be Installed per ASTM E-1643 and manufacturer's Instructions.)

E. Section 07920 - Joint Sealants

F. Other adjacent floor finish trades (for transition details).

1.03 SUBMITTALS

A. Manufacturer's product data for each type of terrazzo and accessory, including the following. System will be evaluated on the basis of these standards. For tests not listed in published data, manufacturer shall supply missing data according to referenced standard.

1. Physical properties.
2. Performance properties.
3. Specified tests.
4. Material Safety Data Sheet.
5. Manufacturer's standard warranty.

B. Shop Drawings: Include terrazzo fabrication and installation requirements. Include plans, elevations, sections, component details, and attachments to other Work. Show layout of the following:

1. Divider and control- and expansion-joint strips.
2. Base and border strips.
3. Abrasive Strips.
4. Stair treads, risers, and landings.

5. Precast terrazzo jointing and edge configurations including anchorage details.

6. Large scale details of terrazzo patterns and metal or other material inserts.

C. Samples for Verification: Match Architect's samples for each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Prepare samples of same thickness and from same material to be used for the Work in size indicated below:

1. Epoxy Terrazzo: minimum 6" x 6" (152.4 mm x 152.4 mm) sample of each color and type of terrazzo.

2. Precast Epoxy Terrazzo: submit a 12" (304.8 mm) long sample for each precast item required.

3. Accessories: submit a 6" length (152.4 mm) of each kind of divider strips, stop strips or control joints required.

4. Full-profile, 12-" (304.8 mm) wide samples of combination tread/ riser, with cast-in nosing.

D. Manufacturer Experience: Furnish list of at least five (5) epoxy terrazzo projects using material being submitted for this project installed during the past five (5) years of the same scope, complexity and at least 50% of the square footage, including the same items as in (G.) below.

E. Installer Certificates: Submit proof of Contractor and Epoxy Supplier Membership in N.T.M.A..

F. Qualification Data: Terrazzo Contractor Experience: Furnish list of at least five (5) epoxy terrazzo projects using material specified for this project or similar that contractor has installed during the past five (5) years of the same scope, complexity and at least 50% of the square footage, including the following:

1. Project name.

2. Square footage of terrazzo installed.

3. Lineal footage of precast base and cast in place base.

4. Address of facility with contact name and phone number.

5. Contact name, address and phone number of prime contractor .

6. Field experience resumes of key project personnel including lead supervisor and field technicians to be used on this project.

G. Material Test Reports: For epoxy terrazzo and moisture test.

H. Material Certificates: For epoxy terrazzo, in lieu of material test reports, when permitted by Architect, signed by manufacturers.

I. Maintenance Data: Submit N.T.M.A. maintenance recommendations and manufacturer's maintenance instructions.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer (applicator) who is acceptable to epoxy terrazzo manufacturer to install manufacturer's products.

1. Terrazzo Contractor Qualifications: Use resin manufacturer certified terrazzo contractor with at least five (5) years of satisfactory experience in installation of resinous epoxy terrazzo with proof of N.T.M.A. membership. Terrazzo contractor shall demonstrate experience during last five (5) years of at least three (3) projects of comparable scope and complexity of at least 50% of total square footage of this project. (See experience criteria in Submittals section.)

B. Source Limitations:

1. Obtain primary Epoxy Terrazzo Flooring System materials including membranes, primers, resins, and hardening agents from a single manufacturer with documented experience providing resinous ground terrazzo flooring, and proof of N.T.M.A. membership.

2. Obtain aggregates, solvents and other secondary materials from source recommended by manufacturer of primary materials.

C. Pre installation Conference: Prior to installation of concrete slab, conduct conference at Project site. Review methods and procedures related to terrazzo including, but not limited to, the following:

1. Inspect and discuss installation procedures, joint details, jobsite conditions, substrate specification, vapor barrier details and coordination with other trades.

2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

3. Review special terrazzo designs and patterns.

4. Review dust-control procedures.

5. Review plans for concrete curing and site drying to enable timely achievement of suitable slab moisture conditions per Section 1.7 A.

D. N.T.M.A. Standard: Comply with N.T.M.A. Guide Specification and written recommendations for terrazzo type indicated unless more stringent requirements are specified.

1.05 WARRANTY

A. Terrazzo contractor jointly with manufacturer shall furnish standard guarantee of Epoxy Terrazzo Flooring System for one year after installation. This labor and material guarantee includes loss of bond and damage due to normal wear and tear.

B. Not included is damage due to Acts of God or other elements beyond scope of protection of this system. Also excluded are reflective cracks from substrate.

C. In case of warranty claim, owner will notify manufacturer and terrazzo contractor in writing within 30 days of first appearance of any problems which are covered under this warranty, and will provide free access to area during normal working hours. Property protection is also the owner's responsibility.

1.06 MATERIAL DELIVERY, HANDLING AND STORAGE

A. Primary system materials shall be delivered in manufacturer's undamaged, unopened containers. Each container shall be clearly marked with the following:

1. Product name

2. Manufacturer's name

3. Component designation (A or B, etc.)

4. Ratio of component mixture

5. CHEMTREC Emergency Response Information

B. Handle materials by methods which prevent damage.

C. Inspect direct jobsite deliveries to assure that quantities are correct and that materials comply with requirements and are not damaged.

D. Replace, at no cost to Owner, material found to be defective in manufacturing or that was damaged in transit, handling or storage.

E. Store materials per manufacturer's instructions and as follows:

1. Seals and labels shall be intact and legible.

2. Temperature of storage area shall be maintained between 55° F (12.8° C) and 90° F (32.2° C).

3. Do not use materials which have been stored for a longer period of time than the manufacturer's maximum recommended shelf life.

1.07 PROJECT CONDITIONS

A. Terrazzo contractor shall, prior to surface preparation:

1. Evaluate slab condition, including slab moisture content and extent of repairs required, if any.

2. Test concrete substrates according to ASTM F2170 (Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes). Do not install terrazzo or terrazzo accessories until test results are 80% or less RH. If 80% RH is not met, consult terrazzo manufacturer for additional drying or negative side moisture mitigation methods.

B. Prior to and during each day of installation, the terrazzo contractor shall verify that the dew point is at least 5° F (-15° C) less than the slab and air temperature.

C. Protect surrounding substrates and surfaces, as well as in-place equipment from damage during surface preparation and system application.

D. Job area shall be free of other trades during surface preparation, crack detailing, divider strip installation, terrazzo pouring, and for a period of 36 hours upon completion. Provide coordination between terrazzo contractor and general contractor as to types of traffic allowed on poured terrazzo after pouring but before coarse grinding, or after grouting but before polishing. Once polished, job area shall be free of other trades until 36 hours after completion of seal coat.

E. Provide ventilation by use of fans or other devices.

F. The general contractor shall maintain lighting at minimum uniform level of 50-60 foot candles (538.2 Lux – 645.8 Lux) in areas where terrazzo system is being installed. If possible, schedule terrazzo installation so that permanent lights will be in place and working during installation.

G. General contractor shall ensure that leaks from pipes and other sources are corrected prior to flooring installation.

H. General contractor shall provide minimum substrate and atmospheric temperature of 55° F (12.8° C) during stripping and pouring and until 48 hours after completion of pouring. General contractor shall not allow substrate or air temperature to fall below 40° F (4.4° C) after terrazzo has been poured.

I. General contractor shall provide protection from other trades prior to final acceptance of owner.

PART 2 PRODUCTS

2.01 EPOXY TERRAZZO

A. Products: Epoxy Terrazzo Systems Overview: The basis of Design is Master Terrazzo Technologies, LLC, Hockessin, DE (www.MasterTerrazzo.com). Prior to system application, treat cracks with MasterFlex Membrane and fill substrate irregularities with MorriFill Epoxy Fill as described in the Execution section. Fill referenced joints with ColorFlex Epoxy Sealant. Seal system with appropriate Master Terrazzo provided sealer.

B. Products of other manufacturers will be considered provided they equal or exceed the material requirements and design qualities of the specified product. Submit requests for Architect's approval with complete technical data for evaluation in accordance with paragraph 1.3 E.

C. Thickness: The system shall be installed at a thickness of 3/8" (9.5 mm) unless otherwise indicated.

D. Materials:

1. Epoxy Resin: Manufacturer's standard recommended for use indicated and in color required for mix indicated.

a. Physical Properties without Aggregates:

1). Hardness: ASTM-D-2240 70-85 Shore D

2). Minimum Tensile Strength: 4,800 psi (33.09 mPA) per ASTM D 638 for a 2" (50.8 mm) specimen made using a "C" die per ASTM D 412.

3). Minimum Compressive Strength: 12,000 psi (82.7 mPA) per ASTM D 695, Specimen B cylinder.

4). Chemical Resistance: No deleterious effects by contaminants listed below after 7-day immersion at room temperature per ASTM D 1308.

a). Distilled water

b). Mineral water

c). Isopropanol

d). Ethanol

e). 0.025 percent detergent solution

f). 1% percent soap solution

g). 10 percent sodium hydroxide

h). 10 percent hydrochloric acid

i). 5 percent acetic acid

b. Physical Properties with Aggregates: For resin blended with Georgia White marble, ground, grouted, and cured per requirements in N.T.M.A.'s "Guide Specification for Epoxy Terrazzo," comply with the following:

1). Flammability: Self-extinguishing, maximum extent of burning 0.25" (6.35 mm) per ASTM D 635.

2). Linear Coefficient of Thermal Expansion: 25.0×10^{-6} in/in per ºF (11.4×10^{-7} cm/cm per ºC) for temperature range of -12° to 140° F (-24° to 60°C) per ASTM D 696.

3). Bond Strength: When tested in accordance with Field Test Method for surface soundness and adhesion as described in ACI Committee No. 403 Bulletin Title No. 59-43 (Pages 1139-1141) the Epoxy terrazzo shall comply with the following value: 100% concrete failure minimum, with 300 PSI (2.1 mPA) minimum tensile strength.

2. Domestic Marble Chips:
   a. Sizes shall be #2's, #1's and #0's, conforming to N.T.M.A. gradation standards.
   b. Abrasion and Impact resistance when testing in accordance with ASTM C 131-89 shall not exceed 40% loss.
   c. Weight gain upon 24-hour immersion in water not to exceed 0.75 %.
   d. Chips shall contain no deleterious or foreign matter.
   e. Dust content less than 1% by weight.
   f. Label bags legibly with correct name and size of chip.
3. Flexible Epoxy Membrane: MasterFlex Flexible Epoxy Membrane, 100% solids with the following properties:
   a. Tensile Strength ASTM D 2370, 68° F (20° C) 1,500 psi (10.3 mPA)
   b. Elongation ASTM D 2370, 68° F (20° C) 130%
4. Primer: Morricite Primer, 100% solids, moisture insensitive. No solvent containing primers are allowed.
5. MorriFill Epoxy Slope and Fill Mortar – 100% Solids fill mortar system including blended aggregate.
6. Divider-Strip Adhesive: Epoxy-resin adhesive recommended by adhesive manufacturer for this use and acceptable to terrazzo manufacturer.
7. Finishing Grout: Morricite Terrazzo Grout, 100% Solids.
8. Control Joint Filler: MTT ColorFlex 100% Solids Flexible, Grindable Epoxy Joint Filler in color selected by architect to match/compliment terrazzo with the following properties:
   a. Tensile Strength ASTM D 2370 @ 68° F (20° C), 1,600 psi (11.03 mPA)
   b. Elongation ASTM D 2370 @ 68° F (20° C) 100%
   c. Tensile Modulus ASTM D 2370 @ 68° F (20° C), 27,800 psi (191.67 mPA)
9. Seal Coat: Thin-coat terrazzo sealer of or approved by terrazzo manufacturer.

E. Sealer shall be SealOnU high performance, high gloss, and chemical resistant aliphatic urethane.

F. Mix: Comply with N.T.M.A.'s "Guide Specification for Epoxy Terrazzo" and manufacturer's written instructions for component proportions and mixing.

1. Color and Pattern Schedule: Where the following designations are indicated, provide custom specified terrazzo matrices matching architect's samples:
   a. TZ1: Formula:
      1). Master Terrazzo Morricite epoxy resin Matrix, MTT#10056 and 100% domestic marble chips consisting of:
         a). 40% Gray #1
         b). 20% White #1
         c). 20% Yellow #1
         d). 10% Amber #1
         e). 10% Black #1

b. TZ2: Formula:

1). Master Terrazzo Morricite epoxy resin Matrix, MTT#10056 and 100% domestic marble chips consisting of:

a). 40% Gray #1

b). 20% Amber #1

c). 20% Black #1

d). 10% White #1

e). 10% Yellow #1

c. TZ_3: (Precast Tread/ Riser): Match TZ1

d. TZ4_: (Precast Base): Match TZ1.

2. List Morricite epoxy matrix color number and chip plate number.

2.02 DIVIDER AND ACCESSORY STRIPS

A. Thin –Set Divider Strips: Angle or T Type

1. Material: White zinc alloy.

2. Top Width: 1/16“ (1.6 mm)

B. Control-Joint Strips: Separate, double L-type angles, positioned back to back, that match material, thickness, and color of divider strips and in depth required for topping thickness indicated.(16 gauge x 3/8" (9.5 mm) with MTT ColorFlex flexible sealant).

C. Accessory Strips: Match divider-strip width, material, and color. Use the following types of accessory strips as required to provide a complete installation:

1. Base bead and base dividers.

2. Edge beads for exposed edges of terrazzo.

3. Anchoring Strips: Adhere the strips to the floor with Morricite Primer or hot glue. Do Not Mechanically Anchor.

2.03 MISCELLANEOUS ACCESSORY PRODUCTS

A. Patching and Fill Material: MorriFill or MonoFill slope and fill mortar.

B. Abrasive Strips: Metal channels matching strips to receive epoxy and abrasive aggregate.

C. Joint Sealants:

1. Control joints: ColorFlex.

D. Terrazzo Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by cleaner manufacturer for use on terrazzo type indicated. Free form crystallizing salts or water soluble alkaline salts.

2.04 PRECAST ACCESSORY ITEMS:

A. Manufacturers: Subject to compliance with requirements, provide products by the following or equal manufacturers acceptable to the Architect:

1. Precast Terrazzo Enterprises, Raleigh, NC 800-849-8849

2. Romoco Precast Terrazzo Products, Manheim, PA 717-665-2739

3. Wausau Tile, Wausau, WI 800-388-8728

B. Precast Epoxy Terrazzo Base Units: 1/2“(6.35 mm) thick; cast in maximum lengths possible, but not less than 36“ (91.44 cm).

1. Type: Configuration indicated or as selected by the Architect.

2. Height: 6 inches.

3. Outside Corner Units: With finished returned edges at outside corner.

C. Precast Epoxy Terrazzo Stair Treads: Thickness indicated in Drawings.

1. Tread/ Riser: Epoxy, Type with abrasive pattern as selected from submittal.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions, including levelness tolerances, have been corrected. Examine areas to receive terrazzo for:

1. Defects in existing work that affect proper execution of terrazzo work.

2. Deviations beyond allowable tolerances for the concrete slab work.

3. Age (minimum 30 days) and moisture content of concrete slab. If concrete substrate moisture exceeds 80% according to ASTM F2170 (Determining Relative Humidity in Concrete Floor Slabs Using in site Probes), consult terrazzo manufacturer for additional drying or negative side moisture mitigation methods.

4. Start work only when all defects are corrected.

3.02 PREPARATION

A. Clean substrates of substances that might impair epoxy terrazzo bond, including oil, grease, and curing compounds.

B. Provide clean, dry, and neutral substrate for terrazzo application. Determine dryness characteristics by performing moisture tests recommended by terrazzo manufacturer.

1. Concrete: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with epoxy terrazzo.

a. Prepare concrete substrate to "open" surface pores by means of vacuum shotblasting or with a terrazzo grinder, dry with coarse diamond stones with a vacuum unit. Surface preparation results should achieve a CSP3-CSP5 profile according to International Concrete Repair Institute Guideline No. 03732. Remove all contaminating or bond breaking substances including but not limited to dust, laitance, curing compounds, coatings, sealers, oil, grease and carpet or vinyl mastics or adhesives. Any oil or grease not removed by vacuum blasting must be chemically removed. All spalled or deteriorated concrete should be mechanically removed by scabbling or chipping hammers. Acid etching is not acceptable.

b. Repair or level damaged concrete with MorriFill Epoxy Fill Mortar. Latex fills or self leveling underlayments are not acceptable.

c. Cracks and non-expansion joints greater than 1/16" (1.6mm) wide after surface preparation shall be prepared until sound.

C. Protect other work from dust generated by grinding operations. Control dust to prevent air pollution and comply with environmental protection regulations.

1. Erect and maintain temporary enclosures and other suitable methods to limit dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

3.03 EPOXY TERRAZZO INSTALLATION WITH CRACK DETAILING

A. General:

1. Comply with N.T.M.A.'s written recommendations for terrazzo and accessory installation.

2. Place, rough grind, grout, cure grout, fine grind, and finish terrazzo according to manufacturer's written instructions and N.T.M.A.'s "Guide Specification for Epoxy Terrazzo."

3. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.

4. Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.

B. Divider and Accessory Strips: Install in locations indicated in adhesive setting bed without voids below strips.

C. Control-Joint Strips: Install back to back directly over concrete control and now-doweled construction joints leaving a space appropriate for anticipated movement- typically 1/4" – 3/8" (6.35 mm – 9.5 mm). Fill gap between control joints with ColorFlex Flexible Epoxy Joint Sealant.

D. Cracks and Non-Expansion Joints

1. Type 1 - Hairline cracks shall be filled with epoxy primer and receive detail coat of epoxy primer with 6" (15.24 cm) fiberglass tape.

2. Type 2 - Fill cracks greater than hairline but less than 1/16" (1.6mm) wide after surface preparation with epoxy primer or MasterFlex Membrane. Place detail coat of Membrane over crack and embed 12" (30.48 cm) wide MasterFlex fabric. Lightly abrade or solvent wipe treated cracks prior to applying primer.

3. Type 3 - Fill cracks greater than 1/16" (1.6mm) with MasterFlex Membrane. Place 25-30 mil detail coat so that Membrane extends at least 9" (22.86 cm) to 12" (30.48 cm) on each side of crack or joint. After Membrane has leveled, lay precut MasterFlex Fabric into wet Membrane. Smooth cloth with a flat steel trowel, allowing cloth to be encapsulated but remain exposed on the surface of Membrane. Lightly abrade or solvent wipe treated cracks prior to applying primer. Allow in base bid for above crack detailing as follows - 5% of lineal footage of total project square footage for combined Type 1 & 2, and 3% of lineal footage of Type 3. {i.e., a 10,000 sq ft (92.9 sq. m) project would allow for a combined 500 lineal feet (152 m) of Type 1 & 2 repairs and 300 lineal feet (91.4 m) of Type 3 repairs.}

E. Primer: Apply epoxy primer evenly over prepared substrate, cracks and non-expansion joints at the rate of 200-300 square feet (18.6 – 27.9 sq. m) per gallon (3.785 liters) for normal concrete, to thoroughly wet surface, but avoiding "ponding" the material. (Highly porous concrete may require additional material.)

F. Placing Terrazzo:

1. Mix terrazzo binder with chips and fillers in ratios as approved by manufacturer.

2. Trowel apply terrazzo mixture over epoxy primer to provide smooth seamless surface at a minimum of 3/8" (9.5 mm) thick. Allow cure per manufacturer's recommendations prior to grinding operations.

G. Rough Grinding: Grind with 24 or finer grit stones or with comparable diamond plates.

H. Intermediate Grinding: Follow initial grind with 80 or finer grit stones.

I. Grouting:

1. Cleanse floor with clean water and rinse thoroughly.

2. Remove excess rinse water by wet vacuum and machine until completely dry.

3. Apply epoxy grout to fill voids.

J. Fine Grinding: Grind with 120 grit stones until all grout is removed from surface. Repeat rough grinding, grout coat, and fine grinding if large voids exist after initial fine grinding. Produce surface with a minimum of 70 percent aggregate exposure.

K. Remove and replace terrazzo areas that evidence lack of bond with substrate. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo.

L. Construction Tolerances: Limit variation in terrazzo surface from level to 1/4“ (6.35 mm) in 10 feet (304.8 cm).

3.04 PRECAST EPOXY TERRAZZO

A. Set units using method recommended by N.T.M.A. and manufacturer unless otherwise indicated. Set units with alignment level and true to dimensions, varying 1/16“ maximum in length, height, or width.

1. Back-butter for full contact with substrate.

B. Seal joints between units with joint sealants.

3.05 CLEANING AND PROTECTING: Upon completion, the work shall be ready for final inspection and acceptance by the owner or his agent. The general contractor shall protect the finished floor from the time the terrazzo contractor completes the work and requests final inspection.

END OF SECTION

SECTION 09510 ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Lay-in acoustical panels (2’ by 2’ 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 ROJECT 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' by 2' 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 l0 pounds per cubit 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 l, Direct Hung.

1. Hanger Wires: Galvanized carbon steel, ASTM A 64l, soft temper pre-stretched, yield-stress load of at least 3 times design load, but not less than l2 gage (0.l06 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 Project 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 l/8 inch in l2 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 l6 inches on center and not more than 3 inches from ends, leveling with ceiling suspension system to tolerance of l/8 inch in l2 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 09549 WIDE PANEL METAL CEILING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wide panel metal ceiling systems consisting of :

1. Aluminum panels with beveled edges.
2. Suspension carrier systems and accessories.

B. Related Sections:

1. Division 15 Sections: Mechanical air grilles, diffusers, and fire sprinklers.
2. Division 16 Sections: Lighting fixtures.

C. System Description: The wide panel metal ceiling system consists of prefinished metal panels, suspension carrier system and accessories, including provisions for the incorporation of mechanical diffusers and lighting fixtures. The system installations are for interior applications.

D. Performance Characteristics: Provide manufacturer's standard system which when installed will provide the following minimum requirements:

1. Flame Spread: 0 – 25 per ASTM E-84.
2. Noise Reduction Coefficient (NRC): 0.70 minimum for perforated panels.

1.02 SUBMITTALS

A. Product Data: Manufacturer's published literature, including specifications.

B. Shop Drawings, showing:

1. Reflected ceiling plan(s): metal ceiling layout, ceiling mounted items and penetration locations.
2. Suspension carrier system and component layout.
3. Details of system assembly and connections to building components.

C. Samples; submit:

1. Specified wide metal panels: Minimum of one (1) actual size panel of each type and finished required by the Project.
2. Color samples: Manufacturers standard colors (finishes) to Architect's selection.
3. Suspension carrier system components and moldings/trim. A minimum 12 inch length of each type required.

D. Quality Assurance/Control Submittals:

1. Test Reports: Certified reports from independent agency substantiating structural compliance to wind loads and
2. Certificates:

a. Data substantiating manufacturer and installer qualifications.
b. Certified data attesting fire rated materials comply with specifications

3. Manufacturer's Instructions: Detailed installation instructions and maintenance data.

1.03 QUALITY ASSURANCE

A. Manufacturer/Installer Qualifications:

1. Provide metal ceiling system components produced by a single manufacturer with a minimum 3 years experience in actual production of specified products and with resources to provide consistent quality in appearance and physical properties without delaying the work.
2. Provide suspension carrier system components produced by a single manufacturer to provide compatible components for a complete metal ceiling system installation.
3. Perform installations using a firm with installers having no less than 3 years of successful experience on projects of similar size and requirements.

B. Regulatory Requirements:

1. Fire Rating Performance Characteristics: Install system to provide a flame spread of 0 – 25, complying with certified testing to ASTM E-84.
2. Installation Standard for Suspension System: Comply with ASTM C-636.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver system components in manufacturer's original unopened packages, clearly labeled.

B. Store components in fully enclosed dry space. Carefully place on skids, to damage from moisture and other construction activities.

C. Handle components to prevent damage to surfaces and edges, and to prevent distortion and other physical damage.

1.05 PROJECT/SITE CONDITIONS

A. Begin system installations only after space are enclosed and weathertight, and after all wet work and overhead work have been completed.

B. Prior to starting installations, allow materials to reach ambient room temperature and humidity intended to be maintained for occupancy.

1.06 EXTRA MAINTENANCE MATERIAL

A. Provide 10 percent of installed quantity to owner as "attic stock".

B. Provide extra material, matching installed material, in manufacturer's original packages clearly labeled.

C. Deliver extra stock and access tools to owner's representative.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Drawings and Specifications are based on “Luxaion” Wide Panel metal ceiling system manufactured by Hunter Douglas Architectural Products, Inc., 5015 Oakbrook Parkway, Suite 100, Norcross, GA 30093. Tel. (800)366-4327.

B. Equivalent products by the following manufacturers are acceptable:

1. Chicago Metallic Corp., 4849 S. Austin Ave., Chicago, IL 60638. Tel. (800) 323-7164.
2. USG Interiors, Inc., 125 S. Franklin, Chicago, IL 60606. Tel. (877) 874-4200.

A. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 CEILING PANEL MATERIALS

A. Wide panel type:

1. Panel 300C: Roll formed aluminum, 0.7 mm (0.028 inches) thick; 300 mm (11.811 inches) wide, with perforated face, fabricated to provide a beveled edge joint between panels when installed with a clip-in type suspension system.

B. Panel Length: As indicated on drawings.

C. Panel Style:

1. Perforated panel pattern:

a. 1.5 mm diameter by 3 mm staggered centers (23% open area).

D. Panel Finish:

1. Interior: To be selected from manufacturer’s standard colors.

2.03 SUSPENSION SYSTEM MATERIALS

A. 300C Panel concealed clip-in suspension system: Provide 38 mm (1-1/2 inch) deep, 1.5 mm (16 ga.) galvanized steel “C” channel primary runners with manufacturer’s cross connector clamps, to which is attached secondary inverted V-shaped formed clip-in style runners of 0.6 mm (.024) inch) thick galvanized steel, by 38 mm (1-1/2 inch) high, that received the ceiling panels.

1. Provide manufacturer’s standard metal clip-in suspension system components, including runner and rail splices and connectors, wall and ceiling brackets, locking clips, hanger rods and adjustment springs, and edge trim.

2.04 CEILING SYSTEM ACCESSORY MATERIALS

A. Edge Trim:

1. Manufacturer’s standard aluminum, L-shaped profile edge trim moldings.

B. Acoustical Materials – black finish and no surface printing.

1. Non-woven acoustic tissue: 0.2 mm (.008 inch) thick.
2. NRC Rating: Not less than 0.70 for in-place material over perforated metal ceiling panels.

C. Air Distribution Devices: Provide distribution devices that are independently suspended, relocatable, adjustable from below finished ceiling, capable of being fully integrated with ceiling system.

D. Lighting Fixtures: Provide fixtures capable of being fully integrated with ceiling system and requiring no interruption of ceiling components, that are independently suspended, and as selected to conform to lighting criteria specified in Division 16.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas receiving wide panel metal ceiling system for conditions that might adversely affect the installation.

B. Verify that all work above ceiling system has been satisfactorily completed prior to start of ceiling installations.

C. Do not start ceiling installations until all unsatisfactory conditions affecting ceiling systems have been corrected.

3.02 PREPARATION

A. Provide layouts for inserts, clips and other support items required to be installed by other trades. Furnish inserts, clips and related items to other trades in a timely manner to preclude construction delays.

B. Coordinate with other trades for proper installation of inserts and related items.

C. Verify ceiling layouts by actual field measurements.

1. Establish ceiling layout to balance borders and minimize out-of-shape conditions. Coordinate all work that penetrates ceiling panels.

3.03 INSTALLATION

A. Install wide panel metal ceiling system in accordance with manufacturer's printed installation instructions, submittals, applicable industry standards, and governing regulatory requirements for the Work.

B. Suspension System Installation:

1. Install suspension system to comply with requirements of ASTM C-636.
2. Support hangers securely fro building structure using hanger rods or wires directly attached to structure, or to inserts or other devices with eye-screws, by looping and wire-tying.

C. Install acoustical material above ceiling panels to comply with manufacturers instructions.

D. Install ceiling panels and trim pieces with neat, tight joints and to comply with approved details.

1. Cut panels as necessary to fit at borders and other penetrations and install panel splices to comply with manufacturer instructions.
2. Install end trim and edge molding trim at perimeter to wide panel metal ceiling system and at other locations where required to conceal edges of ceiling.

E. Install air distribution devices and lighting fixtures at indicated locations.

1. Support devices and fixtures from building structure above, independent from ceiling suspension system.

3.04 ADJUST AND CLEAN

A. Adjust components to provide uniform tolerances.

B. Replace all ceiling panels that are scratched, dented or otherwise damaged.

C. Clean exposed surfaces with non-solvent, non-abrasive commercial type cleaner.

END OF SECTION

SECTION 09640 WOOD FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Factory-finished wood flooring as shown on the Drawings and schedules.

1.02 RELATED SECTIONS

A. Section 06100 - Rough Carpentry

B. Section 07260 - Vapor Retarders (Floor Protection Paper)

C. Section 09050 - Color Design

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: To verify finish and species selected.

1.04 QUALITY ASSURANCE

A. Manufacturer: Provide products from company with at least 5 years experience in the manufacture of engineered hardwood flooring.

B. Installer: Installer shall be a certified installer with least 3 years experience in successful installations of similar product.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver wood flooring materials in unopened cartons or bundles.

B. Protect wood flooring from exposure to moisture. Do not deliver wood flooring until after concrete, masonry, and similar wet work is complete and dry.

C. Store wood flooring materials in a dry, warm, ventilated, weathertight location.

1.06 PROJECT CONDITIONS

A. Conditioning period begins not less than seven days before wood flooring installation, is continuous through installation, and continues not less than seven days after wood flooring installation.

1. Environmental Conditioning: Maintain an ambient temperature between 65 and75 deg. F and relative humidity planned for building occupants in spaces to receive wood flooring during the conditioning period.

2. Wood Flooring Conditioning: Move wood flooring into spaces where it will be installed, no later than the beginning of the conditioning period.

   a. Do not install flooring until it adjusts to relative humidity of, and is the same temperature as, space where it is to be installed.

   b. Open sealed packages to allow wood flooring to acclimatize immediately on moving flooring into spaces in which it will be installed.

B. After conditioning period, maintain relative humidity and ambient temperature planned for building occupants.

C. Install factory-finished wood flooring after other finishing operations, including painting, have been completed.

1.07 WARRANTY

A. Lifetime structural and adhesive bond warranty. Three year warranty on finish.

PART 2 PRODUCTS

2.01 FACTORY-FINISHED WOOD FLOORING

A. Engineered Wood, Plank Flooring:

1. Available Products: Subject to compliance with requirements, provide:

   a. Hartco Valenza Commercial Collection Engineered Hardwood by Armstrong Commercial Hardwood.

   b. Or equal

2. Species: Jatoba

3. Gauge: 5/8 inch thickness overall, nominal. 10-ply cross-grain engineered construction.

4. Width: 3-1/2 inch wide, random lengths.

5. Gloss: Low gloss satin finish

6. Edge Style: Micro-beveled edges and ends

7. Color: Refer to Section 09050 for color selection.

2.02 ACCESSORY MATERIALS

A. Wood sub-floor and underlayment: Refer to Drawings and Section 06100 Rough Carpentry.

B. Wood flooring adhesive: Mastic recommended by flooring and adhesive manufacturers for application indicated.

C. Fasteners: As recommended by manufacturer.

D. Edge Trim: In same species and grade as wood flooring.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas and conditions, with Installer present, for compliance with requirements for ambient air conditions, installation tolerances, and other conditions affecting performance of wood flooring.

1. Verify that substrates comply with tolerances and other requirements specified in other Sections.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Substrate shall have a tolerance of a maximum 1/8-inch deviation in any direction when checked with a 10-foot straight edge.

B. Broom or vacuum clean substrate to be covered immediately before product installation. After cleaning, examine substrate for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after satisfactory conditions have been corrected.

3.03 INSTALLATION

A. Comply with flooring manufacturer's written installation instructions.

B. Provide expansion space at walls as recommended by manufacturer but no more than will be covered by base material.

3.04 PROTECTION

A. Protect installed wood flooring during remainder of construction period with covering of floor protection paper. Do not use plastic sheet or film that might cause condensation.

B. Do not move heavy or sharp objects directly over protection covered wood flooring. Protect flooring with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

C. Repair or replaced any planks damaged during installation or subsequent construction work so that no evidence remains of correction.

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 Armstrong Commercial Flooring, P.O. Box 3001, Lancaster, PA 17604, Tel. (800) 292-6308.

B. Equivalent products by the following manufacturers are acceptable:

1. American Tile, Inc., 4302 N. Camino Ferreo, Tucson, AZ 85750, Tel.: (520) 577-2969.
2. Azrock Commercial Flooring, P.O. Box 354, Florence, AL 35631, Tel. (800) 558-2240
3. Mannington Resilient Floors, P.O. Box 30, Salem, NJ 08079, Tel. (800) 241-2262

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 TILE FLOORING

A. Vinyl Composition Tile: Federal Specification SS-T 312b: Type IV, Composition 1; ASTM F 1066: Composition 1, Class 2, Stonetex Excelon, as manufactured by Armstrong Commercial Flooring, P.O. Box 3001, Lancaster, PA 17604, Tel. (800) 292-6308.

B. Size: 12 inches by 12 inches.

C. Thickness: 1/8- inch gage.

D. Colors: Colors to be selected by the Architect from manufacturer's full range of standard colors.

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, 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 the 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 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, 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: Provide pattern as indicated in the drawings and schedules.

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. Sweet 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 09655 RUBBER FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES: Rubber Flooring Tile, Stair Treads, Risers, and Accessories.

1.02 RELATED SECTIONS

A. Section 07260 – Vapor Retarders (Floor protection paper).

B. Section 09050 – Color Design.

C. Section 09650 – Resilient Flooring (Base).

1.03 SUBMITTALS

A. Submit manufacturer's product data and written instructions for recommended installation and maintenance practices for each type of rubber flooring and accessories.

B. Samples for Verification: Provide samples for all products required for installation in colors, finishes, and patterns indicated.

C. For products requiring color, finish, and pattern selection that are not indicated, submit complete line of color samples for selection, to match level of quality of adjacent items specified.

1.04 QUALITY ASSURANCE

A. Wherever possible, provide rubber flooring, adhesives, cleaners, 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 Johnsonite, 16910 Munn Road, Chagrin Falls, Ohio 44023, phone 800-899-8916.

B. Subject to compliance with requirements, including color, pattern and finish, equivalent products by the following manufacturers are acceptable:

1. The R. C. Musson Rubber Co., 1320 E. Archwood Ave., Akron, OH 44306, Tel. (800) 321-2381.
2. Roppe Corp., 1602 N. Union Street, Fostoria, OH 44830, Tel. (800) 537-9527.
3. Flexco, 1401 East 6th Street, Tuscumbia, AL 35674, Tel: 800-633-3151.

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 RUBBER FLOORING TILE (At Intermediate and Second Floor Stair Landings)

A. Johsonite Roundel Speckled Rubber Tile.

B. Size: Tile 24 inches by 24 inches.

C. Thickness: 1/8- inch.

D. Surface Texture: Raised Square (RTSP)

E. Color: Refer to Section 09050 Color Design.

2.03 RUBBER STAIR TREADS AND RISERS

A. Johnsonite Roundel Speckled One-Piece Stair Tread and Riser system.

B. Size: Full length of stair tread.

C. Surface Texture: Visually-Impared Roundel Raised Square Pattern with 2 inch wide contrasting color grit tape insert.

D. Color: Refer to Section 09050 Color Design.

2.04 ACCESSORIES

A. Provide all necessary rubber accessories and trim pieces required for a complete installation.

B. Adhesives (Cements): As recommended by flooring manufacturer to suit material and substrate conditions.

C. 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 rubber 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 rubber flooring 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, and edgings. Scribe around obstructions to produce neat joints, lay tight, even, and straight. Extend flooring into toe spaces and door reveals.

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 and Pattern Matching: Lay tile so texture pattern aligns with patter on stair tread and risers. Adjust edge of tile location as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis. 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 floor tile with grain in all tiles running in the same direction, to match stair tread and riser grain direction.

E. Accessories: Apply necessary trim pieces, edge trim and accessories where required. Tightly cement rubber accessories to subbase in accordance with above installation procedures.

3.04 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. 72 hours after installation is completed, initial maintenance procedures shall be implemented in accordance with manufacturer's requirements.
2. Keep heavy equipment off the floor at least 5 days to allow the adhesive to set.
3. Sweet or vacuum thoroughly, and remove residual adhesive with a clean white cloth dampened with cleaners as recommended by flooring manufacturer.
4. Wet clean and then dry buff rubber flooring in accordance with flooring manufacturer's instructions.

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, wet clean and then dry buff rubber flooring and accessories in accordance with flooring manufacturer's instructions.

END OF SECTION

SECTION 09680 CARPET

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The extent of each type of carpeting is indicated on the Drawings, and includes carpet and accessories. Each type of required carpet is specified by data sheets, included as last pages of this section.

1.02 SUBMITTALS

A. Submit manufacturers technical data to show compliance with requirements. Include laboratory test reports and manufacturer's certifications and installation/maintenance instructions and recommendations. Submit additional copy of all submittals to installer.

B. Test Certifications: Submit independent test reports that products specified comply with the ratings specified in Paragraph 1.03, Quality Assurance and the following:

1. Critical Radiant Flux of Floor Covering Systems test rating in accordance with N.F.P.A. Standard No. 253 - 1984 and ASTM E 648.

2. Flammability of Floor Covering Materials in accordance with C.P.S.C. FF 1 70 or ASTM D 2859.

3. Smoke Density Test of Materials in accordance with N.F.P.A. Standard No. 258 or ASTM E 662.

C. Submit three 18" x 27" samples of each carpet required, and 6" lengths of exposed edge stripping.

D. Submit installers qualifications and experience record.

1.03 QUALITY ASSURANCE

A. Installer must be a firm with not less than 5 years of carpeting experience, similar to work of this section. Manufacturer must be a firm with not less than 5 years of production experience with carpet similar to types specified in this section; and whose published product literature clearly indicates compliance of product with requirements of this section. Installer shall be approved by the manufacturer of the carpet specified. Installation shall be under direct observation of an experienced supervisor thoroughly familiar in this type of work. Mechanics executing this work shall also be qualified and experienced in all facets of the work performed.

B. General Standard: Comply with recommendations of "Carpet Specifiers Handbook" by The Carpet and Rug Institute, which can be reasonably applied to types of carpeting required.

C. Product Performance Testing; Flame/Smoke Resistance:

1. National Flammability Std. CPSSD FF1 70 or ASTM D 2859 (Methenamine Pill Test). Result: Pass (Self Extinguishing)

2. Radiant Panel Test ASTM E 648: For burning under varying radiant energy levels. Result: Class 1, greater than .45 watts/sq./cm.

3. Smoke density test NFPA 258 and ASTM E 662 for measuring optical density of smoke generated in a radiant heat chamber, with and without flame. Result: Pass (Less than 450 smoke develop limit)

1.04 REPLACEMENT MATERIALS AND EXTRA STOCK

A. After completion of work, deliver to the project site not less than a minimum of 5% of carpet of each type, color, and pattern of carpet and carpet accessories specified and installed. Furnish replacement materials from the same manufactured sequence as the materials installed, in protective wrapping and properly labeled and identified.

B. Deliver extra materials to Owner in accordance with Section 01770 – Closeout Procedures.

1.05 PRODUCT DELIVERY AND STORAGE

A. Deliver carpeting materials in protective wrapping, and store inside, protected from weather, moisture and soiling.

1.06 WARRANTY

A. Provide special warranty, signed by Contractor, Installer and Manufacturer (Carpet Mill), agreeing to repair or replace defective materials and workmanship of carpeting work during 1-year warranty period following acceptance. Attach copies of product warranties.

PART 2 PRODUCTS

2.01 CARPET

A. Data Sheets/Schedule: Each required type of carpet is specified by either carpet data sheet at end of this section or carpet schedule on Drawings, to the extent not specified by provisions of this section.

B. CARPET FIBER (Filament): Refer to carpet data sheet/schedules for selection of fiber or fiber blend required for each type of carpet.

C. CARPET FACE YARN: Except as otherwise indicated or designated by data sheet, fabricate carpet from yarns to denier (weight), plies and twist recommended by manufacturer to achieve the colors, patterns and textures indicated.

D. CARPET COLOR, PATTERN, TEXTURE: Unless otherwise indicated or shown on data sheets, match Architect's sample(s) or match manufacturer's stock carpet(s) as designated for control/selection of color, pattern and texture.

E. CARPET CONSTRUCTION: Fabricate carpet by the construction method indicated or shown on data sheets, as recognized in the carpet industry, using manufacturer's (mill's) standard process.

1. Pile Density Factory Weight (Weight Basis): Tufts per sq. in. (double yarns) multiplied by yarn denier; as indicated.

2. Pile Thickness (Height): Average height above backing, ASTM D 418; as indicated.

3. Pile Face Weight: Oz. per Sq. Yd. above backing, as indicated.

4. Gage or Pitch: Gage is spacing of tufts and pitch is number of tufts in 27", measured at each row of tufts in width of carpet; as indicated.

5. Unitary Backing: Except as otherwise indicated, provide carpet manufacturer's standard type and weight of backing materials, as recommended for adequate strength and carpet stability without application of secondary sheet-type backing, and as appropriate for service and exposure indicated.

6. Primary Backing: Except as otherwise indicated, provide construction or sheet goods, of natural or synthetic fibers or non- woven sheets, as applicable to the carpet construction indicated, and appropriate for the service and exposures indicated.

7. Back Coating: Liquid latex coating or manufacturer's similar equivalent coating as required for carpet stability and tuft bind as indicated. Unless otherwise indicated, provide tuft bind of not less than 8 lbs. for looped pile and 6 lbs. for cut pile, ASTM D 1335.

8. Tufted Carpet: Provide coating weight of not less than 15 oz. per sq. yd.

9. Secondary Backing: Provide 8.0 oz. per sq. yd. woven jute carpet backing. Laminate to primary backing with latex or similar adhesive recommended by manufacturer; provide a bond strength of 2 lbs. per in., FS DDD-C-0095.

10. Carpet Flammability: Provide carpet which passes the flammability test of ASTM D 2859 (DOC FF-1-70), Pill Test.

2.02 CARPET CUSHIONS

A. Provide manufacturer's standard carpet cushion of type, weight and thickness indicated. Refer to drawings for space-to-space variations (if any) in carpet cushion requirements. Provide cushion which passes pill test for flammability, ASTM D 2859 (DOC FF-l-70).

B. Provide carpet cushion for carpet No. l equal to l/4" air step slab rubber padding as manufactured by General Tire Industries.

2.03 CARPET ACCESSORIES

A. Carpet Edge Guard, Nonmetallic: Extruded or molded vinyl or rubber carpet edge guard equal to Model No. 15 as manufactured by Mercer Plastics Company, 1 Jabez Street, Newark, New Jersey. Colors selected by Architect from among standard colors available.

B. Installation Adhesive: Water resistant type as recommended by carpet manufacturer, and which complies with flammability requirements for installed carpet.

C. Seaming Cement: Hot-melt seaming adhesive or similar product recommended by carpet manufacturer, for taping seams and buttering cut edges at backing to form secure seams and prevent pile loss at seams.

D. Miscellaneous Materials: As recommended by manufacturers of carpet and other carpeting products; and selected by installer to meet project circumstances and requirements.

PART 3 EXECUTION

3.01 PRE-INSTALLATION REQUIREMENTS:

A. Installer must examine substrates for moisture content and other conditions under which carpeting is to be installed, and notify Contractor in writing of conditions detrimental to proper completion of the work. Do not proceed until unsatisfactory conditions have been corrected. Contractor and installer shall be responsible for providing necessary moisture tests on substrate. If substrate is not within acceptable manufacturers tolerances, provide necessary temperature and humidity controls, sealants and coatings, special backings, etc. as required to allow carpeting to be installed in accordance with manufacturers specifications and requirements.

B. Clear away debris, remove stains and spills and scrape up cementitious deposits from surfaces to receive carpeting; vacuum clean immediately before installation. Check concrete surfaces to ensure no “dusting” through installed carpet; apply sealer where required to prevent dusting.

C. Sequence carpeting with other work so as to minimize the possibility of damage and soiling of carpet during the remainder of the construction period.

3.02 INSTALLATION

A. Comply with manufacturers' instructions and recommendations for seam locations and direction of carpet; maintain uniformity of direction and lay of pile. At doors, center seams under doors; do not seam in traffic direction at doorways. Extend carpet under open-bottomed obstructions and under removable flanges and furnishings and into alcoves and closets of each space.

B. Provide cut-outs where required, and bind cut edges properly where not concealed by protective edge guards or overlapping flanges. Install carpet edge guard where edge of carpet is exposed; anchor guards to substrate.

C. Install carpet by trimming edges, buttering cuts with seaming cement, taping or sewing or taping-and-sewing seams to provide sufficient strength for stretching and continued stresses during life of carpet. Apply seaming cement over stitching on backing, if not covered by tape.

D. Stretch carpet both directions, the exact amount recommended by carpet manufacturer; trim edges, secure to stripping, and conceal behind edge of stripping. Use power stretchers where sufficient space is available to operate stretchers properly.

3.03 CLEANING AND PROTECTION

A. Remove debris, sorting pieces to be saved from scraps to be disposed of. Vacuum carpet using commercial machine with face-beater element. Remove spots and replace carpet where spots cannot be removed.

B. Advise Contractor of protection methods and materials needed to ensure that carpeting will be without deterioration or damage at time of acceptance.

C. Restretching: Return to installation after approximately 6 months of occupancy and use; restretch carpet in each space, repair faults in seaming, trim and adjust carpeting at edges.

3.04 The individual carpet data sheets as follows:

CARPET NO. 1 DATA SHEET

Manufacturer:	Shaw Contract
Style name	Movement©
Construction	Pattern Loop
Fiber Product	88% ECO Solution Q® BCF SD nylon 12% yarn dyed BCF nylon with recycled content
Protective Treatments	SSP® Shaw Soil Protection
Dye Method	Solution Dyed
Primary Backing	Polypropylene
Electrostatic Propensity	less than 3.5KV - permanent conductive filament
Flammability	ASTM E-648 flooring radiant panel, Class 1 ASTM E-662 NBS smoke chamber, less than 450
Style Number	50875
Secondary Backing	ActionBac®
Gauge	1/10
Stitches per inch	12.0
Production yarn weight	28.0 oz/yd²
Finished Pile Thickness	0.165 inches
Average density	6,109 oz/yd³
Weight density	171,052
Pattern repeat	13/32"W x 22/32"L
Warranty	10 year limited

CARPET NO. 2 DATA SHEET

Manufacturer:	Lees Carpet (Modular Tile)
Type:	First Step L8512
Construction:	Tufted
Surface Texture:	Performance Loop Pile
Gauge	5/32"
Stitches	8.5 per inch
Finish Pile Thickness	0.249" avg
Face Yarn	DuPont nylon 6,6 with nylon 6,6 scraper yarn
Dye System	Yarn Dyed
Fiber Technology	Burlguard® soil release technology
Face Yarn Weight	38 oz/yd²
Backing Materials	Intergrated Cushion Thermobond™ Tile
Primary	Reinforced Synthetic
Bonding Agent	Premium vinyl
Secondary	Fiberglass reinforced thermoplastic composite
Total Weight	215.45 oz/yd²
Size	18 inches by 18 inches
Static	3.0KV when tested under the Standard Shuffle Test 70 degrees Fahrenheit - 20% R.H.
Flammability	Passes DOC-FF-1-70 Pill Test
Flooring Radiant Panel Test	Meets NFPA Class 1 when tested under ASTM E-648 glue down
Smoke Density	NBS Smoke Chamber NFPA-258 - Less than 450 Flaming Mode

Warranties

Wear	Lifetime of carpet, non-prorated. No more than 10% face yarn loss by weight in normal use.
Static	Lifetime of carpet, non-prorated.
Edge Ravel	Lifetime of carpet, non-prorated. Guaranteed no edge ravel in normal use and no seam sealers required.
Delamination	Lifetime of carpet, non-prorated.
Tuft Bind	Lifetime of carpet, non-prorated. Guaranteed not to zipper, wet or dry
Adhesive	Use of Lees adhesives will bond the carpet to the substrate for the life of the carpet.

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 MDOT Architect. Types to be located as shown on the Drawings or as directed by the MDOT Architect.

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 HANDELING

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 LANARK Wallcovering, 10 Bloomfield Avenue, Pine Brook, NJ. 07058. Local Supplier is Davis & Company. Tel. (601) 824-0937.

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 MDOT 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:	JM Lynn
Pattern:	Bacara Geo
Pattern Number:	J220-008 Orsay
Width:	54 inches
Backing:	Osanburg
Weight:	20 ounces per linear yard
Type II	
Class A Flame Rated:	Flame – 15
	Smoke – 25
Reverse pattern / random match	
Pattern Repeat:	V-24”, H-52”

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 09728 FABRIC WALL COVERING

PART 1 GENERAL

1.01 SECTION INCLUDES: Fabric wall covering as shown on the Drawings and Schedules. Provide type as selected by the Architect. Types to be located as shown on the Drawings or as directed by the Architect.

1.02 RELATED SECTIONS: 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. Submit Contractor / Installer qualifications and experience record.

C. Certifications: Submit manufacturer's test data certifying that the products meet the flame spread ratings and smoke development values specified herein in accordance with N.F.P.A. Standard No. 255, Standard Method of Test of Surface Burning Characteristics of Building Materials, or N.F.P.A. Standard No. 701, Standard Method of Fire Tests for Flame-Resistant Textiles and Films.

D. Samples: Submit 3 samples of each type of wallcovering, and moldings mounted on hardboard backing. Submit three 12 inch square samples of each type of wallcovering to illustrate the range of color and pattern variation. Include finished materials as required. Review of samples will be for design, color, texture and pattern only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

E. 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.

C. Test Panels: Install test panels for full width, seams and corner applications of wallcovering in areas designated by the Architect. Test panels accepted by the Architect will be used as the standard of comparison for the work. Replace panels which are not acceptable to the Architect until satisfactory installation is achieved.

1.05 DELIVERY, STORAGE AND HANDELING

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.

1.06 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.

1.07 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. Equivalent products by the following manufacturers are acceptable:

1. Designtex Group, Inc., 200 Varick St. 8th Floor, New York, NY 10014. Tel. (800) 221-1540.
2 KnollTextiles, 1235 Water Street, East Greenville, PA 18041. Tel. (800) 343-5665
3. Koroseal Wallcovering, 3875 Embassy Pkwy., Fairlawn, OH 44333. Tel (800) 753-7512.

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 marking, indicating the fire hazard classification of the wallcovering, as determined by NFPA Standard No. 255 and ASTM E 84, or NFPA Standard No. 701, and complying with the following fire hazard specifications:

1. Flame Spread 0-25
2. Smoke Development 0-450

B. Comply with GSA Federal Specifications CCC-W408 for the type and class required, and as herein specified. Provide Class 2 mildew resistant backing unless otherwise specified. Comply with requirements of ASTM D 1308 for determining stain resistance.

2.03 PATTERN, TEXTURE: Pattern and texture shall be as shown in manufacturer's data sheets and Section 09050 – Color Design.

2.04 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,

2.05 DATA SHEETS/SCHEDULE: Each type of wallcovering is specified by wallcovering data sheets as follows:

A. FWC #1 (Not Used)

B. FWC #2

Manufacturer:	KnollTextiles
Style:	Odeon/WC317/B
Color:	Desert
Total Weight:	21 Ounces
Backing:	Acrylic
Roll Width:	54 inches
U.L. Ratings:	ASTM E 84, with acrylic backing Class A

C. FWC #3

Manufacturer:	DesignTex
Style:	Phillipe
Color:	5502-102
Total Weight:	29.1 Ounces per yard
Backing:	Paper
Roll Width:	54 inches
U.L. Ratings:	ASTM E 84 adhered method Class A

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 inches away from any corner; horizontal seams will be permitted only where specifically indicated. 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 COATINGS

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 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, prefinished 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. Samples: Submit color samples for selection by the MDOT Architect from full range of colors.

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 ICI Dulux Paints, 925 Euclid Ave., Cleveland, OH 44115. Tel. (800) 984-5444.

B. Equivalent products by the following manufacturers are acceptable:

1. Devoe - 925 Euclid Ave., Cleveland, OH 44115. Tel. (888) 265-6753.
2. Benjamin Moore & Company, 51 Chestnut Ridge Road, Montvale, NJ 07645. Tel. (800) 344-0400.
3. Porter Paints, 400 S. 13th Street, Louisville, KY 40203. Tel. (800) 332-6270.
4. PPG Architectural Finishes, Inc., One PPG Place, Pittsburgh, PA 15272. Tel. (800) 441-9695.
5. Sherwin-Williams Company, 101 Prospect Ave., NW, Cleveland, OH 44115. Tel. (800) 321-8194.

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 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 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 Metal
   1st Coat – Waterborne Acrylic Primer – ICI Devflex # 4020
   2nd Coat – Waterborne Acrylic Semi Gloss Enamel – ICI Devflex # 4206
   3rd Coat – Waterborne Acrylic Semi Gloss Enamel – ICI Devflex # 4206
   (First coat not required on items that are shop primed.)
   Not less than 2.5 mils dry film thickness.
2. Zinc Coated Metal
   1st Coat – Waterborne Acrylic Primer – ICI Devflex # 4020
   2nd Coat – Waterborne Acrylic Semi Gloss Enamel – ICI Devflex # 4206
   3rd Coat – Waterborne Acrylic Semi Gloss Enamel – ICI Devflex # 4206
   Not less than 2.5 mils dry film thickness.

B. Interior Paint Systems are as follows:

1. Gypsum Drywall
   1st Coat – Latex Primer – ICI Ultra-Hide # 1030
   2nd Coat – Alkyd Semi Gloss Enamel – ICI Ultra-Hide # 1516
   3rd Coat – Alkyd Semi Gloss Enamel – ICI Ultra-Hide # 1516
   Not less than 2.5 mils dry film thickness.
2. Gypsum Drywall (in wet areas)
   1st Coat – Waterborne Primer – ICI Ultra-Hide Gripper # 3210
   2nd Coat – Polyamide Epoxy Gloss – ICI Tru-Glaze # 4508
   3rd Coat – Polyamide Epoxy Gloss – ICI Tru-Glaze # 4508
   Not less than 4.0 mils dry film thickness.
3. Zinc Coated Metal
   1st Coat – Waterborne Acrylic Primer – ICI Devflex # 4020
   2nd Coat – Waterborne Acrylic Semi Gloss Enamel – ICI Devflex # 4206
   3rd Coat – Waterborne Acrylic Semi Gloss Enamel – ICI Devflex # 4206
   Not less than 2.5 mils dry film thickness.
4. Ferrous Metal
   1st Coat – Waterborne Acrylic Primer – ICI Devflex # 4020
   2nd Coat – Waterborne Acrylic Semi Gloss Enamel – ICI Devflex # 4206
   3rd Coat – Waterborne Acrylic Semi Gloss Enamel – ICI Devflex # 4206
   (First coat not required on items that are shop primed.)
   Not less than 2.5 mils dry film thickness.
5. Painted Woodwork
   1st Coat – Alkyd Enamel Undercoat – ICI Ultra-Hide # 1120
   2nd Coat – Alkyd Semi Gloss Enamel – ICI Ultra-Hide # 1516
   3rd Coat – Alkyd Semi Gloss Enamel – ICI Ultra-Hide # 1516
   Not less than 2.5 mils dry film thickness.
6. Stained Woodwork
   1st Coat – Oil Stain – ICI Woodpride # 1700
   2nd Coat – Polyurethane Satin Finish – ICI Woodpride # 1902
   3rd Coat – Polyurethane Satin Finish – ICI Woodpride # 1902

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 contaminates 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 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 Visual Aid Boards and Tackboards.

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 Project 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. Local Supplier is West Architectural Specialties, Inc. Tel. (601) 982-1601.

B. Equivalent products by the following manufacturers are acceptable:

1. Draper, Inc., P.O. Box 425, Spiceland, IN 47385. Tel. (765) 987-7999.
2. March Industries, Inc., P.O. Box 509, Dover, OH 44622. Tel. (330) 343-8825.
3. NACO, 180 N. Sherman Ave., Corona, CA 91720. Tel. (909) 340-2800.

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures

2.02 MATERIALS

A. Visual Aid Board: Equal to Claridge No. 209 Premier Lecture Cabinet Unit with satin anodized finish, LCS marker board back panel, and Fabricork vinyl finish on inside doors in colors and textures as selected by Project Architect from manufacturer's standards. Include fluorescent light fixture with 15 foot cord, pad of white sketching paper, map hooks, felt eraser, and assorted LCS markers. Size to be 4 feet by 4 feet. Four units required unless show otherwise.

B. 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 Project Architect from manufacturer's standards. Size to be 4 feet by 6 feet. Ten units required unless show otherwise.

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 Project 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 Architect.

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 and operating units are adjusted and properly functioning.

B. Adjust length of light cord to remove slack.

C. Clean units in accordance with manufacturer's instructions, breaking in only as recommended.

END OF SECTION

SECTION 10165 PLASTIC LAMINATE TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES: Extent of toilet partition and urinal screen work required is shown on Drawings. Toilet partitions required are plastic laminate, floor-mounted, overhead braced.

1.02 RELATED SECTIONS: Section 09050 – Color Design.

1.03 SUBMITTALS

A. Product Data; Submit manufacturer's detailed technical data for materials, fabrication, and installation, including product data on anchors, hardware, fastenings, and accessories.

B. Shop Drawings: Submit shop drawings for fabrication and erection of toilet partition 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 anchorages 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.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Equivalent products by the following manufacturers are acceptable:

1. Ampco Products, Inc.,4840 NW St. Road, Opa Locka, FL 33054. Tel. (305) 821-5700.
2. General Partitions Mfg. Corp., P.O. Box 8370, Erie, PA 16505-0370. Tel. (814) 833-1154.
3. Knickerbocker Partition Corp, P.O. Box 3035, Freeport, NY 11520. Tel. 95160 546-0550.
4. Metpar Corp., 95 State Street, Westbury, NY 11590. Tel. (516) 333-2600.

B. Substitutions shall fully comply with specified requirements and Section 01630 - Product Options and Substitution Procedures.

2.02 MATERIALS

A. Provide materials which have been selected for surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are **not** acceptable.

B. Plastic Laminate: NEMA Std. LD-3, minimum 0.062" thick, color and pattern as indicated, or if not indicated, as selected by Architect from manufacturer's standards.

C. Core Material for Plastic Laminate: Manufacturer's standard particleboard for plywood, in thickness to provide finished dimension of 1" minimum for doors, panels, and screens, 1-1/4" for pilasters.

D. Wall Brackets: Wall brackets shall be full-length continuous stainless steel. Brackets shall be used for all pilasters to pilaster, pilasters to wall connections and urinal screens.

E. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories, shall be stainless steel with satin finish.

F. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, chromium-plated steel, or brass finished to match hardware, with theft-resistant type heads and nuts. For concealed anchors, use hot-dip galvanized, cadmium-plated, or other rust-resistant protective-coated steel.

G. Overhead bracing shall occur between each partition pilaster and between each front pilaster and wall. Overhead bracing is also required between urinal screen and wall. Manufacturer's standard design with hardware and accessories.

2.02 PARTITION FABRICATION

A. Furnish standard doors, panels, screens, and pilasters fabricated for partition system, unless otherwise indicated. Furnish units with cutouts, drilled holes, and internal reinforcement to receive partition-mounted hardware, accessories, and grab bars, as indicated.

B. Door Dimensions: Unless otherwise indicated, furnish 24" wide inswinging doors for ordinary toilet stalls and 32" wide (clear opening) outswinging doors at stalls equipped for use by handicapped.

C. Pressure-laminate one-piece face sheets to core material with no splices or joints, and with all edges straight and sealed. Seal exposed core material at cutouts to protect against moisture.

2.03 TOILET PARTITION HARDWARE

A. Hinges: Stainless steel continuous for door height and adjustable to hold door open at any angle up to 90 degrees.

B. Latch and Keeper: Manufacturer's standard surface-mounted latch unit, designed for easy emergency access, with combination rubber-faced door strike and keeper.

C. Coat Hook: Manufacturer's standard unit, combination hook and rubber-tipped bumper.

D. Door Pull: Manufacturer's standard unit.

PART 3 EXECUTION

3.01 INSPECTION: Installer must 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.

3.02 INSTALLATION: Comply with manufacturer's recommended procedure and installation sequence. Install partitions rigid, straight, plumb, and level. Provide clearances of not more than 1/2" between pilasters and panels, and not more than 1" between panels and walls. Secure panels to walls with not less than two stirrup brackets so that holes for wall anchorages occur in masonry or tile joints. Secure panels to pilasters with not less than two stirrup brackets located to align with stirrup brackets at wall. Secure panels in position with manufacturer's recommended anchoring devices.

3.03 ADJUST AND CLEAN

A. Adjust and lubricate hardware for proper operation. Set hinges on inswinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors (and entrance swing doors) to return to fully closed position.

B. 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 07600 – Flashing and Sheet Metal.

B. Section 09050 – Color Design.

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.

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. 100 Sams Creek Road, Mineral Wells, WV 26150, Tel. (304) 489-8113
2. Ruskin Manufacturing, 3900 Doctor Greaves Rd., Kansas City, MO 64030. Tel. (816) 761-7476

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures

2.02 WALL LOUVERS: Double Drainable Blade Fixed Extruded Recessed Mullion Louver: 6 inch deep extruded aluminum louver equal to C/S Model 6157. Free area to be 48.8 percent minimum for 48 inches square; free area velocity at point of beginning water penetration (0.01 oz. / sq. ft.) = 897 fpm; intake pressure drop at .01 oz. free area velocity = 0.12 inch H2O.

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 Project Architect from full range of standard colors.

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 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.

E. Refer to Section 07920 for sealant in connection with installations of louvers.

END OF SECTION

SECTION 10245 ARCHITECTURAL SCREEN WALL

PART 1 GENERAL

1.01 SECTION INCLUDES: Materials, labor, equipment and services necessary to furnish, deliver and install aluminum screen walls at Equipment Yards as shown on the Drawings and as specified herein.

1.02 RELATED SECTIONS: Section 05500 – Metal Fabrication and Section – 09050 Color Design.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, technical data, and installation instructions for required products, including finishes and color samples.

B. Shop Drawings: Submit shop drawings for fabrication and reaction of screen 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.

1.04 QUALITY ASSURANCE

A. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details and installation procedures, except as otherwise indicated.

B. Field Measurements: Verify size, location and placement of screen units prior to fabrication, wherever possible.

C. Shop Assembly: Coordinate field measurements and shop drawings with fabrication and shop assembly to minimize field adjustments, mechanical attachment and field assembly of units. Pre-assemble units in ship to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for units for re-assembly and coordinated installation.

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. 100 Sams Creek Road, Mineral Wells, WV 26150, Tel. (304) 489-8113
2. Ruskin Manufacturing, 3900 Doctor Greaves Rd., Kansas City, MO 64030. Tel. (816) 761-7476

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures

2.02 MATERIALS

A. Aluminum Extrusions: ASTM B 211, Alloy 6063-T52.

B. Clip Angles: Structural grade aluminum.

C. Fastenings: Fasteners shall be aluminum or stainless steel. Provide types, gauges and lengths to suit unit installation conditions.

D. Anchors and Inserts: Use non-ferrous metal or hot-dip galvanized anchors and inserts for installation and elsewhere as required for corrosion resistance. Use stainless steel or lead expansion bolt devices for drilled-in place anchors.

2.03 FABRICATION GENERAL

A. Provide Architectural Screen equal to C/S Vert-a-Cade 301 Screen and accessories of design, materials, sizes, depth, arrangement, and metal thickness as indicated or as required for optimum performance with respect to strength; durability; and uniform appearance.

B. Include supports, anchorages, and accessories required for complete assembly.

2.04 SCREEN CONSTRUCTION

A. Blades shall be fabricated from extruded aluminum sections in 6063-T52 alloy, minimum .081 inch thick and spaced approximately 6 3/4 inches on center. Blades to be nominal 4 inches deep, supported and lined up with heavy gauge extruded aluminum blade braces positively interlocked to each blade and mechanically secured to extruded aluminum supports. Aluminum supports fixed directly to horizontal or vertical steel supports, by Contractor, and to spandrel beams with extruded aluminum clip angles. All fasteners shall be stainless steel or aluminum. Material shipped knocked down for field assembly by the installer. Aluminum supports and blade braces to be in mill finish.

2.05 ALUMINUM FINISH

A. General: Comply with NAAMM “Metal Finishes Manual” for finish designations and application recommendations, except as otherwise indicated. Apply finishes in factory after products are assembled. Protect finishes on exposed surfaces prior to shipment. Remove scratches and blemishes from exposed surfaces prior to shipment. Remove scratches and blemishes from exposed surfaces which will be visible after completing finishing process.

B. Fluorocarbon Coating: Inhibitive thermo-cured primer, 0.2 mil minimum dry film thickness, and thermo-cured fluorocarbon coating containing “Kynar 500” resin, 1.0mil minimum dry film thickness. Furnish manufacturer’s twenty (20) year guarantee of “Kynar 500” finish.

C. Finish: Provide Color as indicated in Section 09050 – Color Design or, if not otherwise indicated, as selected by architect from full range of C/S standard Kynar 500 colors.

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 aluminum screen 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.

B. Form tight joints with exposed connections accurately fitted together.

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 manufacturer, make required alterations and refinish entire unit, or provide new units, at manufacturer'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.

E. Use isolation tape where aluminum comes in contact with steel or concrete.

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., 151 Fifth Ave. NW, Suite J, Saint Paul, MN 55112-3268. Tel. (651) 631-1607.
2. Construction Specialties, Inc., P.O. Box 380, Muncy, PA 17156. Tel. (570) 546-5941.
3. Koroseal Wall Protection Systems, Inc. 3875 Embassy Pkwy., Fairlawn, OH 44333. 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.

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. Elevations, and large-scale details of sign wording and lettering layout. Show anchorage and accessory items

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. Local Distributor is ASI/Mississippi. Tel. (601) 981-9540.

B. Equivalent products by the following manufacturers are acceptable:

1. Matthews International Corp., 1315 W. Liberty Ave., Pittsburgh, PA 15226. Tel. (800) 628-8439.
2. Metal Arts, P.O. Box 639, Mandan, ND 58554. Tel. (701) 663-6535.
3. Mohawk Sign Systems, Inc., P.O. Box 966, Schenectady, NY 12301. Tel. (518) 370-3433.
4. Scott Sign Systems, Inc., 7524 Commerce Pl., Sarasota, FL 34243. 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. 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 – 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.

2.04 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.

2.05 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
Auditorium
Work Rooms
File Rooms
Storage Rooms
Electrical Rooms
Mechanical Rooms
All other rooms accessible to the Corridors

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 10420 PLAQUES

PART 1 GENERAL

1.01 SECTION INCLUDES: Wall mounted cast bronze plaque and MS State seal.

1.02 SUBMITTALS

A. Product Data: Indicate materials and lettering types and sizes. Include installation and maintenance procedures.

B. Shop Drawings: Indicate size, location, mounting height and anchorage. Include layout proof for MDOT Architect's approval.

C. Color Selection: Provide samples of materials, texture, colors and finishes available for MDOT Architect's selection.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Drawings and Specifications are based on products manufactured by Matthews International Corp., 1315 W. Liberty Ave., Pittsburgh, PA 15226. Tel. (800) 628-8439. Local Supplier is West Architectural Specialties, Inc. Tel (601) 982-1601.

B. Equivalent products by the following manufacturers are acceptable:

1. A.R.K. Ramos Mfg. Co., 1321 S. Walker, Oklahoma City, OK 73109. Tel. (800) 725-7266.
2. OMC Industries, Inc., P.O. Box 3188, Bryan, TX 77805. Tel. (800) 488-4662.
3. Southwell Co., 928 N. Alamo, San Antonio, TX 78215. Tel. (210) 223-1831.
4. Spencer Industries, Inc., 1508 N. Mascher Street, Philadelphia, PA 19122. Tel. (215) 634-2700.

C. Substitutions shall fully comply with specified requirements and Section 01630 - Product Options and Substitution Procedures.

2.02 PLAQUE

A. Material: Cast bronze, (alloy: minimum 85% copper: 5% zinc) 28 by 40 inches in size, with Dark Oxidized Background Finish, Matt Texture, Single Line, Bevel Edge Border, raised lettering and concealed mounting. Raised lettering and borders shall have Satin Finish. Exact wording and layout as determined by MDOT Architect.

B. Plaque Wording: Include the following:

1. Name of Project.
2. Year the Construction was completed.
3. Name of the Governor.
4. Name of Commissioners.
5. Name of Project Professionals.
6. Name of Contractor.
7. MDOT Logo.

C. Plaque Lettering: Include the following:

1. Style: Helvetica and Helvetica Medium.
2. Heights: As determined by MDOT Architect.
3. Finish: Satin polished.

D. Protective Coating: Two coats clear metal lacquer for entire plaque.

2.03 STATE SEAL

A. Mississippi State Seal, 30 inch diameter plaque as shown on Drawings or as directed by Project Engineer. MDOT Architect will provide camera-ready artwork.

B. Material: Cast bronze, (alloy: minimum 85% copper: 5% zinc) with Dark Oxidized Background Finish, Matt Texture, Single Line, Bevel Edge Border, raised lettering and concealed mounting. Raised lettering and borders shall have Satin Finish. Exact wording and layout as determined by MDOT Architect. One unit required.

C. Protective Coating: Two coats clear metal lacquer for entire plaque.

PART 3 EXECUTION

3.01 INSTALLATION: Install unit plumb and level, in location 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 and polish in accordance with manufacturer's instructions. Protect from damage until acceptance by Owner.

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. Local Supplier is West Architectural Specialties, Inc. Tel. (601) 982-1601.

B. Equivalent products by the following manufacturers are acceptable:

1. Amerex Corp., P.O. Box 81, Trussville, AL 35173. Tel. (205) 655-3271.
2. Larsen's Mfg. Co., 7421 Commerce Lane NE, Minneapolis, MN 55432. Tel. (612) 571-1181.
3. Potter-Roemer, 3100 S. Susan St. Santa Ana, CA 92704. 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 standard bracket designed to prevent accidental dislodgment of extinguisher, of proper size for type and capacity of extinguisher indicated, in manufacturer's standard plated finish.

2.04 EXTINGUISHER CABINETS: Equal to J.L. Industries Cosmopolitan 1032F12 with ADAC option. Provide Fire-FX option where located in a fire rated wall. Cabinet shall accommodate the Cosmic 10E extinguisher. Provide black die-cut letters, vertical.

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 all Kitchens and within 20' of all Mechanical Rooms and exits.

C. Check all cabinets for scratched, nicked, and other surface defects. Cabinets with these conditions shall be repaired or replaced.

END OF SECTION

SECTION 10526 DEFIBRILLATORS

PART 1 GENERAL

1.01 SECTION INCLUDES: Automated External Defibrillator, including cabinets, accessories and mounting brackets.

1.02 SUBMITTALS: Submit manufacturer's technical data and installation instructions.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Drawings and Specifications are based on products manufactured / distributed by J.L. Industries, Inc., 4450 W. 78th Street Circle, Bloomington, MN 55435. Tel. (612) 835-6850. Local Supplier is West Architectural Specialties, Inc. Tel. (601) 982-1601.

B. Substitutions shall fully comply with specified requirements and Section 01630 - Product Options and Substitution Procedures.

2.02 AUTOMATED EXTERNAL DEFIBRILLATOR: Provide Defibrillator for location(s) as indicated on the Drawings, equal to Medtronic LIFEPAK® CR “plus”.

2.03 CABINETS: Provide cabinet(s) equal to J.L. Industries stainless steel recessed type cabinet complying with ADA requirements. Provide Fire-FX option where located in a fire rated wall. Cabinet shall accommodate the Medtronic LIFEPAK® CR “plus” Defibrillator. Provide complete unit(s) with Commander Alarm and Saf-T-Lok™ options.

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. Defibrillator unit(s) shall be mounted in exposed locations as indicated on the Drawings, or if not indicated, as directed by the Architect. A minimum of one unit is required.

C. Check all cabinets for scratched, nicked, and other surface defects. Cabinets with these conditions shall be repaired or replaced.

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 10534 TRANSLUCENT CANOPIES AND WALKWAY COVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Design, manufacture and installation of translucent insulating glazing system. A complete assembly of extruded tight cell polycarbonate glazing panels incorporated into a complete system tested and warranted by the manufacturer as a single source system.

B. All anchors, brackets, and hardware attachments necessary to complete the specified structural assembly, weatherability and water-tightness performance requirements. All flashing up to but not penetrating adjoining work are also required as part of the system and shall be included.

C. Trained and factory authorized labor with supervision to complete the entire panel installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 05120 – Structural Steel

B. Section 07700 – Roof Specialties and Accessories

C. Section 07920 – Joint Sealants

1.03 QUALITY ASSURANCE

A. Skylight system must be evaluated and listed by recognized building code authorities: International Council Evaluation Service, Inc. (ICC-ES) and SBCCI – Public Safety Testing and Evaluation Services, Inc.

B. Materials and Products shall be manufactured by a company continuously and regularly employed in the manufacture of skylights using polycarbonate (not glass) panel systems for a period of at least ten (10) years. Manufacturers shall provide a list of at least ten (10) projects having been in place a minimum of ten (10) years, with similar size, scope, climate and type.

C. Erection shall be by a factory-approved installer that has been in the business of erecting similar material for at least five (5) consecutive years and can show evidence of satisfactory completion of projects of similar size, scope and type.

D. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system, and will ensure that it fully meets all requirements of this Specification and the Drawings.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for complete system.

B. Shop Drawings: Submit detailed drawings showing layout of panels, anchoring details, joint details, trim, flooring, and accessories. Show details terminations and penetrations of materials. Indicated material type, thickness, finish, and color.

C. Samples: Provide two samples of all panel and connection components.

D. Guarantee: The manufacturer shall submit written guarantee accompanied by substantiating data, stating that the products to be furnished are in accordance with or exceed these specifications.

E. Certified Test Reports: The manufacturer shall submit certified test reports made by an independent organization for each type and class of panel system. Reports shall verify that the material will meet all performance requirements of this specification. Previously completed test reports will be acceptable if they are current and indicative of products used on this project. Test reports required are as follows:

1. Self Ignition Temperature (ASTM 1929-3)
2. Smoke Density (ASTM D-2843)
3. Burning Extent (ASTM D-635)
4. Interior Flame Spread (ASTM E-84)
5. Color Difference (ASTM D-2244-85)
6. Weathering (ASTM D-4364)
7. Yellowing Index (ASTM D-1925)
8. Weathering Evaluation before and after exposure to 330^0F, 25 minutes include Light Transmission, Color Change, and Yellowing Index, per ASTM E-1175, ASTM D-2244 and ASTM D-1925 respectively.
9. Shatter Resistance (ASTM D-3841/SPI Method B)
10. Large Missile Test – Impact Resistance per SFBC PA 201-94
11. Insulation "U" Factor per ASTM C-236 configured for/or NFRC100 test conditions of 15mph
12. Air Filtration (ASTM E-283)
13. Water Penetration (ASTM E-331)
14. Load Bearing Capability (ASTM E-330-90)
15. OSHA Life Safety Fall and Walk Through Protection for 300 lb. point load per STD 29 CFR 1910.23(e)(8)
16. OHSA Life Safety STD 29 CFR – Impact loading by blunt object of 500 ft. lbs. per ASTM E-695-03
17. Performance of exterior windows, curtain walls when impacted by windborne debris per ASTM E 1996-02, Level D
18. IES LM-44-90 Testing for Total and Diffused Reflectometry (Diffused Light Transmission)
19. ASTM E 108, FM 4470, NFPA 256, UBC 32-7. ULC-S107, UL 790 Class C Roof Construction
20. High wind load conditions/hurricane endurance design – Dade County Acceptance for 100 P.S.F. per SFBC, PA 201, PA 202, PA 203

F. MAINTENANCE DATA: The manufacturer shall provide recommended maintenance procedures, schedule of maintenance and materials required or recommended for maintenance.

1.05 WARRANTY

A. Provide a single source walkway and canopy system manufacturer warranty for glazing panels and framing system – third party warranty for glazing panels shall **not** be acceptable.

B. Provide manufacturer 10 year warranty to include:

1. Change in light transmission of no more than 6 percent per ASTM D-1003.
2. No delamination of panel affecting appearance, performance or structural integrity of the panel or the system.

3. Thermal aging – the light transmission and the color shall not change after exposure to heat of 300 degrees F. for 25 minutes. (When measured per ADM D-1003 and ASTM D-2244 respectively.)

PART 2 PRODUCTS

2.01 TRANSLUCENT INSULATING INTERLOCKING TIGHT CELL GLAZING TECHNOLOGY

A. The design and performance criteria of this job are based on products manufactured by CPI International, Inc., Phone: (800)759-6985, Fax (847)816-0425; and as locally represented by: Bill Ward – EMACK Slate Company. Telephone: (800)-536-3424 or (251)895-0492

B. Other translucent polycarbonate systems will be considered provided they fully meet all specifications, warranties, modules, and aesthetic intent of the Drawings and Specifications. Fiberglass skins are unacceptable.

2.02 TRANSLUENT PANEL PERFORMANCE

A. Tight Cell Panel Technology – Longevity and Resistance to Buckling and Pressure

1. Translucent Panels shall be of Tight-Cell technology. Wide Cell technology (cell size exceeding 0.18 inches) will **not** be acceptable.
2. The extruded panel shall include an integral extruded Tight-Cell structural core. The panel's exterior skins shall be connected with supporting continuous ribs, perpendicular to the skins, at a spacing not to exceed 0.18 inch (truss-like construction). In addition, the space between the two exterior skins shall be divided by multiple parallel horizontal surfaces, at a spacing not to exceed 0.18 inch.

B. Appearance

1. Panel assembly thickness shall be minimum 0.47 inch with exposed interlocking 1.25 inch wide U battens.
2. Panel Width – Shall not exceed 2 feet to ensure best performance for wind uplift vibration, oil canning and visual appearance. Panels over 2 feet wide will **not** be approved.
3. The panels shall be uniform in color with an integral Tight-Cell core. In a cross section, the core shall be constructed of tight [honeycomb cells for thickness of 8mm to 12mm] not to exceed 0.18 inch by 0.18 inch. The appearance should be equal to CPI's Pentaglas 12 Panel. Wide cell panel configurations greater than 0.18 inch will **not** be accepted.

C. Color: Ice White

D. Translucent Panel Joint System

1. Panel shall be extruded in one single formable length. Maximum panel width shall not exceed 2 feet. Transverse connections will **not** be accepted.
2. The panels should be manufactured with grip-lock double tooth upstands that are integral to the unit. The upstands shall be 90 degrees to the panel face (standing seam dry glazed concept). Welding or gluing of upstands or standing seam will **not** be accepted.
3. The U battens shall have a grip-lock double tooth locking mechanism to ensure maximum uplift capability.

4. The panel system U connection shall meet wind load performance requirements without deterioration after 100 months of Florida outdoor exposure. This performance must be demonstrated by providing independent lab comparison test reports for a weathered vs. a new panel assembly. As a standard for all systems, provide test reports for a 16mm panel assembly, 6 feet wide x 12 feet long with connectors that have been exposed to Florida weather conditions for 100 months per ASTM E-330-97 for lading, ASTM E 1886-97 for cycling and ASTM E-1996-02 for missile impact at design load of 70 PSF.
5. Air Infiltration – must meet standard of ASTM D-283 at test pressures of 12.0 PSF 0.06 SCFM per linear foot of panel U/H joint connection length.
6. Water Penetration – No water penetration of the panel U/H joint connection length at test pressure of 12.0 PSF per ASTM E-331
7. Free movement of the panels shall be allowed to occur without damage to the weather tightness of the completed system.

E. Flammability

1. The exterior and interior faces shall be an approved light transmitting panel with a CC1 fire rating classification per ASTM D-635. Flame spread no greater than 25 per ASTM E-84. Smoke density no greater than 75 per ASTM D-2843 and a minimum self-ignition temperature of 1000 degrees F. per ASTM 1929. The panel shall be self-extinguishing.
2. Interior flame spread classification of Class I per ASTM E84.

F. Impact Resistance – the panels shall pass the following tests:

1. ASTM D-3841/SPI – Impact and Shatter Resistance of 200 ft. lbs.
2. SFBC – PA 201-94, impact resistance of 350 ft. lbs.
3. ASTM E-1996-02 – Must comply with standard specification for performance of exterior windows or curtain walls when impacted by windborne debris at level D and after cyclic wind loading at the specified design load.

G. OSHA Life Safety Standards 29 CFR 1926.502 (i)(2) and 29 CFR 1910.23 (e)(8)

1. Panel assembly shall withstand impact loading by blunt object of 500 foot pounds per ASTM E695-03.
2. Panel assembly shall withstand a 300 pound point load at 4 foot span.

H. Weatherability:

1. The light transmission as measured by ASTM D1003, shall not decrease more than 6 percent over 10 years, or after exposure to temperature of 300 degrees F. for 25 minutes (thermal aging).
2. The panel shall be tested by recognized laboratory for weathering evaluation per ASTM D4363-84 (EMMAQUA, UNBACKED), after exposure to minimum concentrated natural sunlight radiation of 56000MJ/M^2 of UV, 200 – 385 N.M.). The panel shall not change in color more than 5.0 units Delta E, 5.0 units Delta L and Delta B.
3. The panel shall not change color more than 5.0 units (DETLA-E by ASTM D2244) after 60 months outdoor weathering in Arizona determined by an average of at least two samples.

4. Thermal aging – the interior and exterior faces shall not change color in excess of 0.75 Delta E by ASTM D2244 and shall not darken more than 0.3 units (Delta L by ASTM D2244) and 0.2 units Delta Y (YI) by ASTM D1925 and shall not show cracking or crazing when exposed to 300 degrees F. for 25 minutes.

5. The faces shall not become readily detached when exposed to temp of 30 degrees F. and 0 degrees F. for 25 minutes.
6. Panels shall consist of a polycarbonate resin with a permanent, co-extruded, ultraviolet protective layer. Post-applied coating or films of dissimilar materials are unacceptable. Fiberglass skins will **not** be accepted.
7. UM Maintenance – the system shall require no scheduled re-coating to maintain its performance or for UV protection.
8. Panel shall be factory sealed at the sill to restrict dirt ingress.

I. Diffused Light Transmission:

1. As a reference for measuring the quality of the diffused light through the panel assembly, the IES (Illuminating Engineering Societies) LM-44-1990 Approved Method for Total and Diffuse Reflectometry procedure shall be used. Results for a Clear Pentaglas / Single Glazed panel assembly shall be provided as a base standard for comparison.

   b. For Pentaglas / Single Glazed systems with total illuminator flux output at 60 lumens, diffused light transmission requirements are as follows:

Zonal Zone	percentage of transmittance from the maximum Total lumens transmitted through the panels
0-30	66.0
0-40	78.5
0-60	94.0
0-90	100.0

J. The minimum ratio of the panel weight to the panel thickness should be:

1. for 0.47 inch thick Pentaglas 12 panel, 0.54 pound per square foot.

2.03 METAL FRAME STRUCTURE

A. To meet ANSI/ASCE 7-95 building design load, design criteria shall be:

1. Wind Load 100 miles per hour.

B. The Skylight framing is designed to be self-supporting between the support constructions. The deflection of the Structural faming members in a direction normal to the plane of the glazing, when subjected to a uniform load deflection, shall not exceed L/60 for the unsupported span. The skylights will impose reactions to the support construction. All adjacent and support construction must support the transfer of all loads including horizontal and vertical, exerted by the skylights. Design or structural engineering services for the supporting structure of building components not included in the skylight scope are not included under this section.

C. Water Penetration: The Metal Framed Skylight shall allow no water penetration at a minimum differential static pressure of 6.24 pounds per square foot per AAMA 501-94 Pressure Difference Recommendations and as demonstrated by prior testing of typical framing sample per ASTM E-331.

D. Water test of Metal Frame Structure shall be conducted according to procedures in AAMA 501.2.

2.04 METAL MATERIALS

A. Extruded Aluminum shall be ANSI / ASTM B221; 6063-T6: 6063-T5 or 6005-T5.

B. Flashing:

1. 5005 H34 aluminum 0.04 inch minimum thickness.
2. Sheet metal flashings/closures/claddings are to be furnished shop formed to profile when lengths exceed 10 feet in nominal 10 foot lengths. Field trimming of the flashing and field forming the ends is necessary to suit as-built conditions. Sheet metal ends are to overlap at least 6 inches to 8 inches, set in a full bed of sealant and riveted if required.

C. All Fasteners for aluminum framing to be stainless steel or cadmium plated steel, excluding the final fasteners to the building.

D. All exposed aluminum finish shall be standard color CPICRF Standard Paint, Color White.

PART 3 EXECUTION

3.01 EXAMINATION

A. General Contractor to verify when structural support is ready to received all work in this section and to convene a Pre-Installation Conference at least one week prior to commencing work of this Section. Attendance required of General Contractor, skylight installer and all parties directly affecting and effected by the work of this section.

B. All submitted opening sizes, dimensions and tolerances are to be field verified by general contractor unless otherwise stipulated.

C. Installer to examine area of installation to verify readiness of site conditions. Notify general contractor about any defects requiring correction. Do no work until conditions are satisfactory.

3.02 INSTALLATION

A. Install components in strict accordance with manufacturer's instructions and approved shop drawings. Use proper fasteners and hardware for material attachments as specified.

B. Use methods of attachment to structure allowing sufficient adjustment to accommodate tolerances.

C. Remove all protective coverings on panels immediately after installation.

3.03 CLEANING

A. Follow manufacturer's instructions when washing down exposed panel surfaces using a solution of mild detergent in warm water that is applied with soft, clean wiping cloths.

B. Follow panel manufacturer's strict guidelines when removing foreign substances from panel surfaces requiring mineral spirits or any solvents that are acceptable for use.

C. Installers shall leave panel system clean at completion of installation. Final cleaning is by others upon completion of project, following manufacturer's cleaning instructions.

END OF SECTION

SECTION 10670 STORAGE SHELVING

PART 1 GENERAL

1.01 SECTION INCLUDES: Metal shelving as show on the Drawings.

1.02 RELATED SECTIONS: Section 09050 – Color Design.

1.03 SUBMITTALS: Submit manufacturer's technical product data and installation instructions.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Drawings and specifications are based on products manufactured by Penco Products Inc., P.O. Box 378, Oaks, PA 19456. Tel. (610) 666-0500.

B. Equivalent products by the following manufacturers are acceptable:
   1. Lyon Metal Products, P.O. Box 671, Aurora, IL 60507-0671. Tel. (603) 892-8941.
   2. Stanley Storage Systems, P.O. Box 1151, Allentown, PA 18105-1151. Tel. (800) 523-9462.

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 STORAGE SHELVING

A. Shelving Unit: Heavy Duty Hi-Performance closed type prefinished metal shelving complete with hardware, end kit, label holder and closed base. See schedule for models and Drawings for location of each type.

B. Color: Color to be selected from standard color chart by Architect.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install units plumb and level, in locations and with mountings as shown or as directed by the Project Engineer.

B. Securely attach all components together in accordance with manufacturer's installation instructions.

C. Securely attach units to adjacent units and to wall or floor as required to not move or fall.

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.

3.03 SCHEDULE

A. Model No. 1H8057, 36” wide, 18” deep, and 87” high with 7 shelves.

B. Model No. 1H8067, 36” wide, 24” deep, and 87” high with 7 shelves.

C. Model No. 1H8087, 48” wide, 18” deep, and 87” high with 7 shelves.

D. Model No. 1H8097, 48” wide, 24” deep, and 87” high with 7 shelves.

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 type of toilet accessories required include the following:

1. Toilet Paper Dispenser
2. Grab Bars
3. Soap Dispensers
4. Paper Towel Dispenser
5 Clothes Hook
6. Mop Holder

1.02 RELATED SECTIONS: Section 08800 – Glazing (mirrors)

1.03 SUBMITTALS: Submit manufacturers 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.

1.04 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 Project Architect. Stamped names or labels on exposed faces of units will not be permitted, except where otherwise indicated.

1.05 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. Local Supplier is Hubbard-Lawson Building Specialties, Inc. Tel. (601) 366-7358.

B. Equivalent products by the following manufacturers are acceptable:

1. A & J Washroom Accessories, 319 Temple Hill Road, New Windsor, NY 12553.
2. American Specialties, Inc., 441 Saw Mill River Road, Yonkers, NY 10701.
3. Bobrick Washroom Equipment, Inc., 225 Bobrick Drive, Jackson, TN 38301.

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. 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

3.01 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.

3.02 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. Local Supplier is Hubbard-Lawson Building Specialties, Inc. Tel. (601) 366-7358.

B. Equivalent products by the following manufacturers are acceptable:

1. A.J. Binns Ltd., 76 Ethan Allen Dr., South Burlington, VT 05403. Tel: (802) 655-7502.
2. Magnuson Group Inc., 1400 Internationale Pky., Woodridge, IL 60517. 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 unit(s) plumb and level, at location(s) shown on Drawings or if not shown, as directed by the Project Engineer. A minimum of eight units are required. Securely attach to wall with concealed blocking, 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 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, 9500 Williamsburg Office Plaza, Louisville, KY 40222. Tel. (800) 626-2000.
2. Magic Chef Co., 740 King Edward Avenue, Cleveland, TN 37311. Tel. (423) 472-3371.
3. Manitowoc Ice, Inc., 21105 26TH Street, Manitowoc, WI 54220. Tel. (800) 545-5720.
4. Scotsman Ice System, 775 Corporate Woods Parkway, Vernon Hills, IL 60061. Tel. (847) 215-4500.
5. Sears Contract Sales, 3333 Beverly Road, Hoffman Estates, IL 60179. Tel. (847) 286-2994.

B. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 ELECTRIC COOKTOP: 30 inch build-in clean design electric cooktop equal to GE Profile Model No. JP938WCWW with electronic touch controls, ceramic glass cooktop and auto shut off of burner when not in use.

2.03 REFRIGERATOR #1: Provide 22.6 cu. ft. capacity equal to GE Model PSH23PGRWW with dispenser and integrated ice system, frost free freezer, White. Provide in Break Room #119.

2.04 REFRIGERATOR #2: Provide 17.9 cu. ft. capacity equal to GE Model GTS18JCPWW with automatic icemaker, frost free freezer and reversible door, White. Provide in Break Room #228.

2.05 MICROWAVE: 1.4 cu. ft. oven cavity, 950 watts, over-the-range vented type, equal to GE Model JVM1441WD with Re-circulating Charcoal Filter Kit Model JX81A, White.

2.06 ICE MACHINE: Equal to Model DCE33A-1WB by Scotsman, white. Power supply shall be 115/60/1. Twenty six pounds of Bin storage capacity.

2.07 ELECTRIC WALL OVEN: 30 inch built-in single wall oven, color white on white, equal to GE Model JTP20FWW with self-cleaning oven, one-touch electronic oven controls and dual baking element.

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. Modify (if required) swing of refrigerator door to open toward adjacent base cabinets. Coordinate with cabinets for proper fit.

C. 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 12492 HORIZONTAL LOUVER BLINDS

PART 1 GENERAL

1.01 SECTION INCLUDES: 2" horizontal louver blinds, accessories, attaching hardware, labor and equipment necessary to complete satisfactory installation.

1.02 RELATED SECTIONS: Section 09050 - Color Design

1.03 SUBMITTALS

A. Submit manufacturer's descriptive literature indication materials, finishes, construction and installation instructions, and data verifying that product meets requirements specified. Include manufacturer's recommendations for maintenance and cleaning.

B. Shop Drawings: Indicate field-measured dimensions of openings to receive blinds. Include illustrations of special accessory components not included in manufacturer's product data. Indicate details of head and sill conditions, corner conditions, and conditions between adjacent blind units.

C. Color Samples: Submit two 6" (0.15m) samples of material indicating full color range and color variation.

D. Product Sample: Submit one 16" wide by 24" long fully functional sample blind.

1.04 QUALITY ASSURANCE: Manufacturer and installer shall have at least five years experience in this type of product and installation.

1.05 WARRANTY: Provide manufacturer's standard five year written warranty against defects in materials and workmanship beginning at date of substantial completion.

1.06 PRODUCT DELIVERY: Blinds shall be carefully handled and stored to prevent damage to materials, finishes and operating mechanisms.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Drawings and specifications are based on products manufactured by Skandia Window Fashions, 270 Crossway Road, Tallahassee, FL 32305; Tel. (800) 874–3168.

B. Equivalent products by the following manufacturers are acceptable:

1. Levolor Home Fashions Contract Division, 4110 Premier Dr., High Point, NC 27265. Tel. (336) 812-8181.
2. Hunter Douglas, Inc., 2 Park Way, Upper Saddle River, NJ 07458. Tel. (800) 727–8953.
3. Springs Window Fashions Division, Inc., P.O. Box 500, Montgomery, PA 17752. Tel. (570) 547-6671.

C. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures.

2.02 MATERIALS

A. Provide faux wood blinds equal to Inspire® 2" Traditional Faux Wood Blinds by Skandia Window Fashions.

2.03 COMPONENTS

A. Valance: Provide standard valance, 2 5/8" high, molded. Finish to match slats.

B. Head Channel Hardware: Metal hardware shall be electroplated with lift cords cloth tape guided by acetal low friction thermoplastic grommets in the head channel that prevent wear and discoloration. Operating hardware shall be mechanically locked into head channel by means of snap-in fittings with no mechanical cleats visible from underside of headrail.

C. Bottomrail: Rectangular molded, 5/8" high by 2" deep. Bottomrail finished shall match slat color and finish.

D. Slats: Slats shall be made from lead-free, UV-stabilized, integrally colored, opaque, extruded PVC and are resistant to warping, will not crack or yellow, antistatic, and dust-repellent treated. Slats shall be nominally 2" wide, by 1/8" thick. Spacing shall be manufacturer's standard.

E. Tilt Control: Enclosed worm-gear mechanism and linkage rod for the following operation:

1. Tilt Operation: Manual with wand.

2. Length of Tilt Control: Length required to make operation convenient from floor level and reachable over adjacent built in shelves and desktops.

3. Tilt: Full tilt.

F. Ladder: Braided string, evenly spaced to prevent long term slat sag.

G. Cord Lock: Metal cord lock shall be of a snap-in design and incorporate a floating shaft-type locking pin. The freely rotating locking pin shall offer minimum wear to cord. Cord lock shall incorporate a crash-proof safety feature that shall lock blind automatically upon release of cord. Locks pull cord to stop blind in any position in ascending or descending travel.

H. Lift Cord: Lift cord shall be braided with polyester jacket and center core or an approved equal construction. Size of cord shall be 1.8mm. Cords shall be detachable, if required, and shall be of sufficient length to properly control the raising or lowering of the blind. Lift cords shall be equipped with tassels to match slat finish. Cord ends shall be securely anchored to the bottomrail and it shall be possible to detach and attach cords.

I. Blinds shall be made with the following cord lock and tilter locations when viewed from within the room:

1. Tilter at left, cord lock at right (standard).

2. Where blinds are located at sidelights of doors, tilter and cord lock shall be located on the same side and on the far side away from the door.

J. End Support Brackets: Universal hinged cover and support brackets of phosphate treated steel with a prime coat of vinyl primer and a finish coat of baked on polyester enamel in color to match headrail. Brackets shall facilitate easy removal of head channel and will include an adjustable tab to eliminate lateral headrail movement.

K. Intermediate Support Brackets: Brackets shall be furnished for blinds over 36" wide. Maximum spacing for intermediate support brackets shall be 36".

L. End Stiffeners: Thermoplastic end stiffener caps shall be inserted at each end of the headrail.

M. The blind shall be free of sharp edges, burrs or other defects which might be harmful. When other materials result in improved specifications, they shall be adopted.

N. Color: Color of headrail, bottomrail, ladder, wand, cord and accessories shall coordinate with slats. Plastic headrail components shall be white.

2.04 FABRICATION

A. Prior to fabrication, verify actual opening dimensions by on-site measurement. Calculate blind dimensions to fit with specified tolerances.

B. Fabricate blinds to fill openings from head to sill and jamb to jamb. One headrail per window - may have up to two blinds per headrail if window width exceeds blind maximum. Blind divisions shall be located at mullions.

C. Fabricate blinds to fill all exterior window openings, unless noted otherwise. Do not install blinds at Vestibule 101, Vestibule 102, Stair 115, Stair 140, Lobby 201, Stair 210, or Stair 237. Provide blinds at Lobby 103 only at window area under gypsum board soffit at east and west ends of the space (blind to mount at horizontal mullion behind soffit). Provide blinds at interior windows at Law Enforcement 125 and Fiscal Administrator 204.

PART 3 EXECUTION

3.01 INSPECTION AND PREPARATION: Blind installer shall be responsible for inspection of site, installation conditions, and field measurements prior to blind installation.

3.02 INSTALLATION

A. Install blinds in accordance with manufacturer's procedures except as otherwise specified herein.

B. Install intermediate support brackets and extension brackets as needed to prevent deflection in headrail.

C. Install blinds with adequate clearance to permit smooth operation of blinds and any sash operators.

D. Set tilt and lift controls. Demonstrate blinds to be in smooth, uniform working order.

E. Blinds may be dusted. Gently clean soiled blind surfaces with a mild soap solution. Do not use steam, hot water, bleach or any abrasive or solvent based cleaners.

END OF SECTION

SECTION 14245 HYDRAULIC PASSENGER ELEVATOR

PART 1 GENERAL

1.01 SECTION INCLUDES: Materials, labor, controls, finishes, accessories, equipment and services necessary to furnish, deliver and install the hydraulic passenger elevator as shown on the Drawings and as specified herein.

1.02 RELATED SECTIONS

A. Division 3 Section “Cast-in-place Concrete” for setting sleeves, inserts, and anchoring devices in concrete.

B. Division 5 Sections for Structural Steel and Miscellaneous Metals for the following:

1. Attachment plates, angle brackets, and other preparation of structural steel for fastening guide-rail brackets.

2. Hoist Beam, pit ladder, and steel framing.

3. Steel angle sill supports and grouting hoistway entrance sills and frames.

C. Division 9 Sections, including 09050 Color Design, for finish flooring in elevator car and field painting of unfinished and shop primed ferrous materials.

D. Division 15 Sections for heating and ventilating hoistway and machine room.

E. Division 16 Sections for the following:

1. Providing electrical service to elevators, including fused disconnect switches.

2. Emergency power supply, transfer switch and auxiliary contacts.

3. Heat and smoke sensing devices.

4. Convenience outlets and illumination in machine room, hoistway, and pit.

1.03 DEFINITIONS

A. Hydraulic elevator work is hereby defined to include systems in which cars are hoisted either directly or indirectly by action of a hydraulic plunger and cylinder (jack); with other components of the work including fluid storage tank, pump, piping, valves, car enclosures, hoistway entrances, control systems, signal equipment, guide rails, electrical wiring, roping, buffers, and devices for operating, dispatching, safety, security, leveling, alarm, maintenance an similar required performances and capabilities.

B. Elevator schedules indicate required performances, controls, capacities, features and finishes for each elevator or group of elevators

C. Definitions in ASME A17.1 apply to the work of this Section.

D. Defective Elevator Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

1.04 SUBMITTALS

A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information. Include product data for the following:

1. Car enclosures and hoistway entrances.

2. Operation, control, and signal systems.

B. Shop Drawings: Show plans, elevations, sections, and large-scale details indicating service at each landing, machine room layout, coordination with building structure, relationships with other construction, and locations of equipment and signals. Include large-scale layout of car control station. Indicate variations from specified requirements, maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.

C. Samples for Verification: For exposed finishes of cars, hoistway doors and frames, and signal equipment; 3-inch square Samples of sheet materials; and 4-inch lengths of running trim members.

D. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions as shown on the Drawings, and electrical service, as show and specified, are adequate for elevator system being provided.

E. Qualification Data: For Installer.

F. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.

G. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.

H. Warranty: Special Warranty specified in this Section.

I. Continuing Maintenance Proposal: Service agreement specified in this Section.

1.05 QUALITY ASSURANCE

A. Permits and Inspections: The elevator contractor shall furnish all licenses and permits and shall arrange for and make all inspections and tests required thereby.

B. Installer Qualifications: Elevator manufacturer or manufacturer's authorized representative who is trained and approved for installation of units required for this Project with not less than five years of satisfactory and successful experience installing elevators equal in character and performance to the specified elevator.

C. Source Limitations: Obtain elevators through one source from a single manufacturer.

1. Provide major elevator components, including pump-and-tank units, plunger and jack assemblies, controllers, signal fixtures, door operators, car frames, cabs, and entrances, manufactured by a single manufacterer.

D. Regulator Requirements: Comply with ASME A17.1, ASCE 7-02, and 2000 International Building Code requirements, and appropriate earthquake loads.

E. Accessibility Requirements: Americans with Disabilities Act - Accessibility Guidelines (ADAAG).

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle materials, components and equipment in manufacturer's protective packaging.

B. Store materials, components, and equipment off of ground, under cover, and in a dry location. Handle according to manufacturer's written recommendations to prevent damage, deterioration, or soiling.

1.07 COORDINATION

A. Coordinate installation of sleeves, block outs, and items that are embedded in concrete for elevator equipment. Furnish templates and installation instructions and deliver to Project site in time for installation.

B. Coordinate sequence of elevator installation with other work to avoid delaying the Work.

C. Coordinate locations and dimensions of other work relating to hydraulic elevators including pit ladders, sumps, and floor drains in pits; entrance subsills; and electrical service, electrical outlets, lights, and switches in pits and machine rooms.

1.08 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair, restore, or replace defective elevator work within specified warranty period.

1. Warranty Period: One year from date of Substantial Completion.

1.09 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, provide one year's full maintenance service by skilled employees of elevator Installer. Include monthly preventative maintenance, repair, or replacement of worn or defective components, lubrication, cleaning, and adjusting as require for proper elevator operation at rated speed and capacity. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

1. Perform maintenance, including emergency callback service, during normal working hours.

2. Response time: Within one business day.

B. Continuing Maintenance Proposal: Provide a continuing maintenance proposal from Installer to Owner, in the form of a standard one-year maintenance agreement, starting on date initial maintenance service is concluded. Slate services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, equivalent products by the following manufacturers are acceptable:

1. Otis Elevator Co.

2. Schindler Elevator Corp.

3. ThyssenKrupp Elevator.

B. Substitutions shall fully comply with specified requirements and Section 01630 - Product Options and Substitution Procedures.

2.02 SYSTEMS AND COMPONENTS

A. General: Provide manufacturer's standard elevator systems. Where components are not otherwise indicated, provide standard components published by manufacturer as included in standard pre-engineered elevator systems and as required for complete system.

B. Pump units: Positive-displacement type with a maximum of 10 percent variation between no load and full load with minimum pulsations. Provide the following:

1. Submersible pump, with submersible squirrel-cage induction motor, suspend inside oil tank from vibration isolation mounts.

2. Provide motor with solid-state starting.

C. Hydraulic Silencers: Provide hydraulic silencer containing pulsation-absorbing material in a blowout-proof housing at pump unit.

D. Piping: Provide size, type, and weight piping recommended by manufacturer, and provide flexible connectors to minimize sound and vibration transmissions from power unit.

E. Hydraulic Fluid: Nontoxic, readily biodegradable, fire-resistant fluid made from vegetable oil with antioxidant, anticorrosive, antifoaming, and metal-passivating additives. Hydraulic fluid is approved by elevator manufacturer for use with elevator equipment.

F. Inserts: Furnish concrete inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work where installation of devices is specified in another Section.

G. Car Frame and Platform: Welded steel units.

H. Guides: Provide either roller guides or sliding guides at top and bottom of car and countweight frames. If sliding guides are used, provide guide-rail lubricators or polymercoated, nonlubricated guides.

2.03 OPERATIONS SYSTEMS

A. General: Provide manufacturer's standard microprocessor operation system as required to provide type of operation system indicated.

B. Auxiliary Operations: In addition to primary operation system features, provide the following operational features:

1. Battery-powered Lowering: When power fails, car is lowered to the lowest floor, opens its doors, and shuts down. System included rechargeable battery and automatic recharging system.

2. Automatic Dispatching of Loaded Car: When car load exceeds 80 percent of rated capacity, doors will begin closing.

2.04 DOOR REOPENING DEVICES

A. Infrared Array: Provide door reopening devices with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more of the light beams shall cause doors to stop and reopen.

2.05 FINISH MATERIALS

A. General: Provide the following materials for exposed parts of elevator car enclousres, car doors, hoistway entrance doors and frames, and signal equipment as indicated.

B. Cold-Rolled Steel: ASTM A 1008/A 1008M, commercial steel, Type B, exposed, matte finish.

C. Hot-Rolled Sheet Steel: ASTM A 1011/A 1011M, commercial steel, Type B, pickled.

D. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.

1. Metal surface is satin polished after rolling, No. 4 satin finish.

E. Stainless-Steel Bars: ASTM A 276, Type 304, No. 4 satin finish.

F. Stainless-Steel Tubing: ASTM A 554, Grade MT 304, No. 4 satin finish.

G. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063.

H. Aluminum Sheet and Plate: ASTM B 209, Alloy 6063.

I. Plastic Laminate: High-pressure type complying with NEMA LD3, Type HGS for flat applications.

2.06 CAR ENCLOSURES

A. General: Provide steel-framed car enclosure with nonremovable wall panels, with car roof, access doors, power door operators, and ventilation.

1. Provide standard railings complying with ASME A17.1 on car top where required by ASME A17.1.

2. Provide finished car including materials and finishes specified below.

B. Materials and Finishes: Provide manufacturer's standards but not less than the following:

1. Subfloor: Underlayment grade, exterior plywood, 5/8 inch nominal thickness, properly prepared to receive specified finish.

2. Plastic Laminate Wall Panels: Plastic laminate adhesively applied to ½ inch fire-retardant-treated particleboard with plastic laminate panel backing and manufacturer's standard protective edge trim. Panels have a flame-spread index of 25 or less, when tested according to ASTM E 84. Refer to Section 09050 for Plastic Laminate selection.

3. Base finish: Plastic Laminate to match wall panels.

4. Fabricate car with recesses and cut-outs for signal equipment.

5. Fabricate car door frame integrally with front wall of car.

6. Stainless Steel doors: Flush, hollow metal construction; fabricated from stainless steel sheet. No. 4 satin finish.

7. Sills: Extruded metal with grooved surface, 1/4 inch thick.

8. Ceiling: Down light type, 16 gauge metal pans with incandescent and dimmer switch suspended 7'-4" minimum above the finish floor. Number of downlights shall be dependant upon platform size with a minimum of twenty.

   a. Metal Finish: Stainless steel, No. 4 satin finish.

9. Cab Columns, Front, and Transom: Stainless steel: ASTM a 167, Type 300 stainless steel panels, No. 4 satin finish.

10. Ventilation: Two speed exhaust fan mounted on the car top.

11. Sight Guards: Provide sight guards on car doors.

2.07 HOISTWAY ENTRANCES

A. General: Provide manufacturer's standard horizontal-sliding, door and frame hoistway entrances complete with track systems, hardware, sills, and accessories. Provide frame size and profile to coordinate with hoistway wall construction.

   1. Where gypsum board wall construction is indicated, provide self-supporting frames with reinforced head sections.

B. Materials and Fabrication: Provide manufacturer's standards, but not less than the following:

   1. Stainless steel frames: Formed from stainless steel sheet.

   2. Sight guards: Provide sight guards on doors matching door edges.

   3. Sills: Extruded aluminum with grooved surface, 1/4 inch thick.

   4. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrisive, nongaseous grout complying with ASTM C 1007.

2.08 SIGNAL EQUIPMENT

A. General: Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements with long-life incandescent lamps and acrylic or other permanent, nonyellowing translucent plastic diffusers or LED's.

B. Car Control Stations: Provide manufacturer's standard semirecessed car control stations. Mount in return panel adjacent to car door.

1. Mark buttons and switches with standard identification for required use or function that complies with ASME A17.1. Use both tactile symbols and braille.

2. Provide "No Smoking" sign matching car control station, either integral with car control station or mounted adjacent to it, with text and graphics.

C. Emergency Communication System: Provide system that complies with ASME A17.1 and the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)." On activiation, system dials preprogrammed number of monitoring station. System provides two way voice communication without using a handset and provides visible signals that indicate when system has been activated and when monitoring station has responded. System is contained in a flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.

D. Hall Push-Button Stations: Provide one hall push-button station at each landing.

1. Provide units with flat faceplate for mounting with body of unit recessed in wall.

2. Equip units with buttons for calling elevator and for indicating desired direction of travel.

E. Hall Lanterns: Units with illuminating arrows; Provide single arrow at terminal landings.

1. Units mounted in both jambs of entrance frame.

F. Hall Annunciator: With each hall lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.

G. Corridor Call Station Pictograph Signs: Provide signs matching hall push-button stations, with text and graphics indicating that in case of fire, elevators are out of service and exits should be used instead. Provide one sign at each hall push-button station.

2.09 ELEVATOR

A. Elevator Description:

1. Type: Holeless, beside-the-car, telescoping, dual cylinder.

2. Rated Capcity: 2100 lbs.

3. Rated Speed: 110 feet per minute

4. Operation System: Single automatic.

5. Auxiliary Operations:

a. Battery-powered lowering

6. Car Enclosures:

a. Hoistway width: 7'-4"

b. Hoistway depth: 5'-9"

c. Car Clear Width: 5'-8" minimum

d. Car Clear Depth: 4'-3" minimum

e. Provide elevator car to work with hoistway dimension as indicated in the construction drawings and to comply with ADA.

f. Front walls (Return panels): Satin Stainless steel, No. 4 finish with integral car door frames.

g. Car Fixtures: Satin Stainless-steel, No. 4 finish.

h. Side and Rear Wall Panels: Plastic laminate.

i. Reveals: Plastic laminate.

j. Door Faces (Interior): Satin Stainless-steel, No. 4 finish.

k. Door Sills: Aluminum, mill finish.

l. Ceiling: Satin Stainless-steel, No. 4 finish.

m. Handrails: 1-1/2 inches round Satin Stainless-steel, No. 4 finish at rear of car.

n. Floor finish: Refer to Section 09050 Color Design for floor finish selection. Recess floor as required for specified floor finish.

7. Hoistway entrance:

a. Width: 3 feet.

b. Height: 7 feet.

c. Type: Single-speed side sliding.

d. Fire protection rating: 1 hour.

e. Frames at all floors: Satin Stainless-steel, No. 4 finish

f. Doors and transoms: Satin Stainless-steel, No. 4 finish.

g. Sills: Aluminum, mill finish.

8. Hall Fixtures: Satin Stainless-steel, No. 4 finish

9. Additional Requirements:

a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from Satin Stainless-steel, No. 4 finish.

b. Provide blanket hooks and one complete set of full-height protective blankets.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Verify critical dimensions and examine supporting structure and other conditions under which elevator work is to be installed.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

2. Installation constitutes acceptance of exiting conditions and responsibility for satisfactory performance.

3.02 INSTALLATION

A. Install cylinder plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor and braced at intervals as needed to maintain alignment. Anchor cylinder guides at spacing needed to maintain alignment and avoid overstressing guides.

B. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.

C. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts designed to effectively prevent transmission of vibrations to structure and thereby eliminate sources of structure-borne noise from elevator system.

D. Install piping above the floor, where possible. Where not possible, install underground piping in Schedule 40 PVC pipe casing assembled with solvent-cemented fittings.

E. Lubricate operating parts of system as recommended by manufacturers.

F. Alignment: Coordinate installation of hoistway entranced with installation of elevator guide rails for accurate alignment of entrances with car. Where possible, delay installation of sills and frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.

G. Leveling Tolerance: 1/4 inch, up or down, regardless of travel.

H. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.

3.03 FIELD QUALITY CONTROL

A. Acceptance Testing: On completion of elevator installation and before permitting use (either temporary or permanent) of elevator, perform acceptance tests as required and recommended by ASME A17.1 and by governing regulations and agencies.

B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times test are to be performed on elevators.

3.04 PROTECTION

A. Temporary Use: Comply with the following requirements for elevator used for construction purposes:

1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.

2. Provide strippable protective film on entrance and car doors and frames.

3. Provide padded wood bumpers on entrance door frames covering jambs and frame faces.

4. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.

5. Do not load elevators beyond their rated weight capacity.

6. Engage elevator Installer to provide full maintenance service. Include preventative maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as necessary for proper elevator operation at rated speed and capacity. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

7. Engage elevator Installer to restore damaged work, if any, so no evidence remains of correction. Return items that cannot be refurbished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

3.05 CLEANING

A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided.

B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment room and hoistway. Remove trash and debris.

3.06 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's representative to operate elevator.

B. Check operation of elevator with Owner's representative present and before date of Substantial Completion. Determine that operation systems and devices are functioning properly.

C. Check operation of elevator with Owner's representative present not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

END OF SECTION

SECTION 15010 GENERAL PROVISIONS

PART 1 GENERAL

1.01 INSTRUCTIONS

A. 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 incidental necessary, required, or implied, for installation of complete air conditioning ventilating, heating, plumbing and fire protection systems as specified herein and as shown on the drawings.

B. The General Conditions, Information to Bidders, Special Conditions, and other pertinent documents issued by the Architect are a part of the Contract Documents and shall be complied with in every respect.

C. This Contractor shall examine the general construction drawings, the structural drawings and the electrical drawings, and lay out his work accordingly to avoid conflict.

D. 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.

1.02 LOCAL SITE CONDITIONS

A. Before bidding, make complete investigation at Site in order to be informed as to location of utilities and as to conditions under which work is to be performed. Utility locations shown were obtained from surveys and/or local utility companies and are not to be assumed as being accurate.

B. Make determination of soil conditions before bidding. These specifications and accompanying drawings in no way imply as to condition of soil to be encountered.

1.03 CLEAN UP

A. Do not allow waste material or rubbish to accumulate in or about job site.

B. At completion of work, remove all rubbish, tools, scaffolding and surplus materials from and about building, leaving work clean and ready for use without further cleaning required. Clean all equipment, piping, valves, fixtures, and fittings of grease, metal cuttings, insulation cement, dust, dirt, paper labels, etc.

C. Any discoloration or other damage to parts of building, its finish or furnishings due to failure to properly clean or keep clean mechanical systems shall be repaired without cost to Owner.

1.04 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 Architect and approval.

B. These drawings and specifications shall be considered a part of this contract. Should an error or omission occur in either or both the drawings and specifications, or conflict one with the other, this Contractor shall not avail himself of such unintentional error, omission or conflict, but shall have same explained to him and adjusted before signing the contract or proceeding with the work.

PART 2 PRODUCTS

2.01 COORDINATION: The products of particular manufacturers have been used as the basis of design in preparation of these documents. Any modifications to the mechanical systems and their components, the electrical systems, the building structure and architecture, or any other portion of the building that result from the use of any other than the basis of design equipment shall be coordinated with all other trades. Such coordination shall occur before delivery of products from the manufacturer (before shop drawing submittals) and shall be clearly indicated on the shop drawings. Any related modifications shall be performed without any additional cost to the contract.

2.02 DESCRIPTION: All products shall be new and bear the Underwriter's Laboratories, Inc., (UL) label unless specifically indicated otherwise.

PART 3 EXECUTION

3.01 GENERAL

A. The mechanical plans do <u>not</u> give exact elevations or locations of lines, nor do they <u>show</u> all the offsets, control lines, or other installation details. The Contractor shall carefully lay out his work at the site to conform to the structural conditions, to provide proper grading of lines, to avoid all obstructions, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and to thereby provide an integrated, coordinated and satisfactory operating installation.

B. If the Contractor proposes to install equipment, including piping and ductwork, requiring space conditions other than those shown, or to rearrange the equipment, he shall assume full responsibility for the rearrangement of the space and shall have the Architect review the change before proceeding with the work. The request for such changes shall be accomplished by Shop Drawings of the space in question.

C. The Contractor is responsible for the proper location and size of all slots, holes or openings, in the building structure pertaining to his work, and for the correct location of sleeves, inserts, cores, etc.

3.02 EQUIPMENT CONNECTIONS

A. Each equipment item with drain connections, shall be provided with a properly-sized drain, with trap and clean-out, run to the nearest floor drain or as directed.

B. Rough-in and make final connection to all equipment requiring same, furnished under other divisions of these specifications or by the Owner.

1. Provide necessary labor and materials, including stop valves, traps, pressure-reducing valves, etc. where necessary. Trap and vent drainage connections as required.

2. If equipment or fixtures to be furnished by Owner and/or Owner's vendor are not delivered prior to final acceptance, services shall be capped or plugged at walls or floor as directed, ready for future connection.

C. No equipment or fixture shall be "roughed-in" until proper rough-in drawings are in the hands of the trade doing the work.

3.03 PROTECTION OF EQUIPMENT

A. Responsibility for care and protection of equipment and material under this Contract rests with this Contractor until equipment or materials have been installed, tested and accepted.

B. Store equipment, including pipe and valves, off the ground and under cover. For storage outdoors, minimum 4 mil thick plastic shall be fitted to withstand splattering, ground water, precipitation and wind.

C. All pipe ends, valves, and parts of equipment left unconnected permanently or temporarily, shall be capped, plugged or properly protected to prevent entry of foreign matter.

D. Protect air handling unit coils by use of protective sheet metal panels or plywood.

E. Plug ends of pipe when work is stopped and close ends of ducts with plastic taped in place until work resumes.

F. Damaged equipment shall be repaired or replaced at the option of the Architect/Engineer.

3.04 PAINTING

A. Factory painted equipment that has been scratched or marred shall be repainted to match original factory color.

B. All uninsulated black ferrous metal items exposed to sight inside the building, such as chilled and hot water piping, standpipes, equipment hangers and supports not provided with factory prime coat, shall be cleaned and painted with one coat of zinc chromate primer. In addition, such items in finished spaces shall also be painted with two coats of finish paint in a color to match adjacent surfaces or as otherwise selected by the Architect.

C. Black ferrous metal items exposed outside the building, such as equipment support beams, uninsulated pipe and pipe supports not provided with factory prime coat, shall be cleaned and painted with one coat of rust inhibiting primer and two coats of an asphaltic base aluminum paint. Insulated pipes outside the building shall be cleaned and painted with one coat of rust inhibiting primer before installing insulation.

D. In lieu of painting hanger rods, cadmium plated or galvanized rods may be furnished.

E. No nameplates or equipment shall be painted, and suitable protection shall be afforded to the plates to prevent their being rendered illegible during the painting operation.

F. Galvanizing broken during construction shall be recoated with cold galvanizing compound.

G. All ductwork, piping, insulation, conduit or other appurtenances visible through grilles and diffusers shall be painted flat black.

3.05 PROTECTION OF EXISTING UTILITIES

A. The Contractor shall use extreme caution during excavation operations not to damage or otherwise interrupt the operations of existing utilities. The Contractor shall be responsible for the continuous operation of these lines and shall provide bypasses or install such shoring, bracing, or underpinning as may be required for proper protection.

B. Obtain approval from the Architect at least 7 days prior to connecting to any utility line and coordinate with the appropriate utility company.

3.06 CUTTING AND PATCHING

A. The Contractor shall assume all cost of, and be responsible for, arranging for all cutting and patching required to complete the installation of his portion of the work. All cutting shall be carefully and neatly done so as not to damage or cut away more than is necessary of any existing portions of the structure.

B. All patching will be done by workmen skilled in the trade required.

C. The Contractor shall make suitable provisions for adequately water-proofing at all floor penetrations of water proof membrane floors. This shall include but not be limited to floor drains, open sight drains, hub drains, cleanouts, and sleeves for the various piping. This also applies to membrane roofing systems.

3.07 ACCESS PANELS

A. Provide access panels as required or as indicated to service valves in piping, controls, items in duct, etc.

B. Access doors shall be provided under this section of the specifications and furnished to the General Contractor to be installed.

C. Access doors shall be equal to the following MILCOR types as manufactured by Inryco, Inc.:

1. Style AT Door for Acoustical Tile Ceilings
2. Style AP Door for Acoustical Plaster Ceilings
3. Style K Door for Plastered Wall and Ceiling Surfaces
4. Style DW Door for Drywall
5. Style ATR for Suspended Drywall Ceilings
6. Style M Door for Masonry, Ceramic Tile, Etc.
7. Fire-Rated 1-1/2 hr. (B-label) Door where required.

D. Size and type shall be as required for proper service and/or as may be directed by the Architect.

E. Access doors installed in firewalls or partitions shall be U.L. labeled to maintain the fire rating at the wall or partition.

3.08 ESCUTCHEONS

A. Escutcheons shall be installed on all pipes where they pass through floors, ceilings, walls, or partitions in finished areas.

B. The interior of closets and equipment rooms adjacent to finished areas, shall be considered as finished for the intent of these specifications.

C. Escutcheons shall be split, hinged, stamped brass type designed to fit the pipe, and to cover the terminating pipe sleeve, in chrome plated finish unless otherwise specified, with securing device to hold the escutcheon tight to the pipe.

3.09 EQUIPMENT, MATERIALS AND BID BASIS

A. It is the intention of these specifications to indicate a standard of quality for all material incorporated in this work. Manufacturer's names are used to designate the item of equipment or material as a means of establishing grade, size and quality. Where several manufacturers are named, only these manufacturers' products will be considered and the Contractor's bid shall be based on their products. Other named manufacturers, although acceptable as manufacturers, must prove their product will perform satisfactorily and will meet space requirements, etc., before submitting shop drawings, when their equipment achieves the required results in a manner different than that of the first named manufacturer. Where only one manufacturer is named, unless the specifications state otherwise, manufacturers of similar quality products will be considered. Such unnamed manufacturer's products will, however, be considered as substitutions and shall not be used as a basis for bidding. In the event the Contractor wishes to submit substitutions to the Architect for review prior to bid, he shall furnish descriptive catalog material, text data, samples, etc., as well as any other pertinent data necessary to demonstrate that the proposed substitutions are acceptable equals to the specified product. No substitutions shall be made without the written consent of the Architect.

B. The use of one named manufacturer in the schedules on the drawings is for guide purposes. The provisions of the above paragraph will govern in the selection of products to be used.

3.10 FOUNDATIONS: All concrete foundations required by equipment furnished under the Mechanical Division shall be reinforced and constructed in conformance with the recommendations of the manufacturer of the respective equipment actually applied, and with the approval of the Architect. All corners of the foundations shall be neatly chamfered. Foundation bolts shall be placed in the forms when the concrete is poured. Allow one inch (1") below the equipment bases for alignment, leveling and grouting with non-shrinking grout. Grouting shall be done after the equipment is leveled in place. After the grout has hardened, the foundation bolts shall be pulled up tight and the equipment shimmed, if necessary. After removal of the forms the surface of the foundation shall be rubbed. Unless otherwise noted, foundations shall be six inches (6") high. All concrete work performed shall conform entirely to the requirements of the General Specifications which describe this class of work.

3.11 RECORDS AND INSTRUCTIONS FOR OWNER

A. The Contractor shall accumulate during the job's progress the following data in quintuplicate prepared in neat brochures or packet folders and turned over to the Architect/Engineer for check and subsequent delivery to the Owner:

1. All warranties and guarantees and manufacturer's directions on equipment and material covered by the Contractor.

2. Approved fixture brochures, wiring diagrams, and control diagrams.

3. Original and copies of approved shop drawings.

4. Any data and/or drawings required during construction.

5. Repair parts lists of all major items and equipment including name, address, and telephone number of local supplier or agent.

6. Valve tag charts and diagrams specified elsewhere herein.

B. All of the above data shall be submitted to the Architect/Engineer for approval at such time as the Contractor asks for his last request for payment prior to his final request for payment, but in no case, less than two weeks before final inspection.

3.12 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Description

1. Complete operating and maintenance instructions shall be provided to the Owner. Two (2) separate copies (three for the Owner, one for the Architect) shall be provided, and each copy shall be bound in a separate 3-ring, loose leaf notebook. Operating instructions shall be provided for each system, and shall include a brief system description, a simple schematic and a sequence of operation. Operating and maintenance instructions shall be included for each piece of equipment. Operating instructions shall include recommended periodic maintenance and seasonal changeover procedures, and suggested procedures in operation of all systems to promote energy conservation. These instructions must be written expressly for this project and shall refer to equipment, valves, etc. by mark number from project schedules. Operating instructions and procedures shall be submitted in draft form for approval prior to final issue of complete brochures. Manufacturer's advertising literature or catalogs will not be acceptable for operating and maintenance instructions. Manufacturers' Standard literature is acceptable for each piece of equipment. However, the Contractor shall prepare a SYSTEM O&M manual including overall system descriptions, operating and energy conservation techniques.

2. A system wiring and control diagram shall be included in the operating and maintenance instructions.

3. Prior to final acceptance or beneficial occupancy, provide the services of a competent representative to instruct and train the Owner in the operation of all systems for a period of not less than three (3) days. This instruction shall include a complete walk-through of all equipment and systems. The Architect reserves the right to attend any such meeting and shall be duly notified. 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.

4. A competent technician employed by the Temperature Control Subcontractor shall be required to instruct the Owner in proper operating procedures and shall explain the significance of the temperature control literature filed in the maintenance manual over a period of two (2) days while the system is in continuous operation as specified above.

5. Printed instructions, installed in a suitable frame with a glass front, covering the operation and maintenance of each major item of equipment, shall be posted at locations designated by the Architect. Provide two bound manuals containing complete repair parts lists, and operating service and maintenance instructions for all equipment provided.

3.13 RECORD SET DRAWINGS

A. The Contractor shall maintain on a daily basis at the project site a complete set of "Record Drawings" reflecting an accurate dimensional record of all buried or concealed work. In addition, the "Record Drawings" shall be marked to show the precise location of concealed work and equipment, including concealed or embedded piping and valves and all changes and deviations in the Mechanical work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite instructions from the Architect. The "Record Drawings" shall consist of a set of mylar sepia prints of the Contract Drawings for this Division with the Engineer's seal and Engineer's firm name removed or blacked out. Prior to commencing work the Contractor shall purchase from the Architect a set of mylar sepia prints to be used for the "Record Drawings".

B. Record dimensions shall clearly and accurately delineate the work as installed; locations shall be suitably identified by at least two (2) dimensions to permanent structures.

C. The Contractor shall mark all "Record Drawings" on the front lower right hand corner with a rubber stamp impression that states the following:

"RECORD DRAWINGS (3/8" high letters) to be used for recording Field Deviations and Dimensional Data Only" (5/16" high letters)

3.14 GUARANTY-WARRANTY

A. This guarantee shall include capacity and integrated performance of component parts of various systems in strict accord with the true intent and purpose of these Specifications. Conduct such tests as herein specified or as may be required by the Architect to demonstrate capacity and performance ability of various systems to maintain specified conditions.

B. All materials and equipment shall carry a full year's warranty from time Owner accepts building or the date of substantial completion, whichever is earlier, regardless of start-up date of equipment, unless a longer warranty period is specified under other sections.

3.15 INSTALLATION: All equipment shall be installed in strict conformance with manufacturer's recommendations, as specified herein and as shown. If any conflict arises between these instructions, notify the Engineer immediately for guidance.

3.16 FLAME SPREAD AND SMOKE DEVELOPED PROPERTIES OF MATERIALS

A. Materials and adhesives used throughout the mechanical and electrical systems for insulation, and jackets or coverings of any kind, or for piping or conduit system components, shall have a flamespread rating not over 25 without evidence of continued combustion and with a smoke developed rating of not higher than 50. If such materials are to be applied with adhesives, they shall be tested as applied with such adhesives, or the adhesives used shall have a flamespread rating not over 25 and a smoke developed rating not higher than 50. (Note: Materials need not meet these requirements where they are entirely located outside of a building and do not penetrate a wall or roof, and do not create an exposure hazard.)

B. "Flame-Spread Rating" and "Smoke Developed Rating" shall be as determined by the "Method of Test of Surface Burning Characteristics of Building Materials, NFPA No. 255, ASTM E84, Underwriter's Laboratories Inc., Standard". Such materials are listed in the Underwriters' Laboratories, Inc., "Building Materials List" under the heading "Hazard Classification (Fire)".

3.17 EQUIPMENT FURNISHED BY OWNER

A. The Contractor shall unload, uncrate, assemble, and connect any and all equipment shown on the drawings or called out in the Specifications to be furnished by the Owner for installation by the Contractor.

B. The Contractor shall take full charge of such equipment from the time the items are delivered to the job, set in place, connected, tested, adjusted, and placed into operation.

3.18 HAZARDOUS MATERIALS

A. No products shall be used that contain any known hazardous or carcinogenic materials. Products with asbestos or radioactive content shall not be used.

B. Handling of any hazardous material is not covered in this specification Division (15). Any requirements for such are beyond the scope of this contract and shall be done only by those persons contracted to do so.

3.19 ELECTRICAL WORK

A. All electrical equipment provided under this division shall comply with the electrical system characteristics indicated on the electrical drawings and specified in Division 16.

B. All components shall be in conformance with the requirements of the National Electrical Code and Division 16. Motor starters and disconnects as required for rooftop units, and fans provided under this division shall be furnished under Division 15.

C. All power wiring and final power connections to the system shall be provided under Division 16.

D. Control wiring (120V. and less) shall be provided under Division 15 and extended from the 120V. power circuits indicated on the electrical drawings. All wiring for voltages higher than 30 volts shall be done by a licensed electrician.

E. All electrical characteristics shall be taken from the mechanical and electrical drawings and specifications and coordinated before equipment is ordered or submitted.

3.20 MOTORS

A. Unless specifically noted otherwise in other sections of this specification, all motors and motor controllers shall meet the requirements specified in this section. All motors shall be built in accordance with the current applicable IEEE, and NEMA standards and shall have voltage, phase, frequency and service as scheduled.

B. Each motor shall be suitable for the brake horsepower of the driven unit, rated with 1.15 minimum service factor, and shall be NEMA design B. The motor temperature rise shall not exceed 40 degrees C. for drip proof motors, 50 degrees C. for splash proof motors, and 55 degrees C. for totally enclosed or explosion proof motors. The motor shall be capable of operating continuously at such temperature rises, and shall be capable of withstanding momentary overloads of 25 percent without injurious overheating.

C. Each item of motor driven equipment shall be furnished complete with the motors and drives as required to perform the specific function for which it is intended, scheduled, and specified.

D. Motors shall be ball bearing type selected for quiet operation and shall be manufactured for general purpose duty unless otherwise indicated. Each bearing shall be accessible for lubrication, where necessary, and designed for the load imposed by the V-belt drive or the driven apparatus. Direct drive motors shall be designed for the specific application with all necessary thrust bearings, shaft capacities, etc.

E. Motors larger than 1/2 horsepower shall be of U.S. manufacture and have bearings with pressure grease lubrication fittings.

F. Motors connected to drive equipment by belt shall be furnished with adjustable slide rail bases except for fractional horsepower motors which shall have slotted bases. Motor leads shall be permanently identified and supplied with connectors.

G. Each motor to be installed outdoors shall be of the totally-enclosed fan-cooled type, or housed in a weatherproof housing.

H. Unless otherwise indicated, motors smaller than 1/2 horsepower shall be capacitor start or split phase type designed for 120 volt, single phase, 60 cycle alternating current. Shaded pole motors are not to be acceptable except 35 watts and smaller. Motors 1/2 horsepower and larger shall be squirrel cage induction type, 3 phase, 60 cycle alternating current.

I. If the Contractor proposes to furnish motors varying in horsepower and/or characteristics from those specified, he shall first inform the Architect/Engineer of the change and shall then coordinate the change and shall pay all additional charges in connection with the change.

END OF SECTION

SECTION 15011 SCHEDULE OF SUBMITTAL DATA

PART 1 GENERAL

1.01 RELATED DOCUMENTS: The requirements of the General Conditions, Supplementary Conditions, and Section 15010 apply to all work herein.

1.02 QUALITY ASSURANCE:

A. Shop drawings or fully descriptive catalog data shall be submitted by the Contractor for all items of material and equipment furnished and installed under this contract. The Contractor shall submit to the Architect a sufficient number of copies of all such Shop Drawings or catalog data to provide him with as many reviewed copies as he may need, plus two (2) copies for retention; one by the Architect and one by the Engineer.

B. Before submitting Shop Drawings to the Architect for review, the Contractor shall examine them and satisfy himself that they are correctly representative of the material or equipment to which they pertain. The Contractor shall so note these Drawings before submitting them. The Contractor's review of the Shop Drawings is not intended to take the place, in any way, of the official review of the Architect, and Shop Drawings which have not been reviewed by the Architect shall not be used in fabricating or installing any work.

C. The review of Shop Drawings or catalog data by the Architect shall not relieve the Contractor from responsibility for deviations from the Plans and Specification unless he has, in writing, specifically called attention to such deviations at the time of submission and has obtained the permission of the Architect thereon; nor shall it relieve him from responsibility for error of any kind in Shop Drawings. When the contractor does call such deviations to the attention of the Architect, he shall state in his letter whether or not such deviations involve any extra cost. If this is not mentioned, it will be assumed that no extra cost is involved for making the change.

D. Verification and assignment of dimensions, quantities, and construction means, methods, sequences or procedures, the correctness of which is set forth in the Contract Documents or submittal, shall be the sole responsibility of the Contractor.

E. Reproduction of design documents in any portion for use in a submittal is not acceptable.

PART 2 PRODUCTS

2.01 GENERAL: All products shall be new and bear all labels which are identified by the applicable specification section and Contract Documents.

PART 3 EXECUTION

3.01 SUBMITTAL DATA:

A. General

1. The submittal data to be furnished for this project shall comply with the Specifications and Contract Documents in their entirety. Any submittals herein scheduled are as a minimum only and shall not be construed to limit the submittal data required within the individual Sections of these Specifications.

2. Shop Drawings will be returned unchecked unless the following information is included: Reference to all pertinent data in the Specifications or on the Drawings, such as sound power levels of motor driven equipment where called for in the specifications, electrical characteristics and horse power, capacities, construction material of equipment, UL labels where required, accessories specified, manufacturer, make and model number, weights where specified, starters where required by Division 15, size and characteristics of the equipment, name of the project and a space large enough to accept an approval stamp. The date submitted shall reflect the actual equipment performance under the specified conditions and shall not be a copy of the scheduled data on the drawings. All submitted equipment must be identified on Shop Drawings with same "Mark Numbers" as identified on Drawings or in Specifications. All pertinent data such as accessories shall also be marked. Any deviation from any part of the Contract Documents shall be clearly and completely highlighted.

3. HVAC, plumbing, and fire protection submittal data shall be bound into separate HVAC, plumbing, and fire protection volumes, with each volume containing one copy of all specified equipment shop drawings. The binders shall be provided with an identification tab for each Specification Section that requires submittals. Each item in each tabbed section shall be identified with the paragraph number relating to the item submitted the use of a cover sheet or by highlighting the paragraph on the first page concerning the item. If necessary, binders shall be submitted with the original submittal date and will address and resolve all comments thereon. All submittals shall include identification tabs and sufficient space for all submittal data. FAILURE to provide **BOUND AND IDENTIFIED SUBMITTALS** will result in the **AUTOMATIC REJECTION** of the submittal data with **NO EXCEPTION.**

B. The bound submittals are to be submitted for review within 30 days after the Contract is awarded. No submittal will be checked until ALL required submittals have been received by the Engineer. Only Automatic Temperature Controls, ductwork and piping fabrication drawings may be submitted after the completed bound submittal is reviewed and accepted by the Engineer.

C. The Contractor shall submit with the bound and identified submittal data a letter signed by the Contractor's Project Manager (or higher level officer of the firm) stating that all electrical characteristics of the mechanical equipment to be supplied have been fully coordinated with the electrical contractor. No submittal data will be checked until this letter is submitted. Any changes to the electrical requirements from the Contract Documents resulting from alternate equipment being submitted shall be performed without any additions to the Contract Sum. Shop Drawings shall be submitted for each of the following:

1. Submit attachment and fastening methods for piping and equipment to the Structural Engineer for approval.

2. Automatic Temperature Controls
3. Air Handling Units
4. Cleanouts
5. Condensing Units
6. Cooling Coils
7. Disconnect Switches
8. Ductwork Accessories and Details (min. 1/4"=1'0" scale)
9. Fans
10. Fire Hydrants
11. Grilles, Registers and Diffusers

12. Insulation
13. Manholes
14. Plumbing Drains
15. Plumbing Fixtures, Carriers and Fittings
16. Refrigerant Piping Diagrams and Layouts approved by the compressor Manufacturer
17. Rooftop units
18. Test, Adjusting and Balancing Reports and Forms
19. Valves
20. Water Heaters

D. The Contractor shall submit three copies of a letter, signed by an officer of the company, that the items listed below meet or exceed criterion of the plans and specifications. The letter is to include a list of each item to be used on the project along with the manufacturer.

1. Flexible Duct
2. Flexible Connectors
3. Ductwork Access Doors and Panels
4. Vacuum Breakers
5. Filters
6. Dampers
7. Water Supplies and Stops
8. Pipe Hangers and Supports
9. Hydrants
10. Shock Absorbers

3.02 OPERATING AND MAINTENANCE INSTRUCTIONS:

A. Description

1. Complete operating and maintenance instructions shall be provided to the Owner. Two (2) separate copies (three for the owner, one for the Architect) shall be provided, and each copy shall be bound in a separate 3-ring, loose leaf notebook. Operating instructions shall be provided for each system, and shall include a brief system description, a simple schematic and a sequence of operation. Operating and maintenance instruction shall be included for each piece of equipment. Manufacturers' Standard literature is acceptable for each piece of equipment. However, the contractor shall prepare a SYSTEM O&M manual including overall system descriptions, operating and energy conservation techniques.

2. A system wiring and control diagram shall be included in the operating and maintenance instruction.

3. Prior to final acceptance or beneficial occupancy, provide the services of a competent representative to instruct the Owner in the operation of all systems. This instruction shall include a complete walk-through of all equipment and systems. The Architect reserves the right to attend any such meeting and shall be duly notified.

3.03 OTHER SUBMITTALS:

A. Submit or provide the following prior to occupancy of the project by the Owner.

1. As built drawings for ductwork, HVAC piping, plumbing and fire protection systems.

2. All guarantees.

3. Submit two (2) copies of welders certificate.

4. Certify disinfection of domestic water service.

5. Manufacturer's representative shall certify that HVAC equipment and valves are installed in accordance with the manufacturer's recommendations.

END OF SECTION

SECTION 15015 DESIGN CONDITIONS

PART 1 GENERAL

1.01 DESCRIPTION: The requirements of the General Conditions, Supplementary conditions, and Section 15010 apply to all Work herein.

1.02 DESIGN CONDITIONS

A. Outside conditions are as follows:

		Dry Bulb Deg. F.	Wet Bulb Deg. F.
1.	Summer Outside Air Temperature	98	80
2.	Winter Outside Air Temperature	0	

B. The indoor design condition for cooling is 75 deg. F. dry bulb/50% relative humidity.

C. The indoor design condition for heating is 75 deg. F. dry bulb.

D. Schedule of Working Pressures:

	Working System	Normal Operating Pressure	Temperature Range
1.	Sanitary drain and vent	Atmospheric	Ambient
2.	Domestic Cold Water	150	Ambient
3.	Domestic Hot Water	150	120 deg. F.
4.	Fire Protection	175	Ambient

E. Range of indoor design goals for HVAC sound control:

1. All occupied space shall have an NC criteria curve range not to exceed NC 35.

F. Building envelope design criteria - these values are repeated here to alert the General Contractor to the properties of materials used in the calculation of heating and cooling loads for this project. It shall be the responsibility of the General contractor to notify the Architect and Engineer if materials with properties other than those stated below are used in the construction of this project:

1. Typical vision glass shading coefficient - 0.82

2. Typical vision glass "U" values - 0.6

3. Insulated exterior walls transmission coefficient-0.04 BTU/hr.) (F deg.)(sq.ft.)

4. Roof heat transmission coefficient - 0.024 Btu/(hr.)(F. deg.)(sq.ft.)

PART 2 PRODUCTS & PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 15016 CODES AND REGULATIONS

PART 1 GENERAL

1.01 DESCRIPTION

A. This division and the accompanying drawings cover furnishing of all labor, equipment, appliances and materials and performing all operations in connection with the installation of complete air conditioning, ventilating, heating, plumbing and kitchen hood fire protection systems as specified herein and as shown on the drawings.

B. The general provisions of the Contract including the Conditions of the Contract (General, Supplementary and other conditions) and other divisions as appropriate, apply to work specified in this Division.

1.02 CODES, ORDINANCES AND PERMITS

A. All heating, ventilating and air conditioning materials and workmanship shall comply with the following codes and standards as applicable:

1. The Standard Building Code (1997)

2. The Standard Mechanical Code (1997)

3. The National Electric Code (2002)

4. City of McComb, MS

B. All plumbing materials and workmanship shall comply with the following codes and standards as applicable:

1. The Standard Plumbing Code (1997)

2. The National Electric Code (2002)

3. City of McComb, MS

C. Applicable Publications: The publications listed below form a part of this specification to the extent referenced and are referred to in the text by the basic designation only.

1. Air-Conditioning and Refrigeration Institute Standards (ARI)

2. American National Standards Institute, Inc. Standards (ANSI)

3. American Society for Testing and Materials Publications (ASTM)

4. American Society of Mechanical Engineers Code (ASME)

5. Factory Mutual Underwriters (FM)

6. National Fire Protection Association Standard (2002)

7. Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA)

8. Underwriters Laboratories, Inc. (UL)

PART 2 PRODUCTS

2.01 COORDINATION: Any modification to the mechanical systems and their components, the electrical systems, the building structure and architecture, or any other portion of the building that results from the use of any other than the basis of design equipment shall be coordinated with all plans and codes. Such coordination shall occur before shop drawing submittals and shall be clearly indicated on the shop drawings. Any related modifications shall be performed without any additional cost to the Contract.

PART 3 EXECUTION

3.01 GENERAL

A. This Contractor shall conform to standards prescribed by City, County, State and Federal regulations or ordinances having jurisdiction. Execution of the Contract Documents indicates Contractor's knowledge of above regulations or ordinances and 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.

B. Permits required for the installation of the work, as well as all authorized code inspections, construction fees, meters and assessments shall be arranged for and paid for by the Contractor.

C. The contractor shall comply with all applicable provisions of the William-Steiger Occupational Safety and Health Act O.S.H.A.).

END OF SECTION

SECTION 15020 IDENTIFICATION OF PIPING SYSTEMS

PART 1 GENERAL

1.01 APPLICABILITY

A. All work specified in this Section shall comply with the provision of Section 15010.

B. All piping in mechanical spaces, in unfinished space, such as store rooms and above lift out ceiling, shall be identified with pressure-sensitive or snap on type pipe markers with color bands of the proper size. Markers shall have proper legend and meet OSHA Specifications. Where pipes are too small for such application, a 1-1/2" brass tag shall be used. Do not identify piping in the finished areas, such as offices.

C. Markers shall be placed so as to be easily read. Arrows shall be applied to indicate direction of flow.

PART 2 PRODUCTS

2.01 PIPE MARKINGS

A. Pipe markings shall be manufactured preprinted type in accordance with the following:

1. No tape or self-adhering markers will be allowed.

2. Snap on pipe markers, W. H. Brady Co. or approved equal are acceptable.

3. Markers shall be strapped on with nylon fasteners.

4. Markers will be non-corrosive, non-conductive, mildew resistant and impervious to moisture.

2.02 BAND AND LETTER SIZE: Band and letter sizes shall conform to ASHRAE standards of the following table:

O.D. of Pipe or Covering	Width of Color Band	Size of Letter/Numbers
1¼" and smaller	8"	1/2"
1½" to 2"	8"	3/4"
2½" to 6"	12"	1¼"
6" to 10"	24"	2½"
over 10"	32"	3½"

2.03 IDENTIFICATION: Band legend and color and letter color shall conform to the following table:

Piping Band	Legend Letters	Band Color	
Cold Water (Domestic)	CW (Dom)	White	Green
Hot Water (Domestic)	HW (Dom)	Black	Yellow
Hot Water Circulation (Dom.)	HWC Dom)	Black	Yellow
Drain	D	Black	Green

PART 3 EXECUTION

3.01 EXECUTION

A. Locate pipe identification in the following areas:

1. Each riser.

2. Each valve.

3. One each side where piping passes through walls and floors.

4. At or near each change in direction or height.

5. Every 40 feet along continuous runs.

6. Within 4 feet of exit or entrance to vessel or tank.

B. Indicate pipe content flow direction with arrows of matching style and placed so the arrow points away from the legend.

C. In addition to the above, fire protection piping and accessories will be identified as outlined in NFPA 13.

D. If manufactured preprinted markers are used they shall be attached to the piping with self-locking nylon fasteners.

END OF SECTION

SECTION 15025 MOTOR CONTROLS AND WIRING

PART 1 GENERAL

1.01 SCOPE

A. All electrical work specified in this Section shall comply with the provisions of Division 16. All mechanical work specified shall be in accordance with Section 15000.

B. All motors shall be provided.

C. All motor starters shall be provided by Division 15 for each motor including package units. Motor starters shall be installed either in a Motor Control Center or separately mounted adjacent to the motor served as shown, indicated and/or required.

D. Motor power wiring is defined as those conductors between the energy source and the motor. This power wiring shall be terminated at motor terminals and will be provided under Division 16 work.

E. All control wiring required for automatic starting and stopping of motors shall be provided under this Division unless specifically shown on the electrical drawings.

F. Power wiring will be connected through all line voltage control devices such as firestats and thermostats by Division 16 work.

G. Smoke detectors for HVAC equipment shall be furnished by Division 16 and installed by Division 15.

PART 2 PRODUCTS

2.01 MOTOR STARTERS

A. The Electrical Contractor shall furnish and install all manual starters as required. Where magnetic starters, reversing starters, multiple speed starters, etc., are required, they shall be furnished by the Mechanical Contractor. All poly-phase motors and all motors which are automatically controlled shall be furnished with magnetic starters, full voltage, non-reversing type, complete with necessary auxiliary contacts for controls unless otherwise noted. Heaters shall be of the melting alloy type, sized to the exact nameplate running current of the motor. Overloads shall have visual trip indicators and shall be trip-free with reset button held in. All magnetic motor starters or controllers shall be equipped with one overload element in each phase. Manually operated motors with magnetic controllers shall be provided with oil-tight pushbutton stations and automatically controlled motors shall be provided with oil-tight, "hand-off" automatic switches. All magnetic starters shall be provided with red bull's eye pilot light in cover. Energy for controlled circuits shall be taken through auxiliary contacts, and shall not be taken from the load contacts from the starters. All power wiring and control wiring shall be run in rigid conduit in damp locations or electrical metallic tubing in dry locations and shall conform to NEC Standards.

B. All motor starters, push buttons and pilot lights shall be of the same manufacture as the switchboard.

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide control wiring and install all motor starters, unless integrally factory mounted on a piece of equipment.

B. Provide control wiring to all motors except packaged units that are prewired between the starter and motor.

C. Where line voltage control devices are mounted at, on or inside a unit, such as aquastats, firestat for single phase devices, etc., the power wiring to the unit shall be connected through such a control device by the work of Division 16.

D. On final inspection, it shall be demonstrated to the Architect or his representative that each overload relay control circuit is properly wired and functioning correctly by manually tripping each overload relay individually, one at a time. This inspection procedure shall not involve removal of any wiring or disconnecting any current carrying parts.

E. Standard minimum one-year warranty on all electrical equipment provided herein shall apply.

END OF SECTION

SECTION 15030 TRENCH EXCAVATION AND BACKFILL

PART 1GENERAL

1.01 APPLICABILITY: The work specified herein shall include all labor, materials, equipment, tools, supplies and supervision required to install and place in operation the mechanical systems and appurtenances specified herein and/or indicated on the drawings or reasonably implied as necessary for completion of the various systems.

1.02 SCOPE: Furnish and install heating, air conditioning and ventilating equipment and systems as shown on drawings and described herein.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 WORK BY OTHERS

A. The Electrical Contractor shall bring adequate power to and make final connections to all equipment furnished under this Contract. All control wiring shall be by Controls Contractor.

B. The General Contractor shall provide prepared openings for ducts and other mechanical work as required in walls, roof, ceilings, etc.; shall do all painting as required; and shall assist Mechanical Contractor with installation of all mechanical equipment in exterior walls and on roof.

C. All items of labor, materials and equipment not specifically stated herein or on drawings to be by others and required to make the system complete and operative shall be by this Contractor.

D. The Contractor shall so coordinate the work of the several various trades that it may be installed in the most direct and workmanlike manner without hindering or handicapping the other trades. Piping interferences shall be handled by giving precedence to pipe lines which require a stated grade for proper operation. For example, sewer lines and condensate piping shall take precedence over water lines in determination of elevations. Where there is interference between sewer lines and condensate lines, the sewer lines shall have precedence and provisions shall be made in the condensate lines for looping them around the sewer lines. In all cases, lines requiring a stated grade for their proper operation shall have precedence over electrical conduit and ductwork.

E. All piping and ductwork in finished areas, except where noted to the contrary, shall be installed in chases, furred spaces, above ceilings, etc. In all cases, pipes and ducts shall be installed as high as possible. Runs of piping shall be grouped whenever it is feasible to do so.

F. Piping, equipment, or ductwork shall not be installed in electrical equipment rooms or elevator machine rooms except as serving <u>only</u> those rooms. Outside of electrical equipment rooms, do not run piping or ductwork, or locate equipment, with respect to switchboards, panelboards, power panels, motor control centers, or dry type transformers:

1. Within 42 inches in front (and rear if free standing) of equipment; or

2. Within 36 inches of sides of equipment.

3. Clearances apply vertically from floor to structure.

4. Provide safe access to equipment and apparatus requiring operation, service or maintenance within the life of the system. This includes, but is not limited to, motors, valves, filters, dampers, shock absorbers, etc. Equipment located above lay-in type ceilings is considered accessible.

END OF SECTION

SECTION 15080 HVAC TEST AND BALANCE

PART 1 GENERAL

1.01 RELATED DOCUMENTS: All work specified in this Section is subject to the provisions of GENERAL CONDITIONS, SUPPLEMENTARY GENERAL CONDITIONS AND SECTION 15010.

1.02 SCOPE OF WORK

A. The Contractor shall procure the services of an independent Test and Balance Agency that is independent of any contractor or manufacturer to perform the testing and balancing and prepare reports to the General Contractor and to the Architects and Engineers.

B. The Test and Balance Agency contract shall not be assigned to any subcontractor; the Agency shall work directly under the General Contractor. The independent Test and Balance Agency shall be a certified member of the Associated Air Balance Council (AABC).

C. Testing and Balance Agency as part of its contract shall act as an authorized inspection agency, responsible to the Owner, and shall, during the test and balance, list systems that are installed incorrectly, require correction, or have not been installed in accordance with contract drawings and specifications.

D. One agency shall be responsible for all phases of Total System Balance.

E. Testing and balancing shall not begin until all systems have been completed and are in full working order. The Mechanical Contractor shall put all heating, ventilating, and air conditioning equipment into full operation and shall continue the operation of same during each working day of testing and balancing.

F. Upon the completion of the test and balance work, the Agency shall compile the test data and submit four (4) copies of the complete report to the Architect for his evaluation and approval.

G. After testing, adjusting, and balancing is complete, the Contractor shall visit the job during the heating cycle and during the cooling cycle to make adjustments to provide uniform temperatures throughout the building. Schedule the trips during the months of December through February for the heating cycle, and June through August for the cooling cycle. Obtain signed statements form the Owner acknowledging these two trips and subsequent adjustments. Submit statements to Architect.

1.03 LEAKAGE TESTS, MEDIUM AND HIGH PRESSURE DUCTS: Medium and high pressure duct leakage tests performed by the Contractor as specified under the Air Distribution Section shall be witnessed and certified by the Test and Balance Agency.

1.04 LEAKAGE TESTS, LOW PRESSURE DUCTS: The Test and Balance Agency shall witness and certify to duct leakage tests for low pressure ducts specified to be performed by the Contractor under the Air Distribution (or Air Conditioning) Section. The Test and Balance Agency shall furnish test instruments, confirm the readings, make the calculations for percentage of leakage in accordance with AABC standard methods and submit test report total. Leakage is specified to be not over 5% of the design CFM at the normal operating pressure of the duct system.

PART 2 PRODUCTS

2.01 MATERIALS

A. Provide all required instrumentation, equipment, tools, devices and utility services to perform the operations as specified herein.

B. Instruments used for testing and balancing of system shall have been calibrated within six months preceding tests and checked for accuracy prior to start of work.

C. Instruments shall be of a type normally recognized as adequate and accurate for the test contemplated. List type of instrument, manufacturer, serial number and latest calibration date as a part of the submitted test data.

2.02 PATCHING MATERIALS: Except as otherwise indicated, use same products as used by original Contractor for patching holes in insulation, ductwork, and housings which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes.

PART 3 EXECUTION

3.01 REQUIRED DOCUMENTS:

A. The General Contractor shall provide the following, in a timely fashion to the Test and Balance Agency:

1. Contract drawings (complete set)
2. Applicable specifications
3. Addenda
4. Change orders
5. Reviewed shop drawings
6. Reviewed equipment manufacturer's submittal data
7. Reviewed temperature control drawings

3.02 COOPERATION: The General Contractor and his subcontractors shall cooperate fully with the Test and Balance Agency and provide:

1. Completely operable systems
2. The right to adjust the systems
3. Access to system components

3.03 BELT DRIVES

A. Adjustable speed drives are to be adjusted by the Test and Balance Agency. In cases where the specified capacities cannot be obtained with the original adjustable sheave or original fixed drive sheave, the Agency is to report to the Contractor the sheave size required to obtain the specified capacity.

B. Where larger or smaller sheave sizes are required, the Contractor shall provide new sheaves and, if required, new belts.

3.04 OPERATING TESTS: A complete system operating test shall be made for a period of 8 hours with controls set in their various positions to insure proper operation under the design conditions. All tests and final adjustments shall be made to the complete satisfaction of the Owner and the Architect.

3.05 CONTROL PERFORMANCE CHECK: The results produced by the operation of automatic controls shall be checked by the testing agency; controls requiring adjustment shall be listed and reported to the Contractor.

This does not reduce the responsibility of the Contractor for the checking and adjustment specified under the Temperature Control Section.

3.06 SETTINGS

A. The Test and Balance Agency shall permanently mark the settings of all valves, dampers, and other adjustment devices in a manner that will allow the settings to be restored. If a balancing device is provided with a memory stop, it shall be set and locked.

3.07 REPORT:

A. The following items shall be tested, recorded, and incorporated in the test and balance report. The report shall not be limited to these items. but shall include these tests as minimum requirements.

1. Record each fan manufacturer, model numbers and serial numbers.
2. Test, adjust and record required and measured total CFM for each fan system. Test and record quantity of exhaust of relief air in CFM.
3. Test, adjust and record all required and measured outside air quantities and return air CFM. Test and record quantity of return air in CFM.
4. Test and record required and measured system static pressures; filter differential, coil differential, and fan total static pressure.
5. Record all installed fan drive assemblies; fan sheaves, motor sheaves, and belts.
6. Record each installed motor manufacturer.
7. Record each installed motor horse power.
8. Test and record each motor name plate and measured voltage.
9. Test, adjust, and record each motor name plate and full load amperage.
10. Test, adjust, and record each blower RPM.
11. Test and adjust the CFM delivery of each diffuser, grille, and register.
12. Identify the location of each diffuser, grille, and register.
13. Record the size, type, and manufacturer of each grille, register and diffuser.
14. Data obtained for each diffuser, grille and register shall include required FPM velocity and test resultant velocity, required CFM and test resultant CFM after adjustments.
15. All diffusers, grilles, and registers shall be adjusted to minimize drafts.
16. All tests shall be made with supply, return, and exhaust systems operating, and all doors, windows, etc., closed or in their normal operating condition.
17. All damper positions shall be permanently marked after air balancing is complete.
18. The final balanced condition of each area shall include the testing and adjusting of pressure conditions. Front doors, exits, elevator shafts, etc., should be checked for air flow so that exterior conditions do not cause excessive abnormal pressure conditions.

END OF SECTION

SECTION 15100 MECHANICAL SUPPORTING SYSTEMS

PART 1 GENERAL

1.01 GENERAL: Provide adequate pipe and equipment foundations and suspension systems in accordance with recognized engineering practices, using, where possible, standard, commercially accepted hangers and accessories.

1.02 CODES

A. All pipe hangers and supports shall conform to the latest requirements of the Code for Pressure Piping, Refrigeration Piping ANSI-ASME B31.5-74 and Manufacturers' Standardization Society of Valve & Fittings Industry Documents MSS-SP-58-75 and MSS-SP-69-76.

B. All auxiliary steel necessary for the installation of the pipe hangers and supports shall be designed in accordance with the AISC 1978 Specification.

1.03 DESIGN

A. Supporting Steel not shown for the equipment will be designed, supplied and erected by the Contractor. (The supporting steel is that steel which is connected to the structural steel shown on the Drawings and carries the weight of the mechanical items.) This supporting steel design must carry the dead weight and dynamic load imposed by the equipment and provide for safety of installing personnel and safety of personnel to operate, maintain, repair and replace equipment.

B. The supporting steel shall be connected to the structural steel in such a manner as not to overload the structural steel. It is the responsibility of the General Contractor, Mechanical Contractor and the steel fabricator to verify that this purpose is accomplished. It is the responsibility of the general contractor to call to the attention of the Architect-Engineer any deficiency prior to bidding.

C. Where thermal movement in the pipe line will occur, the pipe hanger assembly must be capable of supporting the line in all operating conditions. Accurate weight balance calculations shall be made to determine the supporting force at each hanger in order to prevent excessive stress in either pipe or connected equipment.

PART 2 PRODUCTS

2.01 PRODUCTS: Numbers refer to Fee & Mason. Equal devices by Grinell or B-line will be acceptable.

2.02 CONCRETE INSERTS: Inserts shall be Figures 186, 2570 or FAMET 9000 where a continuous insert is required.

2.03 BEAM & STEEL JOIST CLAMPS: Clamps shall be Figures 249, 254, 282, 252, or 253.

2.04 RISER CLAMPS: Riser clamps shall be Figures 238 or 241, for steel pipe or Figure 368 for copper tubing. For riser loadings in excess of the maximum recommended loads shown for the above items, clamps shall be designed in accordance with Figures 395 or 396.

2.05 HANGER RODS

A. Hanger rods shall be Figures 267A and 263. Eye rods shall be Figures 228 and 228 WL.

B. All rods shall be galvanized coated.

2.06 PIPE HANGERS

A. All hangers for piping 2 inches or larger shall be provided with means of vertical adjustment.

B. On uninsulated steel pipe, hangers shall be Figures 199, 236, or 239.

C. On uninsulated copper tubing, hangers shall be Figures 307 or 364.

D. On hot insulated steel pipe, hangers shall be Figure 261 or welded attachments, Figures 90, 92, 94, or 96. Where thermal movement causes the hanger rod to deviate more than 5 Degrees from the vertical, or where longitudinal expansion causes a movement of more than ½ inch in the piping supported from below, roller hangers Figures 160, 161, 162, 170 or 272 shall be used in conjunction with a protective saddle sized to suit the insulation thickness. On insulated steel pipe for chilled or hot water or similar service the hanger must be placed on the outside of the insulation.

E. On insulated copper tubing, hangers shall be Figures 199 or 239 and shall be placed on the outside of the insulation.

F. Insulated pipe and tubing supports shall be Pipe Shields, Inc. A1000, A2000, A3000, A4000, A5000, A6000, A7000 or A8000.

G. Base supports shall be Figures 259 or 291.

2.07 BRACKETS AND RACKS: Welded steel brackets shall be Figures 151 and 155. Multiple pipe racks or trapeze hangers shall be fabricated from FAMET channel, clamps, and accessories.

2.08 ANCHORS, GUIDES AND SLIDING SUPPORTS: Pipe anchors shall be Figures 141 or 159. Guides shall be Figures 120, 121, 122 or 165. Sliding supports shall be Figures 143 or 145.

PART 3 EXECUTION

3.01 ATTACHING TO STRUCTURE

A. Where equipment or piping is supported off a concrete structure, inserts shall be used. Where support rod sizes exceed 7/8" diameter or where the pipe load exceeds the recommended load for the insert, use 2 inserts with a trapeze type connecting member below the concrete. In cases where pipes are supported from existing slab, use Phillips' "RED HEAD" or equal, sized for Safety Factor 4.

B. Where equipment or piping is supported from building steel beam, clamps or welded beam attachments shall be used. Holes drilled in building steel for hanger support rods will not be permitted.

C. All vertical runs of piping shall be supported at each floor.

3.02 HANGER RODS AND SPACING

A. Where hanger rod sizes are catalog-listed for a specified hanger, this size shall govern. Where hanger rod sizes are not catalog-listed, the load on the hanger shall be the determining factor and the maximum recommended hanger rod load, as catalog-listed, shall govern.

B. Pipe hangers shall be at each change in direction, not more than 2'-0" from end of run, and on straight runs the spacing shall not exceed whichever is closer: at each joint, or as follows:

PIPE SIZE	STEEL PIPE	COPPER PIPE
To 3/4"	7'-0"	5'-0"
1" to 2"	10'-0"	8'-0"
2-1/2" to 4"	12'-0"	10'-0"
5" to 8"	16'-0"	10'-0"

C. Provide supports at concentrated loads such as equipment, in-line pumps, valves and other piping specialties, to prevent line sag and/or excess stress in the piping systems.

D. For cast iron pipe provide hanger at each joint or fitting with a maximum spacing of 5'-0" on center.

E. Where distance between riser clamp and hanger exceeds 10'-0" in height, intermediate clamps shall be installed to provide support or alignment at a maximum of every 10'-0".

3.03 AUXILIARY STEEL

A. Furnish all miscellaneous structural members necessary to hang or support pipe or mechanical equipment. Material of members shall be consistent with that of the main structural system.

B. All auxiliary steel shall receive one shop coat of primer paint prior to installation.

C. Notify Architect of any adjustment necessary in main structural system for proper support of major equipment and provide for personnel safety for maintenance, repair and replacement of equipment.

3.04 CONCRETE PADS: Provide concrete pads where indicated on drawings under floor-mounted equipment and apparatus.

END OF SECTION

SECTION 15180 MECHANICAL SYSTEMS INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnish and install all insulation for HVAC piping and duct and plumbing piping.

B. Insulations specified are intended to set a standard. Insulations by other manufacturers will be considered provided that samples of each substitute item are submitted for approval.

C. Specifications apply to supply and associated return system unless specifically specified otherwise.

D. All insulation shall have surface burning characteristic ratings as tested by ASTM E-84, UL 723, or NFPA 255 not exceeding:

1.	Flame Spread	25
2.	Smoke Developed	50

E. Composite shall include insulation, jacketing and adhesive used to secure jacketing or facing. All accessory items such as PVC jacketing and fittings, adhesive, mastic, cement, tape and cloth shall have the same component ratings as specified above.

F. Insulation shall include all insulating materials, their applications, bands, tie wire, and weather protection for all pipe, fittings, valves, and equipment as indicated and as specified herein.

G. Pipe insulation on cold surfaces shall pass full thickness through hanger with galvanized iron sheet metal saddle at each hanger as per schedule below:

Through 3"	16 ga. x 12"
4" - 6"	16 ga. x 18"

H. Insulation at supports on 4 inch pipe and larger shall be foamglas on hot water and cold pipe. Hangers on domestic hot water, hot water heating and other hot surfaces where fiberglass insulation is used shall bear on the pipe and insulation shall be applied over hangers in a neat and workmanlike manner.

PART 2 PRODUCTS

2.01 PREMOLDED FIBERGLASS PIPE INSULATION:

A. Pipe insulation (4 lbs. Per cubic foot) shall be fibrous glass wool accurately molded to conform to the outside diameter of the pipe. Insulation shall be one piece snap-on or self-sealing type with white all service jacket. Insulation shall be suitable for use on either hot or cold water pipes with temperature range of +20 degrees to 400 degrees F. Thermal conductivity shall not exceed 0.23 at 75 degrees F. mean temperature.

INSULATION THICKNESS IN INCHES FOR PIPE SIZES

	Temperature Up to	**Up to 1”**	**1 ¼” to 2”**	**2 ½” to 3 ½ ”**
Cooling Systems				
Refrigerant hot gas and liquid	Any	¾”	1”	1 ½”
Refrigerant suction		¾”	1”	1 ½”
Plumbing				
Horizontal portion of rain leaders including each elbow and roof drain body.	Any	1”	1”	1”

2.02 FOAMED PLASTIC SHEET AND TUBING:

A. Minimum of 4.5 lbs. Per cu. Ft. Thermal conductivity shall not exceed 0.28 at 75º F mean temperature. Insulation material equal to Armaflex.

B. Insulate:

1. Water cooler waste and trap with 12” thick foamed plastic tubing
2. Domestic hot water piping below ground with ½” thick foamed plastic tubing.
3. Refrigerant piping.

C. Piping outside the building may be insulated with 1” thick flexible foamed plastic insulation with weatherproof aluminum as hereinafter specified.

2.03 HVAC DUCTWORK:

A. RECTANGULAR DUCTWORK (NOT INTERNALLY LINED): Owens-Corning 1-1/2 inch thick fiberglas faced duct wrap with factory-applied flame-retardant foil-reinforced Draft Facing (FRK). Type FRK 25, Series ED-100.

B. ROUND AND OVAL DUCT WORK: Owens-Corning 1-1/2 inch thick 3/4 lb. density fiberglas duct wrap with factory-applied flame-retardant foil-reinforced Kraft Facing (FRK). Type FRK 25, Series ED-100. Round or oval ductwork in attic shall have 2 inch thick 3/4 lb. density fiberglas duct wrap.

C. RECTANGULAR DUCTWORK (INTERNALLY LINED): Refer to Section 15840.

PART 3 EXECUTION

3.01 GENERAL:

A. The application of all insulation shall be performed by experienced mechanics, regularly employed in the trade, in a neat and workmanlike manner. Unless otherwise specified to a greater quality, the application of all insulation shall be in accordance with the manufacturer's recommendations.

B. Omit insulation from the following items:

1. Exposed plated plumbing pipe.

2. Vents to atmosphere, discharge from safety and relief valves, overflow pipes, and hot only drain pipes.

3. Valves, unions, flanges, traps, strainers, and devices in HOT ONLY piping.

4. Exhaust discharge ducts.

C. Foil-Faced (FF) duct insulation shall be acceptable to NFPA Standards 90A and 90B.

D. All exposed ends of pipe insulation shall be pointed up neatly with appropriate insulating cement, or use premolded PVC end caps on cold only piping and preformed aluminum end caps on dual-temp, hot or steam piping.

E. Piping systems shall be tested and cleaned before insulation is applied.

F. Surfaces to be insulated shall be clean, dry and free of foreign material, such as rust, scale and dirt when insulation is applied. Perform pressure tests required by other Sections before applying insulation.

G. Where existing insulation is damaged due to the new work, repair damage to match existing work or replace damaged portion with insulation specified for new work.

3.02 INSULATION FOR PIPING SYSTEM:

A. Insulate pipe fittings, flanges, unions and valves.

B. Install insulation materials with smooth and even surfaces, jackets drawn tight and cemented down smoothly at longitudinal seams and end laps. Do not use scrap pieces of insulation where a full-length section will fit.

C. Install insulation, jackets and coatings continuous through wall and floor openings and sleeves.

D. Fittings, valves and flanges shall e insulated with field fabricated multiple mitered segments of molded fiberglass insulation of the same thickness as adjoining pipe insulation. Secure fitting insulation segments with 20 gauge galvanized steel wire and apply a smoothing coat of insulating cement. White fabric and mastic shall be used on exposed fittings.

E. Application of all materials shall be in accordance with the manufacturer's instructions.

F. Butt all joints of pipe insulation together and secure all jacket laps with lap adhesive. Seal all joints with joint straps furnished with insulation.

G. Care shall be taken so as not to place insulation over vent and drain inlets and outlets.

H. Staples are not permitted on pipe insulation.

I. Insulate all chilled water and refrigerant piping appurtenances subject to sweating, such as thermometer wells, gauge cocks, and valve stems with preformed and mitered fiberglass pipe insulation. Finish with white vapor barrier mastic.

3.03 INSULATION EXPOSED TO WEATHER OUTSIDE THE BUILDING:

A. Finish with standard weight glass cloth set in a 1/16 coat of vapor barrier. After drying, apply a 1/16 coat of weatherproof vapor barrier similar to SEAL KOTE. Protect insulation including elbows with 0.16” thick corrugated aluminum, overlap two inches, and locate seams to shed water and secure with a minimum of three aluminum bands per section. Oversize insulation to allow for heat tape. Apply insulation after piping has been painted and heat tape has been installed.

3.04 PROTECTION OF UNDERGROUND COPPER PIPING: (REFRIGERANT)

A. Under ground piping, not mill coated and wrapped shall be covered with Armaflex as specified herein. After installation and testing, seal all joints and fittings as specified from insulation manufacturer.

3.05 FIBERGLASS DUCT WRAP TYPE INSULATION: (To be used on round or oval duct only or on rectangular duct with a maximum dimension less than 36.) Adhere insulation tightly wrapped to duct surface with approved adhesive applied in strips approximately 4" wide on approximate 8" centers. In addition, secure insulation to the bottom and/or sides of rectangular duct work with a dimension of 24" and above with mechanical fasteners at not more than 18" on center. Butt circumferential edges of insulation and seal joints with staples at 6" o.c., adhering the flange over each joint, and seal at lap of longitudinal joints. Tape all joints and punctures with 3" wide foil reinforced Kraft tape.

3.06 ARMAFLEX PIPE INSULATION: Apply in accordance with latest edition of Armstrong's "INSULATION INSTRUCTIONS TO THE CONTRACTOR". On outdoor or underground application, apply four coats of Armstrong's Weatherproof Plastic, reinforced with glass mesh.

END OF SECTION

SECTION 15200 VIBRATION ISOLATORS

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.

1.02 DESCRIPTION

A. Provide vibration isolators for mechanical equipment to prevent the transmission of vibration and mechanically transmitted sound to the building structure. Vibration isolators shall be selected by the isolator manufacturer in accordance with the weight distribution of the actual equipment provided so as to produce a uniform deflection.

B. Special care should be taken when selecting vibration isolators and housekeeping pad thickness to insure sufficient height to the drain pan outlet of air handling equipment to allow installation of the water seal and sufficient slope to the drain.

C. There shall be no direct contact of isolated piping or equipment with partitions, conduits, floor slabs or walls.

D. Where spring isolators are exposed to the outside, spring shall be neoprene coated or cadmium plated.

1.03 COORDINATION

A. The isolation devices and channel frames shall be products of a single vibration manufacturer. Submittal data shall include size, type, load and deflection of each isolator selected. Submittal data shall also include clearly outlined procedures for setting and adjusting all isolation devices. The isolation manufacturer's representative shall maintain an adequate stock of springs and isolators of the type used so that any changes required during construction and checking can be accomplished promptly.

B. Coordinate the vibration supports with the manufacturer of the equipment to be isolated. Prior to submitting detailed shop drawings to the Engineer for review, the equipment manufacturer shall approve the shop drawings in writing.

1.04 QUALITY ASSURANCE: Where shown, scheduled, or specified, provide specific vibration isolation equipment, manufactured by Amber-Booth, Consolidated Kinetics Corp., Korfund Dynamics Corp., Mason Industries, Inc., or Vibration ELiminator Co. Where specific type of vibration isolation equipment is not shown or specified, furnish isolators as recommended by one of the isolation manufacturers listed above, compatible with equipment arrangements shown.

PART 2 PRODUCTS

2.01 MOUNTINGS

A. Type "A" double deflection neoprene mountings. Double deflection neoprene mountings shall have a minimum static deflection of 0.35". All metal surfaces shall be neoprene covered and have friction pads at both top and bottom. Bolt holes shall be provided as required. Mason type ND or DNR.

B. Type "B" Spring Mountings. Spring isolators shall be free-standing and laterally stable without any housing and complete with 1/4" neoprene acoustical friction pads between the base-plate and the support. All mountings shall have leveling bolts that must be rigidly bolted to the equipment. Spring diameters shall be no less than 80% of the compressed height of the spring at rated load. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Submittals shall include spring diameters, deflections, compressed spring height, and solid spring height. Mason type SLF.

C. Type "C" housed spring mounting with limit stop. springs in housing shall be as specified above. Housing shall include vertical resilient limit stops to prevent spring extension when weight is removed as when equipment is drained. The housing shall serve as blocking during erection and the installed and operating heights shall be the same. Spring diameters shall be no less than 80% of the compressed height of the spring at rated load. A minimum clearance of 1/2" shall be maintained around restraining bolts and between the housing and the spring so as not to interfere with the spring action. Limit stops shall be out of contact during normal operation. Mountings used outside shall be hot dipped galvanized.

2.02 ISOLATION HANGERS: Type "D" Isolation Hangers. Vibration hangers shall contain a spring and a double deflection neoprene element in series. Neoprene elements shall have a minimum defection of 0.30 inches. Spring diameters shall be no less than 50% of the compressed height of the spring at rated load. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Spring diameter and hanger box lower hole shall be larger enough to permit the hanger rod to swing thru a 30 deg. arc before contacting the hole and short circuiting the spring. Mason Type 30N or PC30N.

2.03 BASES

A. Type "G" Steel Base. All mounts shall be spring type as specified herein. Height saving brackets shall be employed in all mounting locations. Furnish integral structural steel bases. Bases shall be rectangular in shape. All perimeter members shall be WF beams with a minimum depth equal to 1/10th of the longest dimension of the base. Mason Type WF.

B. Type "H" Cradle Base-Steel. Provide steel members welded to height saving brackets for machines having legs or bases that do not require a complete supplementary base. Members shall be sufficiently rigid to prevent stress in the equipment. Mason Type ICS.

C. Type "J" Floating Concrete Base. Furnish rectangular structural channel concrete forms for floating foundations. Bases for split case pumps shall be large enough to provide support for suction and discharge base ells. Channel depth shall be a minimum of 1/12th of the longest dimension of the base not less than 6". Forms shall include 1/2" reinforcing bars welded in place on 6" centers running both ways in a layer 1/2" above the bottom and drilled steel members with sleeves welded below the holes to receive the equipment anchor bolts Mason Type K.

D. Type "K" curb mounted aluminum bases. Curb mounted roof top equipment shall be mounted on vibration isolation bases that fit over the curb and under the isolated equipment. The extruded aluminum top member shall overlap the bottom member to provide water runoff independent of the seal. The aluminum member shall house cadmium plated springs having a 1" minimum deflection with 50% additional travel to solid. Spring diameter shall not be less than 80% of the spring height at the rated load. The weather seal shall be a continuous closed cell sponge material above and below the base and a flexible connection joining the outside perimeter of the aluminum member. Mason Type CMAB.

2.04 FLEXIBLE PIPE CONNECTORS

A. Flexible connectors shall be the twin-sphere type, made of multiple plies of nylon cord fabric and neoprene, hydraulically molded. Connectors through 1-1/2" shall have threaded ends, and connectors 2" and larger shall have flanges with recessed groove to receive the connector's raised neoprene face. Connectors 12" and larger operating above 100 psig shall have isolated limit stops to prevent over-extension and over-compression. Limit stops shall be either control cables with neoprene isolated end fittings and anti-compression stops, or spring loaded control units. Connectors shall be line size and shall be designed for the pressures and temperatures encountered in the system, minimum 150 psig and 220 deg. F. Mason Type MFTNC.

B. Type "M" flexible metal hose. Flexible stainless steel hose shall have stainless steel braid and carbon steel fitting. Mason Type BSS.

2.05 FLEXIBLE DUCT CONNECTORS: Flexible duct connectors shall be non-combustible. Material shall be glass fabric double coated with neoprene (30 ounce per square yard minimum). Flexible connectors shall be a minimum of 4 inches long. Flexible connectors shall be pre-assembled metal-to-fabric-to metal, fabric shall be attached to metal with a double lock grid. Provide flexible connectors meet or exceeds the contract documents provide flexible connectors as made by Duro-Dyne, Young Regulator or Vent Fabrics.

2.06 PIPE ANCHORS: Acoustical pipe anchor shall consist of telescopic arrangement of two steel tubing separated by minimum half inch thickness of heavy duty neoprene. Vertical restraints shall be provided to prevent vertical travel in either direction. Allowable loads on the isolation material shall not exceed 500 psi, the design shall be balanced for equal resistance in any direction.

2.07 PADS: Pads shall be of the neoprene waffle type with identical rubber grids molded back to back. The interconnections shall form suction pockets for gripping smooth steel as well as rough surfaces regardless of how the pad is cut. The square waffle pattern shall be layered out on 1/2 inch centers. Mason Type W.

PART 3 EXECUTION

3.01 GENERAL

A. Furnish mounting type and static deflection as follows:

		Type of Equipment	Type Mounting	Minimum Static Deflection Inches
1.		**Refrigeration Machines**		
	a.	Reciprocating Compressors	A	0.35
		or	B-H	1.50
	b.	Reciprocating Condensing	C	1.50
	c.	Hermetic Centrifugal Chillers	C	1.50
	d.	Absorption Chillers	C	0.75
	e.	Pad Mounted Condensing	Unit	PAD
	f.	Roof Mounted Air Cooler Chillers	B-K	1.50
2.		**Air Compressors**		
	a.	Air Compressor	A	0.35
		or	B-H	1.50
3.		**Pumps**		
	a.	Close Coupled To 7-1/2 HP and over	B-J	0.75
	b.	Flexible Coupled to 125 HP	B-J	1.50
4.		**Packaged Rooftop Air Conditioning and Make-up Air Units**	B-K	1.50
5.		**Cooling Tower**	C	1.50
6.		**Fans and Air Handling Equipment Up to 50 HP**		
	a.	Suspended Units	D	1.00
	b.	Utility Set Floor Mounted	B	1.50

7.	**Utility Sets**		
	a. Suspended	B-H	1.00
	b. Utility Set Floor Mounted	B	1.00
8.	**Packaged Air**		
	a. Handling Equipment Up to 10 HP	B	0.75
	b. 15 HP and Over	B	1.50
9.	**Built-Up Air Handling Unit Fan and Motor**	B-G	1.50

B. Piping shall be isolated with "D" hanger within the mechanical room or within 50 feet of the vibrating equipment which ever is greater. Maximum deflect shall no exceed 2".

C. Provide type M-L flexible pipe connectors on the equipment side from shut off valves at the pump suction and discharge and at other locations shown on the drawings.

D. Provide waffle type pads under chiller and condenser water riser clamps. On risers exceeding stories or 80 feet in height, piping shall be supported by Type B spring mountings.

E. After installation, verify that isolators are properly adjusted, with springs perpendicular to base housing, adjustment bolts are tightened up on equipment mountings, hangers are not cocked, and Type 3 base plates.

END OF SECTION

SECTION 15317 REFRIGERANT PIPING SYSTEM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The requirements of the General Conditions and Supplementary Conditions.

B. Refer to Specification Section 15100 for specification and installation requirements of the pipe support system.

C. Refer to Specification Section 15180 for specification and installation of thermal insulation for the various types of pipe, fittings, and accessories specified in this section.

1.02 DESCRIPTION OF WORK

A. Extent of the piping systems work is indicated on the Drawings and schedules, and by the requirements of this section.

B. The construction requirements herein shall include appurtenant structures and buildings to which the piping system is to be connected.

1.03 QUALITY ASSURANCE

A. Codes and regulations referred to are minimum standards. Where the requirements of these specifications or drawings exceed those of the codes and regulations, the drawings and specifications shall govern.

B. Firms regularly engaged in manufacture of piping products of types, materials and sizes required, whose products have been in satisfactory use in similar service for not less than five (5) years are approved.

C. Certify brazing procedures, brazes and operators in accordance with Section IX ASME Boiler and Pressure Vessel Code (ANSI B31.5). Two copies of the qualification test report and certification shall be submitted to the Architect.

1.04 DEFINITIONS: Pipe sizes listed are for outside diameter of the pipe (O.D.).

PART 2 PRODUCTS

2.01 REFRIGERANT PIPE

A. <u>All Pipe Sizes:</u>

1. Type: Copper tubing of the pipe sizes listed.

2. Class: Type L hard drawn tubing, ASTM B-88

3. Fitting: Sweat type wrought copper.

4. Joints: Socket brazed with 95-5 tin-antimony

PART 3 EXECUTION

3.01 GENERAL PIPE SYSTEM

A. Nonferrous Metallic Pipe: Where nonferrous metallic pipe, e.g., copper tubing, crosses ferrous piping material, a separation must be maintained between pipes.

B. Cut pipe accurately to measurements, and ream free of burrs and cutting splatter. Carefully align and grade pipe, and work accurately into place. Fittings shall be used for any change in direction. Provide for expansion at every building expansion joint. Protect open pipe ends to prevent trash being placed in the lines during installation. Clean all dirt and cutting debris from pipes before making the next joint.

C. Install piping so as to preserve access to all valves, air vents, and other equipment and to provide the maximum headroom possible.

D. Joints shall be made with nitrogen gas in the pipes to prevent oxidation. All piping shall be installed parallel to or at right angles with building walls, columns, and partitions.

E. Clean inside of refrigerant lines with methyl alcohol before assembly and take care thereafter to prevent foreign matter from entering and being sealed in. Cut pipe ends square and deburr. Clean pipe and fitting with #00 steel wool before joining. Make joints without burning.

3.02 TESTS

A. Test refrigerant piping, equipment, valves and fittings at a pressure of 245 psi on the low side and 300 psi on the high side by introducing refrigerant and dry carbon dioxide (C02) or nitrogen throughout the refrigerant circuit. Bubble test joints with soap lather, clean joints of soap and leak-test with a halide torch. The system shall be pumped out and the entire circuit placed under 27 inches of vacuum and allowed to stand sealed off for a period of 8 hours, without any loss of vacuum.

B. Submit an affidavit signed by the Architect's representative and the Contractor's representative stating they have witnessed and approved the dehydration test.

3.03 SUBMITTALS: Submittals shall include but shall not be limited to a diagram approved by the compressor manufacturer, to include the size and length of the refrigerant piping, all offsets and elbows required for the installation location of all valves, filter driers, moisture and liquid indicators and flexible connectors where required.

END OF SECTION

SECTION 15400 PLUMBING BASIC MATERIALS AND METHODS

PART 1 GENERAL

1.01 DESCRIPTION:

A. This Section of the Specifications and related drawings describe requirements pertaining to the plumbing piping and equipment.

B. Refer to the following sections for related work:

1. 15011 Submittals
2. 15020 Identification of Piping Systems
3. 15100 Mechanical Supporting Systems
4. 15431 Drains, Cleanouts and Drainage Accessories
5. 15442 Water Heaters – Electric
6. 15450 Plumbing Fixtures & Trim

1.02 RECORD DOCUMENTS: Provide corrected Record Documents in accordance with the Project Record Documents Sections and the Mechanical General Section.

1.03 GENERAL PROVISIONS AND BASIC MATERIALS: The requirements of the Mechanical General Section apply to this work.

1.04 CODE

A. The work shall comply with the Standard Plumbing Code (1997 edition); acceptability under the codes shall not authorize any substitution, smaller size, lighter weight or less durable materials for the items specified.

B. The Contractor shall obtain and pay for all required permits and inspections and shall deliver one copy of each inspection certificate to the Architect before the date of Substantial Completion.

PART 2 PRODUCTS

2.01 PIPING MATERIALS FOR DRAINAGE SYSTEMS:

A. Aboveground piping all within building: Service weight (SV) No-hub cast iron soil pipe and fittings CISPI301 with "husky" heavy duty stainless steel clamps, CISPI301 and neoprene gaskets, ASTM C-564.

B. Underground building drain piping beneath floor slab to 5’-0” outside building: Service weight (SV) cast iron hub and spigot soil pipe and fittings, ASTM A-74 with neoprene compression gasket, joints, ASTM C-564.

C. Drainage piping outside building all sizes: Polyvinyl chloride pipe (PVC) ASTM D-2665, PVC Type DWV fittings with solvent weld joints.

D. Condensate Drain Piping: Type DWV copper pipe with tin-antimony soldered joints and drainage fittings.

E. All traps shall have brass cleanout plug except where buried.

2.02 ROOF FLASHING: Vent pipes passing through roof shall be flashed with a one piece pipe flashing unit constructed of E.P.D.M. rubber with an aluminum reinforcing ring suitable for a temperature range of -25°F to 250°F as manufactured by Butler Manufacturing Company or approved equal. Flashing shall be installed in accordance with metal building manufacturer recommendations. Vents shall offset in roof joist area or ceiling cavity if necessary so that no vent shall be closer than 4'-0" from outside wall line.

2.03 DOMESTIC WATER PIPING:

A. Aboveground piping 3" and smaller inside building: Type "L" copper tubing with tin-antimony soldered joints and wrought copper socket fittings. Underground piping 3" and smaller: Type "K" hard drawn copper tubing, with 95-5 silver soldered joints and wrought copper socket fittings.

B. Underground piping 3" and smaller beneath slab to 5'-0" outside building: Type "K" hard drawn copper tubing, with 95-5 silver soldered joints and wrought copper socket fittings.

C. Underground piping 4" and larger beneath slab to 5'-0" outside building: Class 50 ductile-iron pipe, with cement mortar lining, and push-on joints. Fittings shall be Class 250 ductile-iron, mechanical joints.

D. Underground piping 1" and smaller below building slab: Below slab Type "L" soft drawn copper tubing, with no joints.

E. Underground piping outside building all sizes: Polyvinyl chloride (PVC) plastic piping Schedule 40, ASTM D-1785 with 150 PSI minimum pressure rating. Fittings shall conform to ASTM D-2466 with solvent weld joints conforming to ASTM D-2564.

2.04 BASIC PIPING SPECIALTIES:

A. Unions:

1. Unions shall be the same material and working pressure as the fittings specified for the piping system. Unions on piping 2-1/2" in size and larger shall be bolted flanged joint and on smaller than 2-1/2" shall be screwed connection.

2. Unions and flanges provided between copper and ferrous pipe connections shall be insulating (dielectric) type to electrically separate dissimilar metal connections in piping system.

B. Dielectric Adapters:

1. Dielectric adapters shall be the union type for pipes 2" in size and larger. Adapters shall have working pressure of 250 psi for union type and 165 psi for flanged type. The insulating gaskets shall have an operating range of 40 degrees F to 240 degrees F and shall limit the galvanic corrosion to a maximum of 1% of the short circuit current. Dielectric adapters shall be Ebco, Crane or Capitol.

2. Provide a dielectric adapter between any ferrous and copper connection including piping and equipment.

C. Thermometers:

1. Thermometers shall be the red-reading mercury filled adjustable angle type. Thermometers shall be adjustable to any angle through a 180 degree arc and shall be provided with a locking device. Thermometers shall have V-cast aluminum case with baked enamel finish and 9 inch scale. Thermometers shall be provided with separable sockets and, where installed on insulated pipes, sockets shall be extended neck type. Thermometer scale range shall be 0 to 160 degrees F. Thermometers shall be Weksler Adjust-Angle Series Type AA-5, Trerice Adjustable Angle Series Type BX, or Weiss Vari-Angle Series Type VS.

D. Pipe Sleeves:

1. The Contractor shall install, as required, in concrete, carpentry or masonry construction, all necessary hangers, sleeves, expansion bolts, inserts and other fixtures and appurtenances necessary for the support of all pipe, equipment and devices furnished under each section of the Specification.

2. Cutting of openings and installation of sleeves or frames through walls and surfaces shall be done in a neat workmanlike manner. Openings shall be cut only as large as required for the installation; sleeves, except as otherwise indicated, and/or frames shall be installed flush with finished surfaces and grouted in place. Surfaces around opening shall be left smooth and finished to match surrounding surface.

3. Where pipes pass through floor slabs, sleeve shall be standard weight black steel pipe with top of sleeve 3" above finished floor. Where pipes pass through walls, sleeves shall be standard weight black steel pipe or 20-gage galvanized sheet metal with ends flush with wall surfaces.

4. Each pipe passing through walls, floors, ceilings or partitions shall be provided with sleeves having internal diameter one inch larger than the outside dimensions of insulated pipes.

5. All pipe sleeves through floors, roofs and masonry walls shall be built in place as the affected walls, floors, and roofs are built.

6. All penetrations through rated floors shall be packed with mineral wool and capped off with a silicon caulk. As an alternate, an approved, fire rated sealant as manufactured by 3M or Hilti may be used.

7. Sleeves through exterior wall shall be steel or cast iron pipe, flush with the exterior surfaces, and with the space between the pipe and the sleeves caulked watertight in an approved manner.

8. Inserts shall be cast iron or galvanized steel individual type, with accommodations for removable nuts and threaded rods up to ¾ inch diameter, and permitting lateral adjustment.

E. Floor, Wall and Ceiling Plates:

1. Escutcheons shall be installed on all pipes where they pass through floors, ceilings, walls, or partitions in finished areas.

2. The interior of closets, adjacent to finished areas, shall be considered as finished for the intent of these Specifications.

3. Escutcheons shall be split, hinged, stamped brass type designed to fit the pipe, and to cover the terminating pipe sleeve, in chrome plated finish unless otherwise specified, with securing device to hold the escutcheon tight to the pipe.

2.05 BACKFLOW PREVENTERS:

A. Reduced Pressure Principle - Provide reduced pressure principle backflow preventer assembly including shutoff valves on inlet and outlet, and strainer on inlet. Backflow preventer shall include test cocks, air-gap drain funnel, and pressure-differential relief valve located between two (2) positive seating check valves. Assembly shall be constructed in accordance with ASSE Standard 1013 and University of Southern California (USC) Foundation for Cross-Connection Control and Hydraulic Research. Pipe drain to nearest floor drain.

B. Double Check Valve - Provide double check valve backflow preventer assembly including shutoff valves on inlet and outlet, and strainer on inlet. Backflow preventer shall include test cocks, and shall be suitable for supply pressures up to 175 psi. Assembly shall be constructed in accordance with ASSE Standard 1013 and University of Southern California (USC) Foundation for Cross-Connection Control and Hydraulic Research.

C. Provide backflow preventers as indicated on drawings. Backflow preventers shall be Watts or approved equal as follows:

Size	Double Check	Reduced Pressure Zone
½” to 3”	007QT-S	009QT-S
4” to 10”	709NRS-S	909NRS-S

2.06 WATER HAMMER ARRESTORS: Water hammer arrestors shall be stainless steel sealed bellows type, pressure rated for 250 psi, tested and certified in accordance with PDI standard WH-201; J.R. Smith Series 5000 or approved equal.

2.07 VALVES:

A. All shutoff valves shall be gate, butterfly, or ball valves unless otherwise noted. All drain valves shall be globe or angle valves unless otherwise noted.

B. Gate valves 2 inches and smaller shall be of Class 125, body and bonnet shall be of ASTM B-62 cast bronze composition, solid disc, copper-silicon alloy stem, brass packing gland, solder ends, Teflon-impregnated packaging, and malleable handwheel; NIBCO S-11 or approved equal.

C. Class 150 valves meeting the above specifications shall be used where pressure requires; NIBCO S-134 or approved equal.

D. Ball valves 2 inches and smaller shall be 600 psi CWP, have cast brass bodies, replaceable reinforced Teflon seats, conventional port, blowout proof stems with extension for insulation, chrome-plated brass ball, solder ends with extended solder cups; NIBCO S-580-BR-R-70 or approved equal.

E. Butterfly valves 2-1/2 inches and larger shall be lug type body, 200 PS; CWP, conforming to ASTM A-395 ductile iron, replaceable EPDM sleeve, with ductile nickel-plated disc, 410 stainless steel stem with extension for insulation, and EFDM O-ring stem seals. Sizes 2 inches – 6 inches shall be lever operated; NIBCO LD-3110-3 or approved equal.

F. Gate valves 2-1/2 inches and larger shall be Class 125 iron body, bronze mounted, with body and bonnet conforming to ASTM A-126 Class B cast iron, flanged ends, with Teflon-impregnated packing and two-piece packing gland assembly; NIBCO F-617-0 or approved equal.

G Globe valves 2 inches and smaller shall be of Class 125, body and bonnet of ASTM B-62 cast bronze composition, solder ends, copper silicon alloy stem, brass packing gland, Teflon-impregnated packing and malleable handwheel; NIBCO S-235-Y or approved equal.

H. Globe valves 2-1/2 inches and larger shall be of Class 125 iron body, bronze mounted with body and bonnet conforming to ASTM A-126 Class B cast iron, flanged end, with Teflon-impregnated packing and two-piece packing gland assembly; NIBCO F-178-B or approved equal.

I. Check valves 2 inches and smaller shall be of Class 125, solder ends, with bodies and caps conforming to ASTM B-62 cast bronze composition, swing type disc; NIBCO S-413-BYW or approved equal.

J. Check valves 2-1/2 inches and larger shall be iron body, bronze mounted, with body and cap conforming to ASTM A-126 Class B cast iron, flanged ends, swing type disc; NIBCO F-918-B or approved equal.

2.08 PLUMBING SYSTEM INSULATIONS:

A. All pipe insulation material shall have a permanent composite insulation, jacket and adhesive fire and smoke hazard rating as tested by procedure ASTM-B84, NFPA 255, and UL 723 not exceeding Flame Spread 25, Smoke Developed 50.

B. The use of staples for securing insulation will <u>not</u> be permitted.

C. Insulation shall be applied on clean dry surfaces. All insulation shall be continuous through wall and ceiling openings and sleeves.

D. Ends of fiberglass pipe insulation on cold pipelines shall be sealed off with white vapor barrier coating at valves, flanges and fittings.

E. Unions shall not be insulated.

F. Pipe covering protection shields and saddles shall be provided around exterior of pipe insulation at pipe hangers which fit around pipe insulation. Foamglass pipe insulation shall be used under saddles on pipe 2" and larger.

2.09 FIBERGLASS PIPE INSULATION: Insulation shall be one piece fibrous glass sectional pipe insulation with white all service jacket. Longitudinal jacket laps and butt strips shall be self-sealing. Insulation shall have an average thermal conductivity not to exceed 0.23 BTU-in. per square foot per degrees F. per hour at a mean temperature of 75 degree F. Insulation shall be Manville Fiberglass Micro-Lok AP-T Plus or approved equal.

2.10 APPLICATION:

A. Butt all joints of pipe insulation together and secure all jacket laps with lap adhesive. Seal all butt joints with joint straps furnished with insulation.

B. Fittings, valves and flanges shall be insulated with molded fiberglass insulation of the same thickness as adjoining pipe insulation. Insulation at fittings shall be covered with white PVC jacket as manufactured by Zeston or equal.

INSULATION THICKNESS IN INCHES FOR PIPE SIZES

	Temperature Up to	Up to 1”	1 ¼” to 2”	2 ½” to 4”	4” & Over
Cold Water	50º-65ºF	½”	1”	1”	1”
Hot Water	200ºF	½”	1”	1”	1 ½”

2.11 FOAMED PLASTIC SHEET AND TUBING:

A. Minimum of 4.5 lbs. per cu. ft. Thermal conductivity shall not exceed 0.28 at 75° F mean temperature.

B. Insulate:

1. Water cooler waste and trap with 1/2 inch thick foamed plastic tubing.

2. Piping outside the building shall be insulated with 1 inch thick flexible foamed plastic insulation with weatherproof aluminum as hereinafter specified.

2.12 WEATHERPROOFING:

A. Protect exposed water piping from freezing down to 0 degrees F in unheated areas with self-regulating heater cable with built-in thermostat. Cable to be installed in contact with pipe and beneath pipe insulation. Protect piping insulation with Pabco insulating division aluminum sheets of .016 thickness and aluminum formed elbows with leak-proof beads and epoxy coated interior.

B. Heater cable shall be as manufactured by Raychem, Chromalox or approved equal.

2.13 PIPE HANGERS AND SUPPORTS: Provide pipe hangers and supports in accordance with Section 15100 "Pipe Hangers and Supports”.

PART 3 EXECUTION

3.01 INSTALLATION:

A. Install soil and vent piping pitched to drain at minimum slope of 1/4 inch per foot (2%) for piping 3 inches and smaller, and 1/8 inch per foot (1%) for piping 4 inches and larger.

B. Install piping and make all joints in accordance with the pipe manufacturer's recommendations. Make provisions for thermal expansion and contraction.

C. Install cleanouts on drainage piping where indicated on the drawings and as required by the code, and at every change in direction of more than 45 degrees in horizontal piping. Locate wall cleanouts as low as possible but high enough for the cover plate to clear the base. Locate test tees where necessary to separate sections of piping for testing.

D. Rough-in for fixtures in accordance with the fixture manufacturer's roughing-in drawings to provide the heights and locations indicated on the Architectural drawings or as specified.

E. Set floor cleanouts so that the top rims are level and flush with the finished floor surface and so that square and rectangular tops are parallel to the walls, unless otherwise noted.

F. Install piping and pipe supports as specified. Keep pipe ends closed except for vent and drain openings; protect vent and drains from the entrance of materials that could cause stoppage.

G. Vents extending through roof shall terminate at 1'-0" above roof and shall be minimum size of 3 inches diameter.

H. Install shut-off valves where indicated on the drawings and required by the code including valves at all fixture groups, and equipment.

I. Install drain valves at low points of all new water piping except buried piping.

3.03 EXCAVATION, TRENCHING AND BACKFILLING:

A. Perform all excavation, trenching and backfilling for work under Division 15. During excavation, material for backfilling shall be piled back from the banks of the trench to avoid overloading and to prevent slides and cave-ins. All excavated materials not to be used for backfilling shall be re moved and disposed of. Grading shall be done to prevent surface water from flowing into trenches and other excavation and any water accumulating therein shall be removed by pumping. All excavations shall be made by open cut. No tunneling shall be done.

B. Bottom of trench shall be uniformly graded to provide firm support and even bearing surface for pipe.

C. Pipe shall be laid on firm soil, laid in straight lines and on uniform grades. Provide bell holes so that barrels of pipe rest evenly on bottom of trench along entire length of pipe.

D. Pipe shall be inspected and tested prior to backfilling. No roots, rocks or foreign materials of any description shall be used in backfilling the trenches. Trench shall be hand filled to a minimum of 12 inches above the top of the pipe with clean earth and tamped to 95 percent compaction after first layer using the modified Proctor test method of compaction.

3.04 TESTS OF PIPING:

A. Install temporary connections and plugs or valves at all points necessary for venting air from the piping, filling, holding test pressure, draining and flushing the piping.

B. Test all new soil, waste and vent piping under 10 feet head of water (except for the uppermost 10 feet) as required by the Plumbing Code, with zero leakage allowed. The test pressure shall be maintained for at least 30 minutes before inspection starts and maintained for the time necessary to inspect all joints but not less than 15 minutes.

C. Test all new pressure piping roughing hydrostatically to show zero leakage in eight (8) hours at the following pressures measured at the low points: Domestic water (C.W., H.W., and H.W.R.), 125 psi.

3.05 FLUSHING AND STERILIZING:

A. Flush all new water piping after pressure tests and repairs are completed by draining from the low points; refill with clean water.

B. Sterilize the above ground water piping after fixtures and equipment are installed with 50 ppm chlorine solution distributed throughout all C.W. and H.W. piping; let stand for 24 hours, then flush enough water at drinking fountains and lavatories to reduce the residual chlorine content to less than one (1) ppm. Domestic water heater shall have the heat source shut off while sterilization is in progress.

3.06 START-UP, ADJUSTMENT, INSTRUCTION: Start-up, lubricate, adjust and test equipment installed under this Section and furnish instructions to the Owner as specified in the Mechanical General Section.

3.07 OPERATIONAL TESTS:

A. When installation and adjustment of all fixtures and equipment is complete, perform operational tests of all plumbing system components at normal operating pressures as specified under the Mechanical General Section and include the following tests:

1. Operate all manual and automatic valves at least one full open-closed cycle; examine for stem leakage, failure to close or other malfunction.

2. Pour at least five (5) gallons of water into every floor drain to test for pipe stoppage.

END OF SECTION

SECTION 15431 DRAINS, CLEANOUTS & DRAINAGE ACCESSORIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. All work specified in this section is subject to the provisions of Section 15010 "Mechanical General".

B. Refer to the following sections for related work in connection with drains, cleanouts and drainage accessories.

1. 15011 Submittals

2. 15400 Plumbing Basic Materials and Methods

1.02 DESCRIPTION OF WORK: The number and size of the drains and cleanouts are indicated and scheduled on the drawings.

1.03 QUALITY ASSURANCE

A. Manufacturing firms shall be regularly engaged in the manufacture of plumbing products of type and sizes required, whose products have been in satisfactory use in similar service for not less than five (5) years.

B. Subject to compliance with requirements, provide drains, cleanouts & drainage accessories of one of the following manufacturers:

1. Josam Mfg. Co.

2. Smith (Jay R.) Mfg. Co.

3. Wade Div., Tyler Pipe

4. Zurn Industries, Hydromechanics Div.

PART 2 PRODUCTS

2.01 GENERAL:

A. Provide factory fabricated drainage piping products of the size and type as indicated on drawings, including features as specified herein. Where not indicated, provide proper selection as determined by installer to comply with installation requirements and governing regulations.

B. Floor drains shall be provided with trap primer connections where indicated on drawings.

C. All floor drains without trap primers shall be provided with deep seal "P" traps.

D. All floor drains located on elevated floors shall be provided with seepage holes and flashing collar or clamping rings to provide for leak proof installation.

2.02 CLEANOUTS

A. Vertical and horizontal lines exposed - Test Tee – Smith 4510.

B. Vertical lines concealed – Smith 4472 with stainless steel access cover.

C. Horizontal lines under unfinished floors – Smith 4405.

D. Finished floors – Smith 4023 cast iron adjustable floor level cleanout assembly with round polished bronze top.

E. Finished Floors - Linoleum, Terrazzo or Tile – Smith 4143 cast iron adjustable floor level cleanout assembly with round polished bronze top. Top depression to be covered with surrounding floor pattern bonded with waterproof adhesive.

F. All lines outside of building - Smith 4400.

G. Finished floors - Carpet Smith 4023-Y cast iron adjustable floor level cleanout assembly with nickel bronze top an 1-1/2" diameter stainless steel carpet marker. Carpet shall cover top of cleanout with carpet marker exposed above carpet to serve as cleanout locator.

PART 3 EXECUTION

3.01 INSTALLATION

A. All floor drain strainers shall be securely fastened to drain body.

B. During construction drains shall be kept covered so that traps, sediment buckets and dome type strainers are kept free from debris and trash.

END OF SECTION

SECTION 15442 WATER HEATERS - ELECTRIC

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. All work specified in this section is subject to the provisions of Section 15010 "Mechanical General".

B. Refer to the following sections for related work in connection with electric water heaters:

1. 15011 Submittals
2. 15020 Identification of Piping System
3. 15100 Mechanical Supporting Systems
4. 15400 Plumbing Basic Materials and Methods

1.02 DESCRIPTION OF WORK: The number and size of the electric water heaters are indicated on the drawings and schedules.

1.03 QUALITY ASSURANCE:

A. Manufacturing firms shall be regularly engaged in the manufacture of electric water heaters of type and sizes required, whose products have been in satisfactory use in similar service for not less than five (5) years.

B. Provide water heaters which comply with ASHRAE 90.1b-1992 for energy efficiency.

C. U.L. and NEMA Compliances - Provide electrical components required as part of electric water heaters, which have been listed and labeled by Underwriters Laboratories and comply with NEMA Standards.

D. NEC Compliance - Comply with the National Electric Code as applicable to installation and electrical connections of ancillary electrical components of electric water heaters.

1.04 SUBMITTALS

A. Product Data - Submit manufacturer's plumbing equipment specifications, installation and start-up instructions.

B. Maintenance Data - Submit maintenance data and parts lists for each item of accessory equipment. Include "trouble-shooting" maintenance guides. Include this data in maintenance manual.

PART 2 PRODUCTS

2.01 GENERAL: Refer to schedule for heater sizes, capacities, electrical characteristics and element operation.

2.02 ELECTRICAL STORAGE TYPE WATER HEATERS:

A. Tank Materials - Tank shall be welded steel construction, 150 psi working pressure.

B. Lining - All interior tank surfaces shall be glass lined.

C. Elements - Electric heating elements shall be low watt density with zinc plated copper sheath.

D. Enclosure - Heater shall be factory insulated and provided with steel enclosure with baked enamel finish.

E. Controls - Adjustable thermostat, high temperature cut off and low water cut off.

F. Accessories - Provide the following water heater accessories:

1. Magnesium anode
2. ASME combination temperature and pressure relief valve.
3. Brass tank blowdown drain valve.
4. Thermometer
5. Automatic air vent
6. Watts No. 530 adjustable bleeder pressure relief valve.

G. Warranty - Furnish three (3) year limited warranty for tank leakage.

H. Manufacturer - Provide water heaters meeting specification requirements of one of the following manufacturers:

1. A.O. Smith
2. Lochinvar
3. Rheem
4. Ruud
5. State Industries

2.03 ELECTRIC INSTANTANEOUS HEATER:

A. Electric instantaneous point of use water heater shall have cast aluminum alloy or high strength reinforced plastic housing. Heating coils shall be flow switch activated and thermostatically controlled.

B. Provide flow control fitting at inlet of heater. Provide ball valve at inlet and outlet of heater.

C. Instantaneous heater shall be equal to Chronomite.

PART 3 EXECUTION

3.01 INSTALLATION OF WATER HEATERS:

A. Install water heaters where indicated on drawings, in accordance with manufacturer's installation instructions, and in compliance with applicable codes.

B. Connections - Make connections between water heaters and domestic water piping shutoff valves with unions or flanges as indicated. Provide dielectric isolation at all tank connections.

C. Identification - Provide sign securely attached to water heater identifying equipment number, service and capacity. Provide identification on all piping connections to water heaters.

D. Testing - Upon completion of installation, pressure test water heaters hydrostatically to assure structural integrity and freedom from leaks.

E. Disinfection and Flushing - Disinfect in accordance with potable water piping requirements and flush water heaters upon completion of installation in accordance with manufacturer's instructions, and comply with applicable health codes.

END OF SECTION

SECTION 15450 PLUMBING FIXTURES & TRIM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. All work specified in this Section is subject to the provisions of Section 15010 "Mechanical General".

1.02 DESCRIPTION OF WORK

A. Extent of plumbing fixtures and trim work is indicated by drawings and schedules, and by requirements of this section.

B. Refer to Division-16 sections for electrical connections to water coolers and other plumbing fixtures; not work of this section.

1.03 QUALITY ASSURANCE

A. Manufacturing: Firms shall be regularly engaged in the manufacturing of plumbing fixtures of the type, style and configuration required, whose products have been in satisfactory use in similar service for not less than five (5) years.

B. Comply with applicable portions of the Plumbing Code, latest edition, pertaining to materials and installation of plumbing fixtures.

C. Comply with applicable ANSI standards pertaining to plumbing fixtures and systems, and bathtub units.

D. Comply with ANSI A117.1 standard and the Americans with Disabilities Act (ADA) pertaining to plumbing fixtures for handicapped.

E. Comply with standards established by Plumbing and Drainage Institute pertaining to plumbing fixture supports.

F. Provide water coolers which are rated and certified in accordance with applicable Air Conditioning and Refrigeration Institute standards and are listed by Underwriter's Laboratories.

1.04 SUBMITTALS

A. Submit manufacturer's specifications for plumbing fixtures and trim, including catalog cut of each fixture type and trim item furnished, roughing-in dimensioned drawings, templates for cutting substrates, fixture carriers, and installation instructions.

B. Submit maintenance data and parts lists for each fixture type and trim item, including instructions for care of finishes. Include this data in maintenance manual.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver plumbing fixtures individually wrapped in factory-fabricated containers.

B. Handle plumbing fixtures carefully to prevent breakage, chipping and scoring the fixture finish. Do not install damaged plumbing fixtures; replace and return damaged units to equipment manufacturer.

C. Fixtures shall be protected after installation to prevent scratches, dents, surface mar or any other damage during the course of construction.

PART 2 PRODUCTS

2.01 PLUMBING FIXTURES

A. Provide factory-fabricated fixtures of type, style and material scheduled on drawings. For each type fixture, provide fixture manufacturer's standard trim, carrier, seats, and valves as indicated by their published product information; either as designed and constructed, or as recommended by the manufacturer, and as required for a complete installation. Where more than one type is indicated, selection is Installer's option; but, all fixtures of same type must be furnished by single manufacturer. Where type is not otherwise indicated, provide fixtures complying with governing regulations.

B. Fixture color shall be white unless noted otherwise.

2.02 MATERIALS

A. Provide materials which have been selected for their surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, foundry sand holes, stains, discoloration, or other surface imperfections on finished units are not acceptable.

B. Where fittings, trim and accessories are exposed or semi-exposed, provide bright chrome-plated or polished stainless steel units. Provide copper or brass where not exposed.

2.03 PLUMBING FITTINGS, TRIM AND ACCESSORIES

A. At locations where water is supplied (by manual, automatic or remote control), provide commercial quality faucets, valves, or dispensing devices, of type and size indicated, and as required shall operate as indicated. Include manual shutoff valves and connecting stem pipes to permit outlet servicing without shut-down of water supply piping systems.

B. Include removable P-traps where drains are indicated for direct connection to drainage system.

C. Provide manufacturer's standard exposed fixture bolt caps finished to match fixture finish.

D. Where fixture supplies and drains penetrate walls in exposed locations, provide chrome plated cast-brass escutcheons with set screw.

E. Provide aerators on all faucet sets of types approved by Health Departments having jurisdiction.

F. Comply with additional fixture requirements contained in fixture schedule.

2.04 MANUFACTURERS

A. Subject to compliance with requirements, provide plumbing fixtures and trim of one of the following:

1. Plumbing Fixtures
   American Standard, U.S. Plumbing Products
   Eljer Plumbingware Division, Wallace-Murray Corporation
   Kohler Company
   Crane Plumbing Co.

2. Plumbing Trim
   American Standard, U.S. Plumbing Products
   Eljer Plumbingware Division, Wallace-Murray Corporation
   Kohler Company
   Delta Commercial Faucet Company
   T & S Brass and Bronze Works, Inc.
   Eastman Brasscraft
   McGuire Manufacturing Co.

3. Flush Valves
   Coyne & Delaney Company
   Sloan Valve Company
   Zurn Industries, Inc., Hydromechanics Div.

4. Fixture Seats
   Bemis Mfg. Co.
   Beneke Corp., Div. of Beatrice Foods
   Church
   Olsonite Corp., Olsonite Seats

5. Water Coolers
   Oasis
   Elkay Mfg. Co.
   Halsey Taylor Div.
   Haws Drinking Faucet Co.

6. Service Sinks/Mop Sinks
   American Standard, U.S. Plumbing Products
   Eljer Plumbingware Div., Wallace-Murray Corp.
   Fiat Products, Unit of Mark Control Corp.
   Kohler Co.
   Stern-Williams Co., Inc.

7. Stainless Steel Sinks
   American Standard, U.S. Plumbing Products
   Elkay Mfg. Co.
   Just Mfg. Co.
   Kohler Co.

8. Fixture Carriers
   Josam Mfg. Co.
   J.R. Smith
   Wade
   Zurn Industries, Inc., Hydromechanics Div.

PART 3 EXECUTION

3.01 INSPECTION AND PREPARATION

A. Examine roughing-in work of domestic water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping, and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Install plumbing fixtures of types indicated where shown and at indicated heights; in accordance with fixture manufacturer's written instructions, roughing-in drawings, and with recognized industry practices. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Comply with applicable requirements of the Plumbing Code pertaining to installation of plumbing fixtures.

C. Fasten plumbing fixtures securely to indicated supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies behind or within wall construction so as to be rigid, and not subject to pull or push movement.

D. Where fixtures are mounted against or abut walls, caulk along fixture.

3.02 CLEAN AND PROTECT

A. Clean plumbing fixtures of dirt and debris upon completion of installation.

B. Protect installed fixtures from damage during the remainder of the construction period.

3.03 FIELD QUALITY CONTROL

A. Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.

B. Inspect each installed unit for damage to finish. If feasible, restore and match finish to original at site; otherwise, remove fixture and replace with new unit. Feasibility and match to be judged by Architect. Remove cracked or dented units and replace with new units.

3.04 EXTRA STOCK

A. Furnish special wrenches and other devices necessary for servicing plumbing fixtures and trim to Owner with receipt. Furnish one (1) device for every ten (10) units.

END OF SECTION

SECTION 15501 FIRE PROTECTION

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. All work specified in this Section is subject to the provisions of Section 15010 "Mechanical General".

B. Refer to the following sections for related work in connection with fire protection piping system:

1. 15011 Submittals
2. 15020 Identification of Piping System
3. 15100 Mechanical Supporting Systems

1.02 DESCRIPTION OF WORK:

A. The extent of the fire protection work required is indicated on the drawings and by the requirements of this specification section.

B. Fire protection work shall include but not be limited to the following:

1. Automatic sprinkler systems.

2. Underground feed main to connection provided outside building by utility contractor.

3. Installation of flow switches and valve supervisory switches.

C. The following is not considered part of this section:

1. Wiring of flow switches and valve switches.

2. Fire extinguishers and cabinets.

1.03 DESIGN CRITERIA

A. Provide a complete automatic sprinkler system, hydraulically designed to provide the following sprinkler protection

BUILDING AREA	HAZARD	DESIGN DENSITY GPM/SF	REMOTE AREA OF APPLICATION	MAXIMUM SP. HEAD SPACING	HOSE STREAM ALLOWANCE
Offices, Vestibules, Lobbies, Corridors, Toilet Rooms, Conference Rooms, Break Rooms, Computer Rooms, Auditorium, Attic	Light	.10	1500 SF	225 SF	100
Storage Rooms, Mechanical & Electrical Rooms, Elevator Equip. Room	ORD. GP.1	.15	1500 SF	130 SF	250

B. All areas of the building shall be completely sprinkled including the following areas:

1. Stairwells (at top level and below lowest level)
2. Elevator Shafts
3. Elevator Equipment Rooms
4. Telephone Rooms
5. Electrical Rooms
6. Attic

1.04 QUALITY ASSURANCE

A. Manufacturing firms shall be regularly engaged in the manufacture of fire protection products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than five (5) years.

B. Installation contracting firms shall have at least five (5) years of successful installation experience on projects with fire protection work similar to that required for the project.

1.05 CODES AND STANDARDS

A. Install fire protection systems in accordance with the following National Fire Protection Associations Standards:

1. NFPA NO. 13 "Installation of Sprinkler Systems."
2. NFPA NO. 24 "Installation of Private Fire Mains."

B. Provide fire protection products which have U.L listing or are listed in the "Factory Mutual Approval Guide."

C. Comply with local Fire Department regulations for sizes, hose threads and arrangement of connections for fire department equipment to Siamese fire department connections.

1.06 SUBMITTALS:

A. Submit manufacturer's technical product data and installation instructions for fire protection materials and products.

B. Prepare one eighth (1/8") scaled shop drawings for fire protection systems indicating sprinkler locations and types, pipe and fittings, hydraulic calculations, pipe sizes, locations, elevations, hangers, wall and floor penetrations and connections. Include all information as required by NFPA.

D. Submit shop drawings to Engineer, Owners' Underwriter/Insurance Agency and to the local authority having jurisdiction for approval. Submit two (2) approved copies, bearing stamp and/or signature of Engineer, Owners' Underwriter/Insurance Agency and of the local authority having jurisdiction before proceeding with fabrication and installation.

E. Submit "Contractor's Certificate Covering Materials and Installation" upon completion of fire protection piping work which indicates that work has been tested in accordance with NFPA 13, NFPA 24 and also that system is operational, complete, and has no defects.

F. At project closeout, submit record drawings of installed fire protection piping and products, in accordance with requirements of Section 15010.

G. Submit maintenance data and parts list for fire protection materials and products. Include this data, product data, shop drawings, approval drawings, approved calculations, certificate of installation, and record drawings in maintenance manual, in accordance with requirements of Section 15010.

1.07 WATER SUPPLY:

A. For hydraulic calculations contractor shall conduct a flow test as near as possible to site. A minimum of 5 psig must be accounted for as a safety factor for future fall off in the water supply.

B. Maximum allowable velocity in sprinkler system piping shall be 20 feet per second.

PART 2 PRODUCTS

2.01 MATERIALS AND PRODUCTS: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match piping materials used in fire protection systems. Where more than one type of materials or products are indicated, selection is Installer's option, however, systems of piping must remain consistent in the type of materials and fittings utilized.

2.02 BASIC IDENTIFICATION

A. Provide identification complying with Section 15020 "Identification for Piping System" in accordance with the following listing:

1. Fire Protection Signs: Provide the following signs:

a. At each sprinkler control valve, provide a sign indicating the portion of system which that valve controls.
b. At each auxiliary drain valve, inspector's test connection or main drain.

2.03 PIPE AND FITTINGS:

A. Underground Piping beneath slab to 5'-0" outside building:

1. Pipe: Class 52 ductile iron, ANSI A21.51
2. Fittings: Ductile iron mechanical joint, 250 lb., ANSI A21.10.
3. Lining: Cement mortar lining for pipe and fittings, ANSI A21.4.
4. Coating: Bituminous seal coating.
5. Joints: Push on gasketed joints ANSI A21.11 with neoprene gasket.

B. Underground Piping outside building:

1. Pipe: Polyvinyl Chloride (PVC), AWWA C-900, ASTM D-1784, Rated SDR 21 (Class 150).
2. Joints: Integrally molded bell ends, ASTM D-3139 with elastomeric gaskets and lubricant.

C. Interior Aboveground Piping:

1. Piping: Welded or seamless Black steel pipe, ASTM A53 or A135.
   a. Class: Schedule 40 for 6" size and smaller and Schedule 30 for 8" size and larger.
   b. Fittings: Class 150 malleable iron threaded, ANSI B16.3.
   c. Fittings: Malleable iron mechanical grooved fittings and couplings ASTM A-47, shall be cut groove type, 500 psi minimum with EPDM gasket, U.L. listed or F.M. Approved.
   d. Fittings: Factory fabricated wrought steel buttwelded, ANSI B16.9.
   e. Fittings: Cast iron flanged, Class 125, ANSI B16.1 with 1/8" minimum, red rubber gaskets.

2. Piping: Welded or seamless black steel pipe, ASTM A53 or A135.

   a. Class: Schedule 10 for 5 inch size and smaller; 0.134 inch wall thickness for 6 inch size; 0.188" wall thickness for 8 inch and 10 inch size.
   b. Fittings: Factory fabricated wrought steel butt welded, ANSI B16.9.
   c. Fittings: Malleable iron mechanical roll-grooved fittings and couplings ASTM A-47, 500 psi minimum, with EPDM gasket, U.L. Listed or F.M. Approved.

3. Acceptable manufacturers of mechanical grooved couplings are ITT Grinnell, Victaulic and Gustin-Bacon.

2.04 JOINTS

A. Threaded joints shall be made up with piping compound or Teflon tape applied to the male threads only.

B. Welded joints shall be done by qualified welders per the requirements of Section 15010 "Mechanical General".

C. Flanged joints shall be made up with rubber gaskets and assembled with machine bolts and hexagon heads made of open hearth steel.

2.05 BASIC HANGERS AND SUPPORTS

A. Provide hangers, supports and anchors complying with Section 15100 and in accordance with the following listing:

1. Adjustable steel clevis hangers, adjustable steel band hangers, or adjustable band hangers, for horizontal-piping hangers and supports.

2. Two-bolt riser clamps for vertical piping supports.

3. Steel turnbuckles and malleable iron sockets for hanger-rod attachments.

4. Concrete inserts, side beam or channel clamps or center beam clamps for building attachments.

2.06 VALVES:

A. Gate Valves: Gate valves shall be iron body bronze mounted, outside screw and yoke, double disc, parallel seat type, U.L. Listed, 175 psi cold water working pressure, equal to Kennedy Fig. 68.

B. Butterfly Valve: Butterfly valves shall be wafer type, cast iron body with bronze disc, rubber gasketed, permanently lubricated worm gear handwheel operation, with external indicator, F.M. Approved, 175 psi cold water working pressure with connection for position supervisory switch, equal to Kennedy Fig. 911.

C. Swing Check Valve: Swing check valves shall be cast iron body, bronze mounted with rubber faced disc, F.M. Approved, 175 psi cold water working pressure, equal to Kennedy Fig. 126A.

D. Wafer Check Valve: Wafer check valves shall be cast iron body with spring loaded bronze disc, stainless steel pin, Buna-N O-rings, F.M. Approved, 175 psi cold water working pressure equal to Kennedy Fig. 706.

E. Equivalent Manufacturers: The following manufacturers will be considered equal: Kennedy, Keystone, Grinnell, Milwaukee, Mueller, United and Clow.

2.07 SIAMESE FIRE DEPARTMENT CONNECTIONS: Siamese fire department connection shall be two-way 4" x 2½" x 2½" back outlet type with single clapper. Unit shall be complete with two (2) 2-1/2" inlets with caps, chains and cast brass body. All exposed surfaces shall be polished chrome plate. Siamese shall be labeled with the name of the fire protection system served. The connection to the Siamese shall be provided with an automatic ball drip with discharge drain line. Unless shown otherwise, pipe the drain from the drip through the wall and terminate with an escutcheon and turned down elbow. Connections shall be set 2'-6" from the hose inlet centerline to the adjoining grade. All wall penetrations shall be sealed and shall have chrome plated escutcheons. Siamese shall be Potter Roemer No. 5710 or equal.

2.08 FLOW SWITCHES

A. Flow switches for wet sprinkler system shall be paddle type water flow alarm equipped with a retard device. Switch shall be suitable for 120 volt A.C. operation and shall have double contacts for either open or closed circuit operation for tie-in with building fire alarm system.

B. Flow switch shall be Grinnell F620 or approved equal.

2.09 TAMPER SWITCHES

A. Tamper switches shall be provided for all main line fire protection valves to supervise the valve position.

B. Tamper switches shall be Grinnell Model F640 or approved equal.

2.10 SPRINKLERS

A. Semi-recessed type sprinklers shall be installed in all areas with ceilings. Sprinklers shall be small frame type chrome plated escutcheon. Sprinkler shall be equal to Viking Micromatic Model M with Model C escutcheon.

B. Upright type rough brass sprinklers shall be installed in areas without ceilings.

C. Temperature rating of sprinklers shall be selected in accordance with NFPA, the ambient room temperature and heat producing equipment.

D. The following manufacturers shall be considered equivalent: Viking, Grinnell, Automatic Sprinkler, and Central.

2.11 SPRINKLER RISER: Provide sprinkler riser where indicated on the Contract Drawings.

2.12 BACKFLOW PREVENTER: Backflow preventer shall be double check valve type, constructed in accordance with ASSE Standard 1013 and University of Southern California (USC) Foundation for Cross-Connection Control and Hydraulic Research. Backflow preventer assembly shall be complete with OS&Y gate valves on inlet and outlet, and test cocks. Backflow preventer assembly shall be suitable for pressures up to 175 psi. Assembly shall be Watts Model 774-OSY or approved equal by Febco, Wilkins, or Beeco.

2.13 ANCHORAGES

A. Clamps, Straps and Washers: Steel, ASTM A-506.

B. Rods: Steel, ASTM A-575.

C. Rod Couplings: Malleable iron, ASTM A-197.

D. Bolts: Steel, ASTM A-307.

E. Cast Iron Washers: ASTM A-126, Class A.

F. Thrust Blocks: 2500 psi concrete.

PART 3 EXECUTION

3.01 SPRINKLERS:

A. Unless otherwise noted on drawings, sprinklers shall be rated for 155 degrees F. Provide higher temperature sprinklers where required due to ambient temperatures within the area.

B. Provide basket type guards over sprinklers in all areas where sprinkler is less than 7'-0" above finished floor, to protect them from damage.

C. Sprinklers shall be provided below all ductwork or other obstructions greater than 4'-0" in width.

D. Sprinklers shall be centered in 2 x 2 ceiling tiles. In 2 x 4 ceiling tiles heads shall be located a minimum of 12" from end of ceiling tile.

E. Provide shields on all sprinklers located near electric panels to limit the sprinkler discharge on the panels.

F. Install sprinklers so that sprinklers are located no closer than 1'-0" to lights, diffusers, or other obstructions.

G. Provide to the representative of the Owner a reserve supply of twelve (12) sprinklers minimum and the tools for removing and replacing the sprinklers. Types of sprinklers shall include a minimum of six (6) of each. The sprinklers and tools shall be contained in a metal carrying case.

H. Where sprinklers are exposed to exterior, sprinkler must be wax coated to protect surfaces from corrosion.

3.02 INSTALLATION:

A. The fire protection system shall include all NFPA specified accessories including signs, test connections and drains.

B. Comply with requirements of NFPA 13 and NFPA 24 for installation of fire protection piping materials. Install piping products where indicated, in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that piping systems comply with requirements and serve intended purposes.

C. Coordinate with other work, including plumbing piping, as necessary to interface components of fire protection piping properly with other work.

D. Fire mains, crossmains, and branch piping shall not be installed inside or above the ceiling of Electrical Equipment Rooms, Telephone Rooms, Elevator Equipment Rooms or Computer Rooms. Only sprinkler branch piping which serves sprinklers located inside such rooms shall be permitted.

E. All valves in direct flow of water to sprinklers shall be provided with valve position supervisory switches.

3.03 DRAINS:

A. All trapped sprinkler piping shall be provided with drain valves and shall be routed to and discharged over the nearest suitable floor drain, hub drain or service sink unless shown or noted otherwise on drawings. Drain valve shall be located at the point of discharge.

B. Where floor drains or service sinks are not available or suitable for the discharge of the sprinkler drain, the drain shall be routed to the exterior and discharged on grade. Location of drain must be approved by Architect.

C. The location of all drains shall be shown on the shop drawings.

D. All drains and inspector's test connections located on exterior walls shall be painted to match exterior and penetration shall be sealed and provided with chrome plated escutcheon secured to wall.

3.04 HANGERS AND SUPPORTS:

A. The installation of all hangers and supports shall comply with NFPA 13.

B. All piping, including drain piping shall be rigidly supported.

C. Feedmains and crossmains, 4" size and larger, where located parallel to bar joists shall be suspended from auxiliary angles which must span a minimum of two joists. Auxiliary angle shall be located at panel point of joists.

D. Where grooved couplings and/or other systems of mechanical fitting and couplings are utilized for fastening, sufficient hangers must be used to prevent any sagging or misalignment of piping.

3.05 ANCHORAGES:

A. General: Provide concrete thrust block anchorages for underground tees, plugs, caps, and bends in accordance with NFPA No. 24. Provide rods and clamps on fittings located underground inside building as shown on drawings.

B. After installation, apply a full coat of asphalt or other acceptable corrosion retarding material to surfaces of rods and clamps.

3.06 ACCESS PANELS: When sprinkler floor control valves or drain valves are concealed above ceilings an access panel must be provided. The exact location must receive prior approval from Architect.

3.07 SLEEVES, CUTTING AND PATCHING:

A. Refer to Section 15010 "Mechanical General" for requirements.

B. All floor and wall penetrations must be neatly done and shall be sealed in accordance with Section 15010.

C. Penetrations in stairwells, corridors and occupied rooms shall be provided with escutcheon plates.

3.08 IDENTIFICATION:

A. Install signs on all inspector's test connections, auxiliary drains, drain valves, etc., in accordance with NFPA.

B. Access panels provided for valves where concealed above ceilings or inside partitions must be provided with permanently attached signs identifying control valve or drain.

3.09 ADJUST AND CLEAN: Sprinkler Piping Flushing: Prior to connecting sprinkler risers for flushing, flush water feed mains, lead-in connections and control portions of sprinkler piping. After fire sprinkler piping installation has been completed and before piping is placed in service, flush entire sprinkler system as required to remove foreign substances, under pressure as specified by NFPA No. 13. Continue flushing until water is clear, and check to ensure that debris has not clogged sprinklers.

3.10 TESTING:

A. Hydrostatic Testing: After flushing system, test fire sprinkler piping hydrostatically, for a period of 2 hours, at not less than 200 psi. Check system for leakage at joints. Measure hydrostatic pressure at low point of each system or zone being tested. Any drop in pressure will not be permitted.

B. Repair or replace piping systems as required to eliminate leakage in accordance with NFPA standards and retest as specified to demonstrate compliance and to satisfaction of the Engineer and Owner.

END OF SECTION

SECTION 15605 ELECTRIC WALL HEATERS

PART 1 GENERAL

1.01 DESCRIPTION:

A. All work specified in this Section is subject to the provisions of Section 15010.

B. All electric heating equipment shall be UL labeled.

C. Refer to Division 16 for electrical characteristics and connections to all electrical heating equipment. Coordinate all electrical equipment with the Electrical Documents.

D. Electric heaters shall be provided to meet the minimum capacities scheduled at the indicated conditions shall meet all constraints of construction.

1.02 COORDINATION: Electric heaters of specific manufacturers have been used as the basis of design. Any modifications to controls, electrical connections, structural supports, etc., that result from the use of equipment by any other manufacturer shall be coordinated with all other trades; this coordination shall occur before delivery of the equipment from the manufacturer. Any modifications shall be performed without incurring any additional cost to the Owner.

1.03 ACCEPTABLE MANUFACTURERS: Electric wall heaters shall be as manufactured by Markel, Berko, or approved equal.

PART 2 PRODUCTS

2.01 DESCRIPTION:

A. Electric wall heater shall be heavy-duty, architectural surface mounted forced-air type, of the wattage, voltage and phase indicated on the drawings. The heater shall so be designed to provide an even distribution of heated air to the space by drawing return air in the periphery of the heater across the element which shall then be discharged from the center section of the heater by means of an electric motor and axial flow fan blade.

B. Heater front shall withstand with less than 1/16” permanent distortion with 10.8 ft. lbs. (324 pounds) impact and 400 lbs. static force applied to an 8 sq. in. area at center grille location. Front assembly shall be attached to the chassis by hidden tamper-resistant screws. All other parts shall be 16-gallon steel zinc coated both sides finished in a high gloss baked enamel.

C. Motor shall be a permanently lubricated unit bearing, totally enclosed, shaded pole type with impedance protection. Motors shall operate at no more than 1400 RPM and shall be the same voltage as the heater. A protective shield shall surround the motor to separate return air from heated air.

D. Heater shall be equipped with a “zero voltage reset” thermal overload which disconnects elements and motor in the event normal operating temperatures are exceeded. For safety, if opened due to abnormal temperatures, thermal overload shall remain open until manually reset by turning heater off for five minutes. Automatic reset thermal overloads which allow the element to continue to cycle under abnormal conditions will not be accepted.

E. Heater shall be Underwriters' Laboratories listed. Heaters shall conform to Underwriters' Laboratories, Inc. standard 1025. Paragraphs 31.20, 31.21, 31.22 and 31.23 and shall not be required to have any "CAUTION" marking on the front of the heater. Heaters not conforming to these paragraphs will not be acceptable.

F. Heater shall be controlled by integrally mounted thermostat. Thermostat shall be heavy-duty, hydraulic type with a range of 40°F to 80°F and with remote sensing bulb placed in the return air. Thermostats shall be electrically rated at least 125% of heater rating. Thermostat shall also act as a disconnect by breaking all ungrounded conductors in the OFF position. Thermostat control knob shall be covered by a 16-gallon tamper-proof access plate to prevent adjustment by unauthorized personnel.

G. Heater shall be equipped with built-in circuit breaker in order to allow the heater to be supplied from feeder taps. A separate switch providing a positive off for control circuits shall be included where required. Circuit breaker and control switch shall be arranged so that all line side conductors will be separately enclosed when heater front is removed for servicing so that no current carrying parts are accessible without the use of additional tools.

PART 3 EXECUTION

3.01 INSTALLATION: Electric heaters shall be installed in complete conformance with the manufacturer's recommendations and the Contract Documents.

END OF SECTION

SECTION 15660 CONDENSING UNITS

PART 1 GENERAL

1.01 DESCRIPTION:

A. All work specified is subject to the provisions of Section 15010.

1.02 COORDINATION:

A. The units of one manufacturer have been used as a basis of design. Any modifications to ductwork, piping, wiring, building structure, etc., that result from the use of any other units shall be coordinated with all trades prior to delivery of approved equipment from the manufacturer to the job site. Any costs incurred because of these modifications shall be the responsibility of the Contractor.

1.03 ACCEPTABLE MANUFACTURERS:

A. The following manufacturers are acceptable on this project: Trane or Carrier. The manufacturer shall have a local distributor with repair parts in stock or have access to repair parts within a 24 hour period.

PART 2 PRODUCTS

2.01 CONDENSING UNIT:

A. Air cooled outdoor unit shall be factory assembled into a weatherproof cabinet. Unit shall be UL Listed and comply with ARI Standard No. 240.

B. Cabinet shall be heavy-gauge, zinc coated steel, phosphatized, painted with an epoxy resin primer (exterior) and finished with an acrylic topcoat. Electrical and refrigeration connections shall be located at accessible pints. Removable panel shall allow access to all components and connections. Drainage hole shall be provided in drain pan for removal of coil condensate.

C. Condensing units shall consist of the following components: compressor(s), condenser coil, condenser fans, refrigerant receiver, sight glass charging valves, controls, precharged with refrigerant, filter dryer, low pressure cut-outs, crankcase heater, and service valves.

D. Compressors up to 20 tons capacity shall be welded steel, hermetic type. Compressors greater than 20 tons capacity shall be serviceable hermetic type with spring loaded cylinder heads and non-flex ring plate valves. Heads shall be removable type. Cylinders shall have liners with hard valve seats and standard modulation unloaders.

E. Compressors shall be equipped with built-in crank case heaters, high/low pressure cutouts and anti-slugging controls.

F. Condenser coils shall be constructed with cooper tubes that are mechanically bonded to aluminum fins. Coils to be factory pressure tested to 425 psig. Coils to include a protective, coated, metal grille guard.

G. Condensing fans shall be propeller type, with direct drive motors. Fans shall be statically and dynamically balanced at factory. Motor shall be waterproofed, heavy duty, ball bearing type with built-in thermal overload protection.

H. Defrost controls shall be activated by ambient temperature on coil. Provide a timer control to activate defrost cycle if coil temperature is low enough to cause frosting conditions. On split system with more than one circuit of refrigeration, provide controls that will prevent simultaneous defrosting of each circuit.

I. Provide an outside thermostat to sense outside ambient temperature, set at 42ºF to control operation of electric resistant heat.

J. See capacities and unit characteristics as scheduled on Contract Documents.

2.02 CONTROL SYSTEM:

A. Unit shall be complete with a manufacturer's supplied solid state temperature controls package.

2.03 WARRANTY:

A. Condensing units to be complete with manufacture's five (5) year, non-prorated parts and labor warranty.

PART 3 EXECUTION

3.01 INSTALLATION:

A. Condensing units and associated items shall be installed in complete conformance with the manufacturer's recommendations and these Contract Documents.

B. All low voltage wiring shall be installed in conduit by a licensed electrician. Low voltage control wiring shall be installed under this division. All line voltage wiring (115V and higher) shall be installed under Division 16.

END OF SECTION

SECTION 15701 VARIABLE FREQUENCY DRIVES

PART 1 GENERAL

1.01 DESCRIPTION: All work specified in this Section is subject to the provisions of Section 15000.

1.02 COORDINATION: The units of one manufacturer (Magnetek) have been used as the basis of design. Any modifications to controls, electrical connections, roof penetrations, etc., that result from the use of another manufacturer shall be coordinated with all other trades before delivery of the equipment from the manufacturer. Any modifications required shall be performed without incurring additions to the Contract.

1.03 ACCEPTABLE MANUFACTURERS: Acceptable manufacturers of variable frequency drives are Magnetek, Parametrics or approved equal by engineer. The manufacturer shall have a local distributor with repair parts in stock.

PART 2 PRODUCTS

2.01 The variable frequency converter shall consist of a modularized diode rectified and capacitor assembly which will first convert, then filter and maintain a fixed DC voltage source from the fixed voltage and frequency input. The inverter shall use power transistor semiconductors with a minimum rating of 1100 volts on 460 VAC controls and 550 volts on 230 VAC controls to invert the converter generator fixed DC voltage into a sine-coded pulse-width modulated output. The control logic shall consist of a single printed circuit board, and incorporate a microcomputer central processing unit to control all inverter, converter, base drive and external interface functions.

2.02 Unit features shall include:

A. NEMA 1 enclosure, wall mount, .95 power factory throughout speed range

B. 4-20 Ma or 0-10 VDC process follower

C. Operators control panel with Run/Stop, Auto/Manual, Speed adjustment, Speed/Frequency indication

D. Input disconnect: molded case, thermal magnetic circuit breaker with through-door interlocking operating mechanism

E. Controlled speed range of 40.1

F. Overload capability of 120% for 60 seconds

G. Six selectable output frequency ranges

H. Fifteen selectable Volts/Hertz patterns

I. Coast/ramp to stop: Motor can be stopped wither by coasting, when the output transistors are shut off, or by ramping when the motor is brought to zero speed using the decel ramp.

J. Adjustable acceleration/deceleration time: independently adjustable from 0.1 to 1800 seconds

K. Run and fault LED'S

L. Run and fault contacts for customer use

M. Programmable memory module: A factory installed programmable plug-in module using EPROM based logic -The memory module will add the following functions and adjustments to the drive:

1. Critical frequency rejection (permits stepover of up to three frequencies of the drive/machine system if resonance develops)
2. Infinite Volts/Hertz adjustment
3. Minimum frequency
4. Maximum frequency
5. Torque limit
6. Slip compensation
7. DC injection time and amplitude

2.03 Manual bypass with magnetic contactors to provide transfer of a motor from the drive to utility line power and shall include a NEMA 1 enclosure, non-fused door interlock disconnect, bypass contactor, load contactor, motor overload, relay, control circuit transformer, safety circuit trip light, safety circuit terminal strip, power on light, mode selector switch and lights, and normal/test selector.

2.04 The following protective features shall be provided:

A. Electronic thermal motor overload, switch selectable level motor overload protection.

B. Ground fault protection monitors the output and trips the drive to protect power semiconductors when a ground fault is sensed.

C. Automatic current limited stall prevention automatically reduces frequency and voltage, while allowing maximum motor torque - When the load returns to normal, frequency is accelerated back to the previous set value and operation continues.

D. Auto restart on fault allows up to five restart attempts to avoid nuisance shutdown.

E. Speed search allows drive to start into a spinning motor without tripping or waiting for coast down of high inertia loads - Drive output starts at maximum frequency and minimum voltage, and searches down until frequency is matched with the speed of the motor and is then accelerated back to set speed - This feature eliminated the need for the motor to always to at reset before starting.

F. DC injection braking can be applied to the motor for a short duration to stop the motor shaft - It is available on start or stop command, or can be applied for a quick stop from the operating frequency - On starting, can be used to prevent windmilling of load.

G. Ten-function fault indication displays:

1. Fuse loss - momentary power loss
2. Overcurrent - hot sink overtemperature
3. Overload - external fault (user contact)
4. Overvoltage - control function error
5. Undervoltage - control function selection error

H. DC bus discharge indicator

I. Current limiting DC bus fuse

J. Isolated operator's controls

K. Phase to phase short circuit protection

L. Heat sink overtemperature protection

2.05 Frequency controllers shall be supplied for AHU-1.

PART 3 EXECUTION

3.01 INSTALLATION:

A. The adjustable frequency controllers shall be installed in complete conformance with the manufacturer's recommendations and the Contract Documents.

B. The adjustable frequency controllers shall be tested and adjusted to provide the scheduled capacities.

END OF SECTION

SECTION 15740 VARIABLE AIR VOLUME BOXES

PART 1 GENERAL

1.01 DESCRIPTION:

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 all required equipment, appurtenances, and accessories for a complete heating and/or 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 service omitted from the plans or specifications that is not called to the attention of the Architect at least 72 hours before bidding and corrected by addendum shall be provided as though shown.

PART 2 PRODUCTS

2.01 COORDINATION: The units of one manufacturer (Trane) 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 VARIABLE AIR VOLUME UNITS:

A. General: Furnish and install an operational variable air volume system as herein specified. The system shall be installed in accordance with this specification and the variable volume unit manufacturer’s printed recommendations.

B. Casing: Units shall be completely factory assembled, manufactured of corrosion protected welded steel and fabricated with a minimum 26 gauge metal constructed to withstand the pressures encountered. All interior surfaces shall be acoustically and thermally insulated with one and one half PCF glass fiber, matcoated for erosion protection. The insulation shall meet NFPA 90A requirements per standard NFPA #225-ASTME84-50T. All units shall be provided with provision for hanger rod support at each corner. Static regain computer duct design program must be run and provided by unit manufacturer. Program output must include thorough sound analysis and static pressures at all points in the system.

C. Ratings: All pressure drops, capacities, and sound data shall be certified as complying with ARI Standard 880.

D. 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 100% 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, or galvanized steel. 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. Multi-point, multi-axis flow ring or cross sensor to be furnished and mounted by terminal unit manufacturer. Single point sensors are not acceptable. 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. A calibrated air flow measuring device shall be provided with each control unit. It shall include sensing taps and calibration chart unit mounted. Accuracy shall be ± 5 percent. Units shall have pressure independent volume regulators.

E. Sound Levels: All unit sizes 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 Standard 880. Acoustical data shall be made available for octave bands 2 through 8 for both discharge and radiated sound power. It shall be tabulated at the proposed unit's required minimum pressure and at differential pressures a minimum of 2.50 inches above this value.

F. All thermostats, controls, interlocks, and volume controllers shall be furnished by box supplier.

G. Controls shall be DDC - pressure independent type - 24 VAC reversible synchronous air valve motor - all set points reside in EEPROM and remain intact through power failures (no batteries allowed). Boxes self calibrate once a week, communicate to EMS over comm. link. Hardware consists of ucm microprocessor controller, flow sensor and zone sensor with night setup capability, timed override request bottom comm. jack for portable interface device, and adjustable setpoint. Setpoint can reside in sensor or in EMS software, 24 VAC control power transformer included.

The VAV boxes must be able to comply with NFPA-90A-1989 that may require a given box or a group of boxes to drive fully open, or fully closed, or minimum flow or maximum flow. Execution shall be over the communication link and by hard wired terminal strip connected to central fire alarm system.

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. Install all equipment in accordance with the latest manufacturer's written instructions, and in accordance with governing codes and recognized industry standards and practices to ensure that the equipment serves the intended function.

C. Coordinate all work with other trades as necessary for proper interfacing.

D. All equipment shall be protected from any form of damage. Any damaged equipment shall be replaced without additional cost.

3.02 START-UP: The initial start-up shall be made by an authorized representative of the equipment manufacturer.

3.03 ADJUSTMENT: 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 15765 ROOFTOP AIR CONDITIONING UNIT

PART 1 GENERAL

1.01 DESCRIPTION:

A. All work specified in this Section is subject to the provisions of Section 15010.

B. Rooftop air conditioning units shall be provided with minimum capacities scheduled, shall meet all constraints of construction, and shall comply with all Section. All rooftop units shall be certified with ARI Standard 210-79.

C. Unit to be mounted on concrete pad on grade and identified as RTU-1.

1.02 COORDINATION: The rooftop air conditioning units indicated on the schedule have been used as a basis of design. Any modifications to ductwork, piping, wiring, building structure, etc., that result from the use of any other units shall be coordinated with all trades prior to delivery of approved equipment from the manufacturer to the job site. Any costs incurred because of these modifications shall be the responsibility of the Contractor.

1.03 ACCEPTABLE MANUFACTURERS: The following manufacturer is acceptable on this project: Trane or Carrier.

PART 2 PRODUCTS

2.01 SUMMARY: The contract shall furnish and install package rooftop unit(s) as shown and scheduled on the contract documents. The unit(s) shall be installed in accordance with this specification and perform at the specified conditions as scheduled.

2.02 APPROVED MANUFACTURERS:

1. Trane: TCD210, Carrier or Lennox.

2. Substitutions: Ten working days prior approval required as indicated under the general and/or supplemental conditions of these specifications. Mechanical contractor shall be responsible for electrical and mechanical changes to the structure when using a product other than the specified product. As build drawing changes are the responsibility of the mechanical contractor.

2.03 HOUSING:

A. Rooftop air conditioning unit shall be designed and manufactured for outdoor installation. Unit shall be completely factory assembled to form a water-tight assembly.

1. Housing shall consist of galvanized steel panels and reinforcing. All panel exteriors shall be protected with a factory applied backed enamel finish. Housing shall be insulated with 1" thick, 1-1/2 pound density fiberglass with exposed surface designed for exposure to air stream and meeting NFPA flame spread and smoked developed 50.

2. Alternate housing construction shall consist of 1" of polyurethane insulation foamed in place between two (2) galvanized steel panels, with no polyurethane exposed to the air stream.

3. Provide a screened outside air intake with dampers.

2.04 GENERAL UNIT DESCRIPTION:

A. Unit(s) furnished and installed shall be cooling only package rooftop(s) as scheduled on contract documents and these specifications. Cooling capacity ratings shall be based on ARI Standard 210. Unit(s) shall consist of insulated weather-tight casing with compressor(s), air-cooled condenser coil, condenser fans, evaporator coil, return-air filters, supply motors and unit controls and drives.

B. Unit(s) shall be 100% factory run tested and fully charged with R-22.

C. Unit(s) shall have labels, decals, and/or tags to aid in the service of the unit and indicate caution areas.

D. Units shall be dedicated down flow or dedicated horizontal airflow as manufactured.

E. Wiring internal to the unit shall be colored and numbered for identification.

2.05 ELECTRIC HEATING SECTION:

A. Provide heavy duty nickel chromium heating elements internally wired. Heater shall have pilot duty or automatic reset line voltage limit controls and any circuit carrying more than 48 amps shall have fuse protection in compliance with N.E.C.

B. Heater shall be factory-supplied and field-installed internal to unit cabinet.

C. Heater shall be UL and CSA listed and approved and provide single point power connection.

2.06 EVAPORATOR COIL:

A. Provide configured aluminum fin surface mechanically bonded to copper tubing coil.

B. Provide an independent expansion device for each refrigerant circuit. Factory pressure test at 450 psig and leak test at 200 psig.

C. Provide drain pan for base of evaporator coil constructed of PVC or galvanized steel with external connections.

2.07 CONDENSER SECTION:

A. Provide internally finned seamless copper tube mechanically bonded to configured aluminum fins. Factory pressure test to 450 psig.

B. Provide vertical discharge, direct drive fans with aluminum blades. Fans shall be statically balanced. Motors shall be permanently lubricated, with integral thermal overload protection in a weather tight casing.

2.08 REFRIGERATION SYSTEM:

A. Compressor(s): Provide scroll compressor with direct drive operating at 3600 rpm. Integral centrifugal oil pump. Provide suction gas cooled motor with winding temperature limits and compressor overloads.

B. Units shall have cooling capabilities down to 0 degree F as standard. For field-installed low ambient accessory, the manufacturer shall provide a factory-authorized service technician that will assure proper installation and operation.

C. Provide each unit with one refrigerant circuit(s) factory-supplied completely piped with liquid line filter-drier, suction and liquid line pressure ports.

D. For heat pump units, provide reversing valve, discharge muffler, flow control check valve, and electronic time initiated, temperature terminated defrost control (12 ½-20 tons).

2.09 OUTDOOR AIR SECTION: Provide manual outside air damper with 0-25% operating range.

2.10 OPERATING CONTROLS:

A. Provide factory-wired roof top units with 24 volt control circuit with control transformers, contactor pressure lugs or terminal block for power wiring. Contractor to provide field-installed unit-mounted disconnect switch. Units shall have single point power connections. Field wiring of zone controls to be NEC Class II.

B. Provide microprocessor unit-mounted control which when used with an electronic zone sensor provides proportional integral room control. This UCM shall perform all unit functions by making all heating, cooling and ventilating decisions through resident software logic.

C. Provide factory installed indoor evaporator defrost control to prevent compressor slugging by interrupting compressor operation.

D. Provide an anti-cycle timing and minimum on/off between stages timing in the microprocessor.

E. Economizer Preferred Cooling (if supplied with economizer) – compressor operation is integrated with economizer cycle to allow mechanical cooling when economizer is not adequate to satisfy zone requirements. Compressors are enabled if space temperature is recovering to cooling setpoint at a rate of less than 0.2 degrees per minute. Compressor low ambient lockout overrides this function.

2.11 STAGING CONTROLS:

A. Provide NEC Class II, electronic, adjustable zone control to maintain zone temperature setting.

B. Provide 7 day, 24 hour programmable electronic thermostat.

C. Provide remote temperature sensor capability.

D. Provide mixed air sensor in supply air to close outside air damper.

2.12 CONCRETE PAD: Contractor to provide and install a reinforced concrete pad at grade and as indicated on drawings. Pad shall have a slope on top of 1/8”/foot, with broom finish. Pad shall be minimum of 6” thick with ½” round steel rebar at 12” o.c. both ways. Concrete shall be minimum 3000 psi strength.

2.13 ELECTRICAL:

A. Unit shall be U.L. approved and shall be complete with factory mounted starters and disconnect.

B. When available from the manufacturer, units shall have only one (1) electrical service; when electric heating requirements do not permit a single point service, a two-(2) point service will be allowed. However, the Contractor shall be responsible for all the work to assure a proper installation when the equipment is actually supplied. Electrical service(s) shall enter the unit from below, inside the roof curb.

C. A control power transformer shall be included to provide 24-volt control power. Units shall be completely pre-wired at the factory in accordance with the National Electrical Code.

2.14 REFRIGERANT CIRCUIT:

A. Each refrigerant circuit shall be complete with hermetic or semi-hermetic compressor with high and low pressure cut-offs, crankcase heater, moisture indicating sight glass, filter drier, and access and service valves minimum of two independent refrigerant circuits.

B. Evaporator coil shall have copper tubes mechanically bonded to aluminum fines, factory leak tested at 300 psig.

C. Condenser coil shall have copper tubes mechanically bonded to aluminum fins, factory leak tested.

2.15 FANS:

A. Evaporator fan shall be belt driven centrifugal, forward curved type with an adjustable sheave, sized to meet the air quantity and static pressure scheduled at approximate midpoint of adjustment.

B. Provide a permanently lubricated, open drip-proof motor with thermal overload protection. Motor shall have Class B insulation.

C. Fan bearings shall be permanently lubricated with an average life of 100,000 hours.

D. The entire fan/motor assembly shall be isolated from the unit with rubber-in-shear vibration isolators. Provide fan guard on outside of fan.

2.16 CONTROLS:

A. Controls for rooftop air conditioning unit shall include cooling and heating thermostat, sub-base, control power transformer, a microprocessor based control panel, and all necessary contactors, relays and wiring.

B. Thermostat shall include Heat-Off-Cool selector, adjustable cooling and heating set-point, and Fan-On-Auto selector. Cooling shall be controlled in one (1) step.

C. Each rooftop unit shall be provided with an integral control panel and remote thermostat located where indicated on the plans. Control panel shall consist of a system switch (OFF-HEAT-COOL-AUTO), fan switch (ON-AUTO), and indicating lights for: fan on, dirty filter, cooling on, heating on.

D. Thermostats shall be provided with locking covers. All thermostats shall be mounted on 5'-6" above finished floor, unless otherwise indicated.

E. Each rooftop unit shall be provided with a high temperature limiting device (firestat) in both the supply and return air streams, which shall shut down the unit and send an alarm signal to the central fire alarm panel in the event of excessive temperature.

F. Each rooftop unit shall be provided with a pressure type airflow switch to prevent cooling or heating operation until airflow has been established.

2.17 ECONOMIZER:

A. Units shall be provided with economizer cycle.

B. Provide outside and return air dampers with fully modulating interlocked actuators. Outside air dampers shall be normally closed, return air dampers normally open.

C. Provide belt driven power exhaust during economizer cycle.

D. Provide enthalpy controls for economizer.

2.18 CONDENSATE DRAINS: Condensate drains from rooftop units shall be Type L copper insulated as specified. Provide traps; extend to dry wells as shown on drawings.

PART 3 EXECUTION

3.01 EXAMINATION:

A. Contractor shall verify that roof is ready to receive work and opening dimensions are as indicated on shop drawings.

B. contractor shall verify that proper power supply is available.

3.02 INSTALLATION:

A. The entire rooftop unit and associated items shall be installed in complete conformance with the manufacturer's recommendations and the Contract Documents.

B. Units shall be provided with duct connections as indicated and all connections shall be made with flexible connectors as specified.

C. All low voltage wiring shall be installed in conduit by a licensed electrician. Low voltage control wiring shall be installed under this Division. All line voltage wiring (115 and higher) shall be installed under Division 16.

D. Contractor shall install in accordance with manufacturer’s instructions.

E. Mount units on factory built roof mounting frame providing watertight enclosure to protect ductwork and utility services. Install roof mounting curb level.

3.03 MANUFACTURER'S FIELD SERVICES:

A. The manufacturer shall furnish an alternative price for:

1. Extended compressor warranty for one (1) year.

2. Extended heat exchanger warranty for five (5) years.

3. Extended parts and labor my manufacturer to be provided to the Owner for a period of one (1) year.

B. The contractor shall furnish manufacturer complete submittal wiring diagrams of the package unit as applicable for field maintenance and service.

END OF SECTION

SECTION 15840 DUCTWORK AND ACCESSORIES

PART 1 GENERAL

1.01 DESCRIPTION:

A. All work specified in this Section is subject to the provisions of Section 15000.

B. Ductwork shall be provided to meet the minimum capacities indicated, shall meet all constraints of construction, and shall comply with all Specification Sections.

C. See Section 15180 for ductwork insulation.

D. No ductwork shall be fabricated until fabrication shop drawings have been prepared, submitted and reviewed.

PART 2 PRODUCTS

2.01 DUCTWORK - GENERAL:

A. SMACNA Standards indicated shall mean standard published by the Sheet Metal and Air Conditioning Contractor's National Association, Inc. Ductwork shall be constructed in complete conformance with the latest edition of the SMACNA Manual. Duct classification shall be as follows:

1. From air handling unit to all terminal units: Medium Pressure - 6" static pressure, Class A seals.

2. From terminal units to diffusers, toilet exhaust ductwork: Low Pressure - 1" static pressure, Class B seals.

B. Ductwork shall be constructed of G90 galvanized sheet steel, unless otherwise specified herein. All medium pressure supply air ductwork from each rooftop unit for the first twenty feet shall be perforated acoustical (K-27 or equal). All return and outside air ductwork shall be lined with duct liner. Additionally, each branch duct which connects to the main supply air duct within the first twenty (20) feet from the unit shall be perforated acoustical for the first five (5) feet. Medium pressure ductwork may be 1" thick, double-wall, acoustical duct (K-27 or equal), at the Contractor’s option. Ductwork shall be round, oval or rectangular as indicated. Sizes given shall be considered to be the minimum, and any conversion from the given shape shall be made without increasing air velocity or friction losses. All duct dimensions indicated are net clear inside dimensions.

C. Liner for first 20'feet from air handling equipment shall be 1" thick, 3 lb. per cubic foot density fiberglass duct liner. All other internally insulated ductwork shall be 1" thick, 1-1/2 lb. cubic foot density fiber glass duct liner. Secure liner with spray-on adhesive and stick pins and clips. Liner shall have black neoprene face in contact with the air stream. Liner shall meet all requirements for Flame Spread and Smoke Developed ratings; i.e., NFPA 25/50. Thermal conductivity for duct liner insulation shall be K = 0.24 Btu-in. per sq. ft. per ? F per hour at 75? F mean temperature.

D. Ductwork fabrication shop drawings shall be submitted as part of the shop drawing submittal.

E. Turning vanes shall be installed in all 90 degree square and rectangular elbows and at other locations shown. The turning vanes shall be double thickness type, with vanes secured to the runners and runners secured to the duct. Elbows in round ductwork and other radiused elbows shall have an inside radius equal to the diameter of the duct.

F. All branch takeoffs in medium pressure ductwork shall be made with conical, bellmouth, or lateral fittings.

G. Low pressure round ducts up to and including 12" in diameter shall be longitudinal lock seam construction. Low pressure round ducts larger than 12" and all medium pressure round ducts shall be spiral lock seam construction.

1. Girth joints in ducts up to and including 12" shall be beaded crimp type and each joint shall be fastened with sheet metal screws, equally spaced, not more than 8" on centers and with a minimum of 3 screws in each joint. The beaded-crimp joint shall provide at least a 1" lap to accommodate the sheet metal screws.

2. Girth joints in ducts larger than 12" shall be the beaded sleeve type. The beaded sleeve joints shall be fabricated of the same gauge galvanized sheet steel and the duct shall be fastened with a minimum of 3 sheet metal screws in each joint.

H. Duct hangers and supports shall be in accordance with Section IV (pages 4-1 through 4-13) **HANGERS AND SUPPORTS** of the referenced SMACNA Standard, except:

1. Hangers shall be spaced <u>not</u> over 8'-0" on centers.

2. For rectangular ducts with longest dimensions up through 60", hangers shall be the galvanized steel strap type; with the longest dimension 61" and larger, hangers shall be trapeze type constructed of galvanized steel angles with round hanger rods. Sizes for strap hangers and trapeze angles and rods shall be based on duct size as scheduled in the SMACNA Standard, Table 4-1 (page 4-8) for strap hangers and Table 4-3 (page 4-10) for trapeze hangers.

3. For round ducts, hangers shall be galvanized steel strap hangers. Sizes and number of strap hangers shall be based on duct size as scheduled in the SMACNA Standard, Table 4-2 (page 4-9). For duct sizes requiring 2 hangers, the hanger supports shall be minimum 3/8" round steel hanger rods.

2.02 MANUAL DAMPERS AND DAMPER HARDWARE:

A. Splitter dampers shall be constructed of not less than 20 gauge galvanized steel sheet. The length of the damper blade shall be the same as the width of the widest duct section at the split, but in no case shall blade length be less than 12".

B. Volume Control Dampers:

1. Dampers shall be single blade butterfly type in ducts up to and including 12" x 12" size; for ducts larger than 12" x 12", in either or both dimensions, the dampers shall be the multi-blade type. All dampers in O.A. ductwork shall shut tightly and have vinyl edge seals.

2. Single blade butterfly dampers shall be constructed of not less than 16 gauge galvanized steel blade mounted in a galvanized steel frame. For rectangular dampers, the top and bottom edges of the blade shall be crimped to stiffen the blade. Damper shall be provided with an extended rod to permit installation of a damper regulator.

3. Dampers larger than 12" in either direction shall be multi-blade dampers and shall be the opposed blade type, constructed of not less than 16 gauge galvanized steel blade mounted in galvanized steel channel frame. Blade spacing shall not exceed 6" and the top and bottom edges of the blade shall be crimped to stiffen the blades. Damper blades shall be interconnected by rods and linkages to provide simultaneous operation of all blades. Damper shall be provided with an extended rod to permit installation of a damper regulator.

C. Hardware for Manual Dampers:

1. Splitter damper hardware - When neither dimension of a damper exceeds 18", the damper shall be provided with a ball joint bracket attached to the outside of the duct. The bracket shall have a set screw for securing damper rod in position. The damper operating rod shall be not less than 1/4" diameter steel rod and shall be secured to the damper blade with a clip. When either dimension of a damper exceeds 18", the damper shall be provided with 2 ball joint brackets and rods. The rods shall be located at quarter points on the damper.

2. Duct mounted regulators with operating handle and locking quadrant shall be provided on manual volume control dampers.

3. Damper hardware shall be Ventfabrics, Young Regulator or Duro-Dyne provided the equipment meets or exceeds the requirements of the Contract Documents.

D. Dampers shall be Ruskin or approved equal by Air Balance, Price, or American Warming and Ventilating.

2.03 FLEXIBLE DUCTWORK:

A. Flexible ductwork shall be Class 1, UL 181 air duct with an aluminized mylar or polyester inner liner laminated to a corrosion resistant steel wire helix. Aluminum helix is not acceptable.

B. A 1" thick, one (1) pound density fiberglass insulation and vinyl outer jacket shall cover the wire helix.

C. The maximum allowable length of low pressure flexible ductwork shall be 4'-0" and shall be limited to short run-outs and end runs connected to round neck ceiling supply diffusers. Provide a spin-in fitting with integral volume damper at all flexible run-out connections in low pressure ductwork.

D. The maximum allowable length of medium pressure flexible ductwork shall be 1'-0" and shall be limited to short run-outs connecting FPB and VAV units to medium pressure sheet metal ductwork.

E. Flexible ductwork shall be designed for pressures up to 4" W.G. for low pressure ductwork and 10" W.G. for medium pressure ductwork.

F. Low pressure flexible ductwork shall be Clecon Model Flex 28 VF Series or Genflex Type SLS-181 or Wiremold type WGC and medium pressure flexible ductwork shall be Clecon Model FLEX 28 VF Series, Genflex 1HPL-181 or Wiremold type WGC.

2.04 FLEXIBLE DUCT CONNECTIONS: Flexible duct connections shall be non-combustible, installed at all belt-driven equipment and where shown. Material shall be glass fabric double coated with neoprene (30 0z. per square yard minimum) and shall be Vent Fabrics, Duro-Dyne or Young Regulator, provided the equipment meets or exceeds the requirements of the Contract Documents. Provide duct supports on each side of flexible connections.

2.05 FIRE DAMPERS:

A. Fire dampers (FD) shall be provided at all penetrations through fire rated walls and partitions. Fire dampers shall be UL labeled and shall be Type B (blades out of the air stream) or Type C (round or oval duct). Damper shall be Ruskin Model 1BD2 or approved equal.

1. Hat channel frame shall be 16 gauge (1.5 mm) minimum galvanized steel with tabbed corners for reinforcement. Bearings shall be stainless steel sleeve. Blades shall be airfoil shaped double skin construction with 14 gage (1.9 mm) equivalent thickness. Blade edge seals shall be silicone rubber and galvanized steel mechanically locked in blade edge (adhesive or clip fastened seals not acceptable) and shall withstand 450 F (232 C). Jamb seals shall be flexible metal compression type.

2. Each damper shall be 1-1/2 hour rated under UL555, and shall further be classified by Underwriters Laboratories as a Leakage Rated Damper for use in smoke control systems. Leakage rating under UL555S shall be Class 1 (4 cfm/sq. ft. at 1" w.g. and 8 cfm/sq. ft. at 4" w.g.).

3. Dampers shall operate (open and close) under HVAC system operating conditions with pressures of at least 8" w.g. in the closed position and 4000 fpm air velocity in the open position.

4. In addition to the leakage ratings, the dampers and their actuators shall be qualified as a single entity under UL555S to 350 F (177 C) elevated temperature. Actuators shall be installed at time of damper fabrication. Dampers shall be equipped with factory supplied caulked sleeve. All wiring or piping material required to interconnect the actuator with detection and/or alarm or other systems shall be furnished by others. Damper shall be Model FSD60 or approved equal.

5. Electric actuator shall be 120 volts ac, 70 watts running and 25 watts while in the holding mode. The actuator shall be designed to spring the damper closed upon loss of power in less than 20 seconds. Stall type actuators are unacceptable. Damper actuators shall be factory installed on the damper and tested to verify cycle timing.

B. Acceptable manufacturers of fire dampers are: Prefco, Ruskin, or Air Balance provided, the equipment meets or exceeds the requirements of the Contract Documents.

2.06 ACCESS DOORS:

A. Provide a duct access door at each fire and/or smoke damper where required for access. Access doors 18" x 18" and larger shall have a continuous hinge on one side with latch on the other side. Access door shall be designed for five (5) times the pressure of the duct in which it is mounted. Access doors shall be of sufficient size to provide access to the dampers for resetting or replacing thermal links. Access doors shall be double metal faced, internally insulated same as duct, and provided for gasket seal. Access doors downstream of fire dampers in medium pressure ductwork shall be the implosion type.

B. Coordinate the location of access doors above inaccessible ceilings with the Architect.

2.07 AIR EXTRACTORS: Provide in duct mounted supply outlets and takeoff or extension collars to supply outlets. Air extractors shall be factory-fabricated and factory or field assembled units consisting of curved turning vanes or louver blades for uniform air distribution and change of direction with minimum turbulence and pressure loss. Where adjustable devices such as air deflectors or extractors are inaccessible they shall be provided with means for adjustment and position lock external to the duct in which they are located. Similar to Young Regulator Model No. 1.

2.08 DUCT INSTRUMENT TEST HOLES: Provide for each system four (4) test holes two: (2) in supply duct and two(2) in return air plenum at opposite ends near air handling units with screwed caps. Also, at duct mounted coils and electric duct heaters provide one (1) on either side of the coil or duct heater.

2.09 REGISTER AND GRILLE CONNECTION:

A. Where take-offs are on side of duct, clinch lock short tee sections onto trunk. Install collars with slip joints and 3/4" flange at outlet end. At plastered surfaces set collars exactly flush with plaster surface (mechanic must be on job to make adjustments during plaster application). Set flange face so as to receive register gasket, and be concealed by register flange. Collars may be deleted where mounting frames are furnished with registers.

B. Install boots above lay-in ceilings simultaneously with ceiling work; mechanic must be on job during this phase of construction work.

C. At return relief and exhaust grilles 48" or more in either dimension, collars shall be 1 x 2 x 1/8 inch steel angle frames with corners mitered, welded and ground smooth. Frames in ceilings shall be independently suspended from the ceiling structure, or the duct shall have special reinforcing to prevent sagging of the boot.

D. Interior of ductwork visible through grilles and diffusers shall be painted flat black.

PART 3 EXECUTION

3.01 INSTALLATION:

A. Install all ductwork and accessories as shown and in accordance with applicable SMACNA standards.

B. All joints in ductwork shall be sealed with a fire retardant duct sealant. Tape is <u>not</u> acceptable.

C. Duct liner shall be cut to provide overlapped and compressed longitudinal corner joints. Liner shall be installed with coated surface facing the air stream. Duct liner shall be adhered to the ductwork with 100% coverage of the sheet metal surfaces using a fire retardant adhesive applied by spraying. Coat all exposed leading edges and all transverse joints with fire retardant adhesive. All leading and trailing edges shall be secured with sheet metal airfoils.

D. Sound Proof Construction for Duct Penetrations is required for openings between ductwork and interior spaces. The method for sound proofing shall be as follows:

1. Fill openings with fibrous glass blanket or board for full depth of penetration.

2. Caulk each side of opening with non-hardening, non-aging caulking compound equal to Johns-Manville "Duxeal".

3. Penetrations through fire-rated partitions and shafts shall be sealed with Dow-Corning RTV fire-retardant foam.

4. Duct system sound levels shall be maintained at such a level as to not exceed a maximum of NC 35 for all spaces. Duct fabrication and installation shall be altered, if noise levels are exceeded, at no cost to the Contract.

5. All exterior kitchen exhaust ductwork shall be painted with rust inhibiting primer.

6. Unavoidable obstruction: Where structural elements or pipes must pass through a duct, provide two-piece streamliners, and enlarge duct to compensate for net loss of area. Round pipes and rods smaller than three (3) inches need not have special treatment. Note: This provision will not be used to justify obstructions which can be avoided.

E. Splitter Dampers:

1. Provide where shown on drawings. Fabricate blades of same thickness galvanized steel as the duct where used (min. 20 ga.), securely attached to a rod at the air leading edge to present a round nose to air flow. Length shall be sufficient to close either branch duct.

2. Anchor splitters at the air entering edge by 3/16 inch adjustable galvanized steel rods that pass through set screw clamps on the outside of duct. Use one (1) rod and clamp on splitters with leading edge up to 15 inches, (2) rods up to 30 inches, and on 15 inch centers above 30 inches.

3. When splitter dampers occur above other than lay-in ceilings, provide Young Model No. 890-A damper assembly complete with supports, bearings and Young No. 1 regulators with an additional end bearing and chromium plated ceiling escutcheon.

END OF SECTION

SECTION 15841 FILTERS

PART 1 GENERAL

1.01 GENERAL: All work specified in this Section is subject to the provisions of Section 15010.

1.02 COORDINATION: The filters of one manufacturer (Farr) have been used as the basis of design. Any modifications to ductwork, building structure, etc., that result from the use of any other units shall be coordinated with all trades; this coordination shall occur before delivery of equipment from the manufacturer. Any modifications shall be performed without incurring any additional cost to the Owner.

1.03 ACCEPTABLE MANUFACTURERS:

A. Manufacturers listed below are acceptable: Farr.

B. All devices selected must meet or exceed all the requirements of the Contract Documents.

PART 2 PRODUCTS

2.01 FILTER: Filter media shall have an average efficiency of 35-35% on ASHRAE Test Standard 52-76. It shall have an average arrestance of not less than 97% on that standard. Filters shall be listed by Underwriter's Laboratories as Class 2.

PART 3 EXECUTION

3.01 SPARES: Provide one (1) complete set of replacement filters as recommended by the manufacturer.

END OF SECTION

SECTION 15850 FANS

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. 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 all 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 service omitted from the plans or specifications that is not called to the attention of the Architect at least 72 hours before bidding and corrected by addendum shall be provided as though shown.

G. V-belt drives shall be designed for not less than 150% of connected driving capacity and motor sheaves shall be adjustable to provide not less than 20% speed variation. Sheaves shall be selected to drive the fan at a speed to produce the scheduled capacity indicated on the drawings when set at the approximate midpoint of the sheave adjustment. Motors with V-belt drives shall be provided with adjustable bases.

H. Fan motor enclosure shall be the drip-proof type unless specifically indicated otherwise.

I. Roof-mounted fans shall be waterproof design so that water cannot enter the building through the fan housing, whether or not the fan is operating.

J. Belt driven power assemblies shall be mounted on vibration isolators.

K. Centrifugal fan wheel shall be statically and dynamically balanced.

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 horsepower. 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 horsepower required with a service factor of 1. Motors and/or drives shall be changed if required to delivery 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.

1.03 SUBMITTALS:

A. In accordance with Section 15011, submittals shall be furnished for the following:

1. All fan sections, including motors and drives. All centrifugal fans, including motors and drives.
2. In-line centrifugal fans

B. Complete maintenance and operating manuals.

C. Sound power levels for all fans (Db and/or sone levels).

D. Provide fan curves for each fan showing CFM versus static pressure, horsepower and efficiency at the specified design point.

1.04 APPLICABLE STANDARDS:

A. All fans and power exhausters shall be listed in the current edition of AMCA and shall bear the AMCA seal.

B. Fan performance criteria:

1. Fans shall be scheduled on plans indicating manufacturer's name and model number, CFM, static pressure, sones, drive, horsepower and voltage. Fan motors ½ horsepower and larger shall be sized based on full design CFM at 115% design static pressure.

PART 2 PRODUCTS

2.01 COORDINATION: 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 form the manufacturer. Any modifications shall be performed without incurring any additional cost to the contract.

2.02 FANS:

A. Furnish and install all supply and exhaust fans as scheduled on drawings. Fans shall be of the type size and capacity as scheduled and shall be furnished as hereinafter specified and scheduled.

B. All fans shall have been statically and dynamically balanced prior to leaving the factory. Fans found vibrating noticeable in the field, due to damage in shipment, improper handling, etc., shall be removed and replaced at no additional cost to the Owner.

2.03 DESCRIPTION:

A. CABINET FANS:

1. Ceiling and inline cabinet fans as indicated on drawings shall have acoustically insulated housings and shall not exceed sound level ratings shown. Fans shall bear the AMCA Certified Ratings Seal and UL Label. Integral backdraft damper shall be chatter-proof. Fans shall have true centrifugal wheels. Face grille shall be of aerodynamic white egg crate design and provide 85% free area. Manufacturers shall submit vibration amplitudes and magnetic motor hum in decibels. Fans shall be

provided with cord, plug, and receptacle inside the housing. Entire fan, motor and wheel assembly shall be removable without disturbing the housing. Fan motors shall be suitably grounded and mounted on vibration isolators. Fans shall be Greenheck or approved equal by Cook, Acme or Penn.

B. IN-LINE CENTRIFUGAL FANS:

1. In-line fans shall be the belt driven centrifugal type complete with housings, adjustable motor bases, motor and drives, fan wheel, bearings, drive guards and inlet screens (where indicated). The fan housing shall be the heavy gauge steel tubular type of all welded Class 1 construction complete with curved conversion vanes, inlet and outlet flanges, access door and drive arrangement indicated. The bearings and drive shall be protected from the air stream by an enclosure. Provide mounting brackets as indicated.

2. The bearings shall be the self-aligning ball bearing pillow block type with double locking cover. The bearings shall have a 400,000 hour average life and shall have the grease lines extended to the outside of the fan housing for ease of maintenance.

3. The fan wheel shall be the air foil centrifugal type for fan wheels 27" and larger in diameter and backward inclined type for fan wheels under 27" in diameter. Fan wheels shall be of Class 1 construction and shall be statically and dynamically balanced. The fan shall bear a certification to verify that the wheel has been balanced.

4. The motor shall be mounted on an adjustable base and shall be as specified herein before. Provide drive guards.

5. Fans shall be Greenheck, Cook or approved equal by Engineer.

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: An authorized representative of the equipment manufacturer shall make the initial start-up. The balancing contractor shall be responsible for final verification and reporting of all airflows.

3.03 ADJUSTMENT: 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 15860 CENTRAL AIR HANDLING UNITS

PART 1 GENERAL

1.01 GENERAL

A. Manufacturer must clearly define any exceptions made to the Plans and Specifications Mechanical contractor is responsible for expenses that occur due to exceptions made.

B. Unit must be specifically designed for indoor outdoor installation.

C. Fabricate draw-through type air handling units suitable for medium pressure operation.

D. Fabricate units with fan and coil sections plus accessories, including cooling coil, mixing box/ filter section drain pan.

E. Unit casing shall be leak-proof and constructed to withstand suction pressure of 2.0 inch water gauge with a maximum deflection of 1 in 200.

1.02 RELATED DOCUMENTS

A. 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 all 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 service omitted from the plans or specifications that is not called to the attention of the Architect at least 72 hours before bidding and corrected by addendum shall be provided as though shown.

1.03 ACCEPTABLE MANUFACTURERS: The Air Handling Unit shall be Trane, Carrier, or approved equal by Engineer.

1.04 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 horsepower. 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 horsepower 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

A. 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 CENTRAL STATION AIR HANDLING UNITS

A. CASINGS

1. Construct casings of minimum 16 gauge G90-u galvanized steel structural frames and base. Construct double wall panels of minimum 18 gauge G90-u galvanized steel exterior panels and minimum 22 gauge solid G90-u galvanized steel interior panels. In order to properly clean and service the interior of the air handler, the casings shall be constructed such that structural frames are free standing and double wall panels are non-load bearing. Contractor shall be responsible to provide connection flanges and all other framework that is needed on unit to ensure that removal of unit's double wall panels shall not affect structural integrity of unit.

2. Panels shall be fully removable to allow for a proper way to thoroughly clean panels of microbial growth and to access internal parts. Secure panels to structural frames with yellow di-chromate plated screws. If panels are not removable, then manufacturer shall provide access sections with doors between all internal components to ensure access for cleaning of the air handler.

3. Casing shall have removable full size access panels or double wall doors as scheduled on drawings. Construct access doors of minimum 18 gauge G90-u galvanized steel exterior panels and minimum 22 gauge perforated G90-u galvanized steel interior panels. Provide automotive style neoprene gasket around full perimeter of access doors to prevent air leakage. Provide "ventlock" style non-corrosive allow latches operable from the inside or outside of unit. If access doors do not open against unit operating pressure, provide safety latches that allow access doors to partially open after first handle movement and fully open after second handle movement. Insulate access doors with 2" thick 1-1/2 LB per cubic foot density, matte faced, fiber glass insulation.

4. Insulate casing sections with 2” thick 1-1/2 LB per cubic foot density matte faced fiberglass insulation. Provide double wall casing construction and encase insulation between exterior and interior casing panels such that no insulation is exposed to air-stream. Foil facing on insulation is not acceptable as alternate to double wall construction. Insulate all structural channels connected to casing panels and cover openings in structural channels with galvanized steel. Insulation shall comply with NFPA 90A.

B. FANS

1. Provide fan sections with double width, double inlet centrifugal fan designed and suitable for class of service indicated in the unit schedule. Fan shaft to be properly sized and protectively coated with lubricating oil. Fan shafts shall be solid and properly designed so that fan shaft does not pass through first critical speed as unit comes up to rated RPM. fans shall be statically and dynamically tested as an assembly at the required RPM to meet design specifications. Key fan wheels to fan shaft to prevent slipping.

2. Mount fans on minimum 16 gauge steel isolation bases. Internally mount motors on same isolation bases and internally isolate fans with 2” spring isolators. Install flexible canvas ducts between fan and casings to ensure proper isolation. Flexible canvas ducts shall comply with NFPA 90A. If no flexible canvas duct is provided, then the entire unit shall be externally isolated from the supply duct work and piping by contractor in order to avoid transmission of noise and vibration through the ductwork.

C. MOTORS AND DRIVES

1. Factory installed motors on slide base to permit adjustment of belt tension.

2. Fan motors shall be heavy duty, high efficiency open drip proof.

3. V-Belt drive shall be variable pitch rated at 1.2 time the motor nameplate.

D. COILS/DIRECT EXPANSION

1. The same manufacturer shall supply D/X coil and air handling unit. Install coil so that headers and return bends are enclosed within the same casing.

2. Construct coils of configuration plate fins and seamless copper tubes. Fins shall have collars drawn and firmly bonded to tubes by means of mechanical expansion of tubes. Do not use soldering or tinning in bonding process.

3. Construct coil casings of minimum 16 gauge galvanized steel with formed end supports and top and bottom channels. If two or more coils are stacked in unit, install intermediate drain channels between coils to drain condensate to main drain pans without flooding lower coils or passing condensate through air-stream.

E. REFRIGERANT CIRCUIT/DIRECT EXPANSION COIL

1. Each refrigerant circuit shall be matched to a hermetic or semi-hermetic compressor with high and low pressure cut-offs, crankcase heater, moisture indicating sight glass, filter drier, and access and service valves minimum of two independent refrigerant circuits.

2. Evaporator coil shall have copper tubes mechanically bonded to aluminum fines, factory leak tested at 300 psig.

PART 3 EXECUTION

3.01 INSTALLATION

A. 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. An authorized representative of the equipment manufacturer shall provide the initial start-up. Said start-up shall include verification of proper installation and wiring and verification of proper operation of the airflow control systems. The balancing sub-contractor shall be responsible for final verification and reporting of all air flow rates and pressurization.

B. The air flow control system manufacturer shall furnish a minimum of four hours of Owner training to provide an overview of the job specific airflow control components and general troubleshooting procedures.

3.03 ADJUSTMENT: 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 15870 GRILLES, REGISTERS AND DIFFUSERS

PART 1 GENERAL

1.01 DESCRIPTION:

A. All work specified in this Section is subject to the provisions of Section 15010.

B. Grilles, registers and diffusers shall be provided to meet the minimum capacities indicated, shall meet all constraints of construction.

1.02 COORDINATION: The grilles, registers and diffusers of one manufacturer have been used as the basis of design. Any modifications to ductwork, controls, building structure, etc., that result from the use of any other units shall be coordinated with all trades. This coordination shall occur before delivery of equipment from the manufacturer. Any modifications shall be performed without incurring any additional costs to the Contract.

1.03 ACCEPTABLE MANUFACTURERS:

A. Manufacturers listed below are acceptable. Approved equal products which are ADC tested, rated and certified may be Price, Metalaire or Titus.

B. All devices selected must meet or exceed all the requirements of these contract documents.

PART 2 PRODUCTS

2.01 DESCRIPTION:

A. Color of all grilles, registers and diffusers are to be selected by Architect. Also, ceiling mounted items shall be selected to fit the ceiling in which they are applied.

B. Air distribution devices shall be as follows:

1. Exhaust air register shall have a fixed core of 1/2" x 1/2" x 1/2" aluminum squares. Register shall have opposed blade dampers.

2. Return air grilles (ceiling mounted) shall have a fixed core of 1/2" x 1/2" x 1/2" aluminum squares. Finish shall be white baked enamel.

3. Supply air diffusers (square) shall be as scheduled extruded aluminum rectangular to round neck diffusers with T-Bar flange frames.

4. Sidewall air registers shall be aluminum face bars on 1/2" centers. Unit shall have off-white finish.

C. The Contractor shall verify that all air distribution devices are suitable for the ceiling and wall types in which they are installed.

D. All air distribution devices shall be shown in grille, register and diffuser schedule.

PART 3 EXECUTION

3.01 INSTALLATION:

A. Grilles, registers and diffusers shall be installed as indicated in conformance with the manufacturer's recommendations. Coordinate the actual units to be provided with all trades.

B. All grilles, registers and diffusers shall be selected and submitted at an NC level of 35 or less.

C. The grilles, registers and diffusers shall be tested and adjusted to provide the scheduled capacities.

END OF SECTION

SECTION 15900 AUTOMATIC TEMPERATURE CONTROLS

PART 1 GENERAL

1.01 DESCRIPTION:

A. All work specified in this Section is subject to the provisions of Section 15010 and Division 16.

B. The Control Contractor shall furnish all labor, materials, wiring, equipment and services necessary for proper installation of Automatic Temperature Controls (ATC), Varitrane. VAV CCPII controllers and associated end devices on AHU-1, AHU-2, AHU-3 and AHU-4. Each system to be furnished with a stand alone controller that shall perform all the functions as described in the Sequence of Operation and the Points List and with the added feature of a "Time of Day" capability.

C. The basic system shall be Direct Digital. That is all modulating devices shall be Direct Digital. All two position devices and interlocks may be electric/electronic.

D. This section shall include but is not limited to the automatic controls for the following:

1. Supply Fans
2. Exhaust Fans
3. Cooling, D/X Coils
4. VAV, VCEF
5. Electric Duct Heaters
6. Air Handling Unit
7. Condensing Units

E. The Controls Contractor shall be responsible for all required control and interlock wiring as specified under this section of the specifications. Wiring shall be color coded and installed in accordance with National Electric Code and Division 16 of these specifications.

F. High limit thermostats (firestats) shall be provided in intake air of exhaust fans and in discharge air of supply fans.

G. Duct mounted smoke detectors shall be furnished and installed under Division 15 in the supply duct and return air path of each air handling system and where otherwise shown. Detectors shall be wired by the Electrical Contractor under Division 16. Detectors shall be compatible with the building smoke detection and fire alarm systems. All necessary interlocks, wiring, relays, contactors, etc., with the building fire alarm system and mechanical equipment, shall be provided under Division 16.

H. Thermostats shall be electronic type. Thermostats shall be single setpoint type with digital push button external adjustable setpoint, low voltage type as suitable for application.

I. Coordinate the controls carefully with the integral controls furnished with the main supply fans terminal units, and central plant equipment.

J. The control wiring shall be extended from the control power circuits (indicated on the electrical drawings) through the control panels indicated to all terminal devices (starters, contactors, sensors, etc.) under this Division 15. Control wiring shall be run in conduit in equipment rooms, and plenum cable elsewhere.

K. The temperature control contractor shall provide all automatic control dampers of the types indicated on the plans and not specified to be integral with other equipment. Frames shall not be less than 13 gauge galvanized steel. Blades shall not be over 8" wide nor less than 16 gauge galvanized steel roll formed. Bearings shall be oilite, ball bearing or nylon with 1/2" shafts. Side seals shall be stainless steel of the tight-seal spring type. Dampers and seals shall be suitable for temperature ranges of -40 to 200°F.

1. All proportional control dampers shall be opposed blade type and all two-position dampers shall be parallel blade types.

2. Dampers shall be sized to meet flow requirements of the application.

3. Maximum leakage shall be 3% at static pressure of 3" of W.C.

4. Where ultra-low leakage dampers are specified the blade edges shall be fitted with replaceable, snap-on, inflatable seals to limit damper leakage to 1/2% at applied static pressure.

5. Smoke Dampers: Dampers shall be parallel blade minimum leakage type with operable temperature range rated at 400°F. Dampers shall meet requirements of NFPA 90A.

L. All automatically controlled devices, unless specified otherwise elsewhere, shall be provided with actuators which shall be sized to operate their appropriate loads with sufficient reserve power to provide smooth modulating action or two-position action and tight close off as specified.

1. Where two or more actuators are to be operated in sequence with each other, sequencing shall be by spring range, pilot positioners, or by digital sequencing with separate analog outputs, as specified in the sequence of operation.

M. Firestats shall be 135°F manual reset, line voltage type with bimetal actuated switches. Switch shall have and adequate rating for the applied load.

N. Safety low limit shall be manual reset line voltage type with bellows actuated switches.

1.02 RELATED DOCUMENTS: The Automatic Temperature Control (ATC) Contractor shall be bound by the same Specification that the mechanical and electrical trades must follow.

1.03 WORK INCLUDED:

A. This Specification is for all labor, materials and equipment required for the construction of the ATC systems.

B. The systems shall be complete in all respects, tested and ready for operation.

C. All materials, equipment and apparatus shall be new and of first-class quality.

1.04 GENERAL INSTRUCTIONS:

A. The ATC systems as specified herein shall be provided in their entirety by the ATC Contractor. The ATC Contractor shall base his Bid on the systems as specified.

B. The ATC Contractor shall submit a (Base) Bid which will include all central processing hardware and software, electronic and control equipment, sensors and thermostats, as shown on Plans.

1.05 SCOPE:

A. The ATC systems shall be supplied and installed completely under the ATC Contract. Components shall be mounted and wired by the ATC Contractor.

B. The ATC Contractor shall provide the engineering, installation, calibration, software programming and checkout necessary for complete and fully operational ATC systems, as specified hereafter.

1.06 WORK BY OTHERS:

A. The HVAC Subcontractor shall:

1. Furnish and install all necessary piping connections, taps and wells required for flow, pressure or temperature measuring devices.

2. Provide dampers, if so indicated, under Equipment Specifications.

B. The Sheet Metal Subcontractor shall:

1. Install all automatic dampers furnished by the ATC Contractor.

2. Assemble multiple section dampers with required interconnecting linkages, shafts and brackets and extend the required number of shafts through the ducts for externally-mounted damper motors. Jack shafts will be assembled with sealed roller or ball bearings of stainless steel construction.

C. The Division 16 Electrical Subcontractor shall provide, install and connect all power wiring.

1.07 ATC CONTRACTOR:

A. The ATC Contractor shall have a local office within a 100 mile radius of the job site, staffed with factory trained engineers fully capable of providing instruction, routine maintenance and emergency maintenance service on all system components. The ATC Contractor shall have a three year experience record in the design and installation of computerized building systems similar in scope and performance to that specified herein, and shall be prepared to provide evidence of this history as condition of acceptance and approval prior to Bidding.

B. The ATC Contractor shall be prepared to make a personal presentation of his systems to the Owner or his designated representatives prior to award of the Contract should the Owner request it.

PART 2 PRODUCTS AND SYSTEMS

2.01 MISCELLANEOUS:

A. Duct Mounted Control Dampers

1. Duct mounted Dampers shall be designed to operate in systems having velocities up to 3,200 FPM with a static pressure differential of 4" WG. The frame shall be minimum 16 gauge galvanized steel roll formed channel. Blades shall be minimum 16 gauge galvanized steel with a maximum width of 8". Shafts shall be minimum 1/2" diameter. Maximum damper section size shall be 48" x 72", with larger dampers installed in sections with appropriate jack shafting.

2. All multiple blade duct mounted proportional control dampers shall be opposed blade type and all two-position dampers shall be parallel or opposed blade type.

3. Duct mounted Dampers shall be minimum leakage type equipped with blade and edge seals.

B. Actuators

1. Electronic valve and damper operators shall be positive positioning, spring return. Motors shall be of the low voltage synchronous type and shall be non-overloading at a continuous stall.

2. Actuators to be factory selected, mounted and tested for proper operation based on unit size, type and torque requirements.

PART 3 EXECUTION

3.01 INSTALLATION REQUIREMENTS: All electrical work performed in the installation of the ATC system as described in this specification shall be per the National Electrical Code (NEC) and per applicable state and local codes. Where exposed, conduit shall be run parallel to building lines properly supported and sized at a maximum of 40% fill. In no cases shall field installed conduit smaller than 1/2" trade size be allowed. Where conductors are cable rated for use in return air plenums shall be used.

3.02 OWNER TRAINING: The ATC contractor shall provide three copies of an operator's manual describing all operating and routine maintenance service procedures to be used with the temperature controls. This contractor shall instruct the Owner’s designated representatives in these procedures during the startup and test period. The duration of the instruction period shall be no less than 8 hours, during normal working hours.

3.03 CALIBRATION AND ADJUSTMENTS: After completion of the installation, perform final calibrations and adjustments of the equipment provided under this contract and supply services incidental to the proper performance of the ATC system under warranty below.

3.04 ACCEPTANCE PROCEDURE: Upon completion of the calibration, contractor shall startup the system and perform all necessary testing and run diagnostic tests to ensure proper operation. Contractor shall be responsible for generating all software and entering all database necessary to perform the sequence of control and specified software routines. An acceptance test in the presence of the Owner's representative or Engineer shall be performed.

3.05 WARRANTY: All ATC devices and installation shall be warranted to be free from defects in workmanship and material for a period of one year from the date of job acceptance by the owner. Any equipment, software, or labor found to be defective during this period shall be repaired or replaced without expense to the owner. Factory authorized warranty service shall be available within 50 miles of jobsite.

3.06 AS BUILT DRAWINGS: ATC Contractor will provide Owner and Engineer three sets blue line Auto Cadd control riser diagrams after job is built. One set of black line control riser diagrams will be framed and hung on central plant will next to Automatic Temperature Control panels.

PART 4 - SEQUENCE OF OPERATIONS

4.01 BYPASS VAV ZONING SYSTEMS (AHU-1 and AHU-2)

A. DAMPER UNIT CONTROLLER

1. Damper Control:
The microprocessor based VAV box controller shall continuously monitor the zone temperature, damper position, and zone setpoints. The damper unit controller shall use a PI control loop to maintain the heating and cooling setpoints by positioning the damper for the proper airflow to meet the load requirements. Airflow shall be limited by the minimum and maximum position setpoints. **Time of day scheduling will be included.**

2. Heat/Cool Mode Decision for VAV Box Controller:
The heat/cool control action for the individual VAV unit controller shall be determined by the VAV/static system controller, and then sent to the V.F.D. controller to be executed. The VAV system V.F.D. compares the supply air pressure of the system and setpoint.

3. Local Heat Control:
The VAV box controller shall have three local heat outputs available to control duct or perimeter heat. The local heat type selection shall determine the heating control algorithm used by the VAV box controller. The choices shall include:

a. 1-3 stages electric - Three stages of local electric heat are staged on by space demand. If the local heat is configured to “1-3 stages electric” and the VAV system controller goes into the heating mode, the Local Heat shall be disabled. When the Local Heat is enabled to run, the VAV box shall go to the heating minimum position as edited in the damper unit controller setpoint menu.

4. Priority Local Heat:
Priority Local Heat shall be controlled via an entry on the VAV system controller setup menu. If Priority Local Heat is edited to YES, VAV box controllers shall control their local heat to the heating setpoint for that zone. In this mode, the VAV box controller shall attempt to heat to setpoint with local heat first.

5. Occupied/Unoccupied Mode:
During occupied operation as programmed by the time clock, the VAV box controller shall control to the zone sensor module setpoint knob or a setpoint provided by the VAV system controller. The setpoint at the zone sensor module shall be the cooling setpoint; the heating setpoint shall be 2°F below the cooling setpoint. This heating setpoint offset shall be editable from 2-10°F. If the zone sensor setpoint is disabled or has failed, the VAV box controller shall control to the programmed Occupied Cooling setpoints. The factory defaults shall be 74°F cooling and 71°F heating. These setpoints shall be editable.

During unoccupied operation, the VAV box controller shall control to the programmed unoccupied setpoints. These setpoints shall have factory defaults of 85°F cooling and 60°F heating. The setpoints shall be editable.

6. Drive to MAX Position:
A VAV box controller shall be able to be manually overriden from the zone sensor to drive to the Maximum position.

B. VAV SYSTEM CONTROLLER

1. Heat/Cool Decision for the VAV System Controller
All VAV box controllers shall be scanned continually by the VAV system controller. The quantity and strength of all zone heating and cooling calls shall be determined. At power-up and on transition from Unoccupied to Occupied, the greater number of calls for either heat or cool shall determine the mode of the VAV system controller and the HVAC system.

2. Heat/Cool Changeover for the VAV System Controller
Once a heating/cooling decision has been determined, the VAV system controller shall require a minimum number of opposite calls to changeover. This shall be an editable setup parameter. All current mode callers shall be responded to before the system shall be allowed to changeover.

3. VAV System Controller Heat/Cool Staging
The VAV system controller shall have the capability of controlling multiple stages of cooling. The number of stages to be energized shall be determined by the quantity of zones calling, the strength of the calls (degrees from setpoint), and the time duration of the calls.

All stages of cooling shall be protected with minimum on/off timers. A stage shall not turn off until its minimum ON time has been satisfied. Once a stage is off, it shall not be able to be turned on again until its minimum OFF time has been satisfied.

4. Supply Air Temperature Limiting
The VAV system controller shall enforce supply air temperature limits to avoid mechanical problems with the air handling unit, and to help insure occupant comfort by maintaining reasonable discharge air temperatures. When the supply air temperature falls outside the normal operating range, cooling stages shall be limited by the VAV system. Normal staging control shall resume when the supply air temperature returns within normal operating range. The supply air temperature high/low limits shall be an editable setup parameter.

5. Velocity/Static Control
The VAV system controller shall modulate V.F.D. box to protect air handling components from excessively low air flow or high duct velocity pressure. A sensor located in the supply air duct shall measure system air flow velocity and pass the information to the VAV system controller. The controller shall compare the measured air flow against the supply air setpoint. This setpoint shall be editable. If the measured flow is lower than the setpoint, the VFD dampers shall be driven down in speed. If the measured airflow velocity is greater than the setpoint plus a differential, the V.F.D. shall be driven up in speed. If the airflow is in the deadband between the setpoint and the differential, the V.F.D. shall maintain RPM's.

The VAV system controller shall be capable of controlling the V.F.D.using measured velocity pressure. The selection shall be made with a dip switch located on the controller. The duct mounted velocity sensor shall be field-convertible for velocity or static pressure.

If the duct velocity should fail, the V.F.D. shall be driven to the Fail Safe RPM. This should be an editable setpoint.

The VAV system controller shall calibrate the sensor against actual flow on power-up, when the system goes from the occupied to the unoccupied mode, or randomly once every seven days if no other calibration has occurred.

In the unoccupied mode the VAV shall be driven to 50%.

6. Priority Shutdown
The VAV system controller shall have priority shutdown capability. A priority shutdown shall be initiated by a building automation system command or an external contact closure. It shall also be initiated by a supply air temperature sensor failure or a communication failure (no VAV unit controllers communicating).

7. **The Central Controller shall have the capabilities of Time of Day Scheduling.**

C. VAV SYSTEM CONTROL POINTS:

1. Group Functions
The VAV system controller shall allow VAV box controllers to be controlled and monitored independently. The following group functions shall be supported:

a. Group Occupied/Unoccupied - The time of day scheduling for the VAV system shall be done by box.

b. Group Timed Override - If the timed override button on a sensor is pressed to invoke the timed override period, all damper unit controllers that are members of that group shall go to the occupied mode.

c. Group Overrides - The VAV system controller shall have the ability to override several VAV boxes controller. The following commands shall be issued:

1. Occupied/Unoccupied. The box can be set to Auto which shall follow the time of day schedule, or it can be overridden to Continuous Occupied or Continuous Unoccupied mode.

2. Flow Control. The box can be set to Auto which shall follow temperature vs. setpoint demand, or it can be overridden to Continuous Open, Closed, Minimum, or Maximum.

3. Local Heat. Local zone heat can be overridden to enabled or disabled.

4. Enforce Minimum While Unoccupied. Selecting “Yes” enforce the minimum positions of the VAV box controllers during unoccupied. Selecting “No” shall allow the VAV to go fully closed during unoccupied.

5. Energy Saver Mode. When enabled the energy saver mode shall allow VAV box controllers to close below their minimums. This shall only occur if a zone is in the cooling mode and if it has a zone temperature lower than the active heating setpoint, or if a zone is in the heating mode and it has a zone temperature greater than the active cooling setpoint.

6. Ventilation Mode. When enabled this mode shall allow VAV and relief fan to run for greater ventilation. This shall occur when the group is occupied and the air conditioning system is in a zero energy state (no stages of heating or cooling are energized) for more than four minutes. When the ventilation mode is active, the minimum VAV position setpoint shall be multiplied by 4.

4.02 RTU-1 (LOCATED ON GROUND): The DX-electric heat in reheat position shall be controlled by a programmable thermostat – Honeywell Model T7300-F2010 and Sub-Base Q7300G2005. A zone humidstat with SP of 60% RH will control humidity during occupied periods. The re-heat electric duct heater will have 3 stages of control.

END OF SECTION

SECTION 16010 ELECTRICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE

A. This Division and the accompanying electrical drawings cover furnishing all labor, equipment and materials and performing all operations in connection with the installation of complete electrical systems as documented.

B. There are many interfaces between the work involved with this Division and the work in other Divisions, particularly with Division 15. Be aware of the responsibilities at the interfaces.

C. The plans and specifications are considered cooperative and complimentary.

1.02 DEFINITIONS

A. Provide: furnish, install, connect, test, demonstrate and leave operational.

B. Wiring: wire or cable installed in raceway with all required boxes, fittings, connectors, etc.

C. Work: materials completely installed, including the labor involved.

D. Raceway: Galvanized rigid steel conduit (GRC), electrical metallic tubing (EMT), Intermediate metal conduit (IMC), schedule 40 Polyvinyl Chloride (PVC), flexible steel (FLX), sheathed flexible steel (SLT).

1.03 CODES AND REGULATIONS

A. All work shall comply with all local laws, ordinances and regulations applicable to the electrical installation, applicable building codes and with the requirements of the National Electrical Code (NEC), Vol. 70 of the N.F.P.A.

B. Where different sections of any of the aforementioned codes and regulations, the Specifications and/or the Drawings require different materials, methods of construction, or other requirements, the most restrictive shall govern. In any conflict between a general provision and a special provision, the special provision shall govern.

C. Obtain all permits and licenses, and pay all fees as required for execution of the Contract. Arrange for necessary inspections required by the city, county, state and other authorities having jurisdiction and present certificates of approval to the Owner or his designated representative.

D. Under no circumstances will asbestos, or asbestos related materials, be allowed on this project. Should any be found on the project they will be reported in writing.

E. Communicate with all required utility offices to meet utility schedules and regulations. Acquire services to avoid project delays.

1.04 SITE VISIT

A. All interested parties shall visit the site and thoroughly familiarize themselves with the local conditions in advance of any project activity.

B. No allowances will be made for lack of knowledge of job conditions.

1.05 DRAWINGS AND SPECIFICATIONS

A. The Electrical Drawings are diagrammatic, and are not intended to show the exact location of raceways, outlets, boxes, bends, sleeves, couplings or other such elements.

B. The Drawings and Specifications shall both be considered as part of the Contract. Any work or material shown in one and omitted in the other, or which may fairly be implied by both or either, shall be provided in order to give a complete job.

C. Should conflicts exist between the Drawings and Specifications, the Specifications shall govern.

D. Refer to the Architectural, Structural and Mechanical plans and details for dimensions, and fit the work to conform to the details of building construction. The right is reserved to shift any switch, receptacle, ceiling outlet or any other outlet a maximum of 10'-0" from its location as shown before it is permanently installed, without incurring additions to the Contract in time or cost.

E. All conduit and wiring shown on the Electrical Drawings shall be provided under this Division regardless of its function.

1.06 DEVIATIONS

A. No deviations from the drawings and specifications shall be made without the full knowledge and consent of the Owner and/or Engineer.

B. If it is found that existing conditions make desirable a modification in requirements covering any particular item, report such item to the Owner and/or Engineer for his decision and instructions.

1.07 MECHANICAL EQUIPMENT LOADS

A. The horsepower, wattage (or amperes) of mechanical equipment indicated is the estimated requirement of equipment furnished under another Division. All wiring, protective devices and disconnect switches shall be of the voltage, size and ampacity for the actual equipment installed. In no case shall these items be of smaller capacity than those indicated.

B. Coordinate with other trades and provide suitable equipment so that the above requirements shall be met without incurring additions to the Contract in time or cost.

C. The Contractor shall provide suitable disconnecting means in conformance with the requirements of the NEC, for all items or equipment utilized on the project no matter how, or by whom, furnished. However, duplication, or redundancy, is not required.

PART 2 PRODUCTS

2.01 STANDARDS FOR MATERIALS AND WORKMANSHIP

A. All material shall be new and shall bear the inspection label of Underwriter's Laboratories, Inc. (UL).

B. The published standards and requirements of the National Electrical Manufacturer's Association (NEMA), the American National Standards Institute (ANSI), the Institute of Electrical and Electronic Engineers (IEEE) and the American Society of Testing Materials (ASTM) shall govern and apply where applicable.

C. Specified catalog numbers and trade or manufacturers names are intended to describe the material, devices, or apparatus desired for type, style and quality. Similar materials of other manufacturers, if of equal quality, capacity or character may be substituted in conformity with the provisions of the General and Supplementary Conditions. Substitutions require "prior approval."

D. Where 3 or more manufacturers are named, one of the named manufacturers shall be used.

E. Where, in the opinion of the designer, no equal exists then "no equal" will be stated.

2.02 SHOP DRAWINGS

A. Shop drawings shall be submitted for the following equipment and items suitably bound, and marked, and with contents of no less than one specification section, as indicated below, per individual submission. Submittals not called for herein and/or submittals pertaining to the actual construction process will not be reviewed.

I. <u>SECTION 16100</u>

1. Conduit and fittings
2. Wire and cable
3. Junction boxes
4. Pull boxes
5. Supporting devices

6. Wire connection

II. <u>SECTION 16200</u>

1. Circuit breakers
2. Panelboards
3. Disconnect switches
4. Fuses
5. Distribution Panel Breaker

B. Shop drawings and/or catalog data submittals on all items of equipment and materials shall be submitted in conformity with requirements of the General and Supplementary Conditions. Do not submit more than the required number of sets.

C. A submittal including a list of the manufacturers of the principal items of material: wire, conduit, connectors, panelboards, switchboards, motor control centers, generators, etc., shall be submitted prior to the first shop drawing submission and within 30 days of contract award.

D. All material lists and shop drawing submittals shall include a stamped indication signifying that the submittals have been previously reviewed for compliance with the Contract Documents, that all coordination required prior to field installation has occurred and that the material being submitted is approved for installation. The stamped indication shall include the name of the contracting firm, the date of the review and the signature of the contractor. The Engineer will not review the shop drawing submittals without the contractor's stamped approval already on the shop drawings. The responsibility of complying with the Contract Documents will not be relieved by the Engineer's review.

E. All pricing is to be based upon the products, manufacturers, and processes described in the Contract Documents. Requests for approval of substitutions shall be written and delivered to the Owner and/or Engineer's office no later than 10 days before bid date.

F. Samples of all materials proposed for use shall be presented to the Owner and/or Engineer for his approval when requested.

2.03 AS-BUILT (RECORD) DRAWINGS

A. Maintain on the job site at all times during construction a set of "As-Built" mylar sepias with all changes during construction marked thereon. Include any sketches or "marked-up" drawing prints as may be generated on the job site to assist in recording the changes.

B. The "As-Built" sepias shall show all changes and deviations from the Contract Drawings including relocation of outlets, conduit and equipment. Record final dimensioned locations of switchboards, panelboards, transformers, disconnect switches, etc. Make sufficient measurements to locate all underground conduit.

C. At the completion of construction, the sepia drawings, sketches and mark-up prints shall be presented to the Owner and/or Engineer.

2.04 MAINTENANCE AND INSTRUCTION MANUALS: Submit to the Owner and/or Engineer, upon completion of the work, three (3) copies of maintenance and instruction manuals for equipment provided.

2.05 SUBMISSION OF DRAWINGS: Submission of Engineers drawings for shop drawings and unaltered Engineer's drawings for "As-Built" will not be acceptable.

PART 3 EXECUTION

3.01 COORDINATION

A. Conduit, outlets, equipment or lighting fixtures are located in any area, coordinate the space requirements with all trades. Such shall be arranged so that space conditions will allow all trades to install their work, and will also permit access for future maintenance and repair.

B. Conduit and equipment installed at variance with the above requirements shall be relocated and/or revised to conform with the above requirements without incurring additions to the Contract.

C. Coordination of space requirements with all trades shall be performed so that:

1. No piping or ductwork, other than electrical, shall be run within 42" of panelboards, switchboards or transformers.

2. No pipes or ducts that operate at a temperature in excess of 120 degrees F. shall be installed nearer than 3" to any electrical conductor.

3.02 PROTECTION OF MATERIALS

A. All conduit and other openings shall be kept protected to prevent entry of foreign matter. Fixtures, equipment, and apparatus shall be kept covered for protection against dirt, water, chemical or mechanical damage before and during construction.

B. The original finish, including shop coat of paint of fixtures, apparatus or equipment that has been damaged shall be restored without incurring additions to the Contract in time or price.

3.03 HOUSEKEEPING PADS: The contractor shall provide 4" minimum height concrete pad, integral with floor, under all floor mounted electrical equipment or apparatus.

3.04 CUTTING AND PATCHING: The Contractor is responsible for all cutting and patching, including escutcheon plates where necessary, whether or not such cutting and patching is shown or indicated.

3.05 ACCESS TO ELECTRICAL ITEMS: The contractor is responsible for maintaining access to all concealed electrical equipment, apparatus, or devices whether, or not, shown or indicated. Where access panels are required, refer to Owner or Engineer for approved means, methods and appearance.

3.06 ELECTRICAL ROOMS AND CLOSETS

A. Doors to electric rooms and closets shall open outward. If in conflict with Arch. drawings refer to Owner or Engineer for resolution.

B. Manufacturer's equipment shall not be larger than that dimensioned, or scaled, on plans. Conflicts shall be brought to the attention of the Owner, or Engineer for resolution prior to order.

C. Clear working space in electric rooms and closets shall be no less than that required by the N.E.C.

D. The contractor shall submit for review, prior to construction or purchase of any equipment, scaled drawings of electrical rooms, closets, or spaces showing, in detail, his planned installation locations of the equipment he intends to purchase. These shall clearly show compliance with A,B, and C above.

3.07 TESTS

A. Upon completion of the electrical work, conduct an operating test in the presence of the Engineer or his designated representative.

B. The installation shall be demonstrated to operate in accordance with the Contract Documents. Any material or workmanship which does not meet with the approval of the Engineer shall be removed, repaired or replaced as directed without incurring additions to the Contract in time or cost.

C. Furnish all instructions, tools and personnel required for the test. Have sufficient tools and personnel available to remove panel covers, coverplates, etc., as required for proper inspection. Provide suitable test equipment.

3.08 DEMONSTRATION AND INSTRUCTIONS: Present to the Owner and/or Engineer or his designated representative a physical demonstration and oral instructions for proper operation and maintenance of electrical equipment and systems installed.

3.09 GUARANTEE

A. All systems and components shall be provided with a one year guarantee from the time of final acceptance. The guarantee shall cover all materials and workmanship. During this guarantee period, all defects in materials and workmanship shall be corrected without incurring additions to the Contract. The correction shall include all required cutting, patching, repainting, or other work involved, including repair or restoration of any damaged sections or parts of the premises resulting from any fault included in the guarantee.

B. In addition to this general guarantee, present to the Owner and/or Engineer any other guarantees or warranties from equipment or system manufacturers. These supplemental guarantees or warranties shall not invalidate the general guarantee.

END OF SECTION

SECTION 16100 BASIC MATERIALS AND METHODS

PART 1 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section shall comply with the provisions of Section 16010.

B. This Section covers the basic electrical materials and installation methods that are applicable to Division 16.

PART 2 PRODUCTS

2.01 CONDUIT

A. Galvanized rigid steel conduit (GRC) shall be low carbon, hot-dipped galvanized and to meet UL Standards and shall have threaded joints.

B. Flexible metal conduit (FLX) shall be flexible steel conduit tubing and shall meet Underwriters Laboratories Standard for Flexible Steel Conduit.

C. Steel conduit approved manufacturers are Allied, Southwire, Triangle, Republic, Wheatland and Pittsburg.

2.02 CONDUIT FITTINGS

A. GRC conduit fittings shall be zinc-coated, ferrous metal and taper threaded type.

B. Conduit connections to switchboards, motor control centers, transformers, panels, cabinets, and pull boxes with specific grounding requirements, shall have grounding wedge lugs between the bushing and the box or locknuts designed to bite into the metal.

C. Each conduit end shall be provided with either an insulated throat connector or separate locknut and insulated bushing. Bushing shall be installed before any wire is pulled.

D. Conduit fittings approved manufacturers are Raco, Steel City, O.Z Gendy, Thomas & Betts, Efcor and Appleton.

2.03 CONDUCTORS: Conductors shall be copper of 98% conductivity, 600 volt insulation. Sizes specified are AWG gauge for No. 4/0 and smaller and circular mils (MCM) for all sizes larger than No. 4/0. Conductors No. 10 and smaller shall be solid or stranded and type "THHN" or THWN" insulation. No. 8 and larger shall be stranded and type "THHN" or "THWN" insulation.

2.04 OUTLETS

A. Outlet boxes and covers shall be of such form and dimensions as to be adapted to their specified usage, locations, size and quantity of conduit, and size and quantity of conductors entering the boxes. In special "Fire Rated" partitions, outlets shall comply with ASTM No. E119.

B. Flush ceiling outlets for surface or pendant mounted lighting fixtures shall be one-piece 4" square or octagonal pressed steel boxes. Boxes for devices in unfinished masonry walls or stud walls shall be pressed steel, square corner, sectional switch boxes, or shall be 4" square box with a square cornered tile wall cover, set flush with masonry construction.

Boxes in concrete ceiling slab shall be octagonal, shallow concrete boxes. Welded boxes are not acceptable. Steel boxes shall be used with all steel conduit and type AC or MC cable. Boxes used in conjunction with ENT shall conform with the foregoing except shall be made of a high heat-resistant plastic suitable for fixture support and shall be specifically designed for use with ENT.

C. All outlet boxes in plaster or masonry walls or ceiling shall be provided with plaster rings.

D. Junction boxes and all outlets not indicated as containing wiring devices or lighting fixtures shall have covers. Covers for outlets in walls shall be as specified for wall switches and receptacles.

E. Outlet boxes exposed to the weather and outlet boxes for vaportight lighting fixtures and devices shall be of cast corrosion resistant type.

F. Outlet box approved manufacturers are Appleton, Raco, Steel City or Crouse-Hinds.

2.05 DISCONNECT SWITCHES

A. Disconnect switches shall be "heavy-duty" type enclosed switches of quick-make, quick-break construction. Switches shall be horsepower rated for 600 volts AC as required. Lugs shall be UL listed for copper and aluminum cable.

B. Padlocking provisions shall be provided for padlocking in the "Off" position.

C. Switches shall be furnished in NEMA I General Purpose enclosure unless noted otherwise. Switches located on the exterior of the building or in "wet" locations shall have NEMA 3R enclosures.

D. Fused disconnect switches shall have rejection type fuse clips with dual element, current limiting fuses of rating shown.

2.06 FUSES

A. Provide all fuses. All fuses shall be of the same manufacturer. All fuses shall be of the high interrupting rating (200,000 Amps), current limiting type. Fuses shall be provided for each fuse cutout and the specified quantity of fuses shall be furnished for spares.

B. Circuits 0 to 600 ampere shall be protected by rejection type, current limiting type. All dual-element fuses shall have separate overload and short-circuit elements. Fuse shall incorporate element having a 284 degree F. melting point alloy and shall be independent of the short-circuit clearing chamber. The fuse must hold 500% of rated current for a minimum of 10 seconds and be listed by Underwriter's Laboratories, Inc., with an interrupting rating of 200,000 amperes RMS symmetrical. The fuses shall be UL Class RK-1.

C. Furnish and turn over to the Owner a minimum of one (1) set of spare fuses (set consisting of three fuses) for each type and rating of fuse used. When the number of fuse sets of the same type and rating actually installed exceeds five (5) sets, furnish an additional spare set of fuses for each five (5) or fraction thereof.

D. Provide a cabinet in which to store all spare fuses.

PART 3 EXECUTION

3.01 CONDUIT

A. Rigid steel shall be used for service entrance and all feeders and branch circuits where exposed to damage.

B. GRC shall be used for all underground feeders.

C. Conduit shall be continuous from outlet to outlet, from outlet to cabinet, junction box and pull box. Conduit shall enter and be secured to all boxes, etc., in such a manner that each system will be electrically continuous from service to all outlets. All conduit from cabinets and junction boxes shall terminate in approved outlet boxes or conduit fittings. Conduit connections to any box which has no threaded hub shall be double locknutted.

D. Provide junction boxes or pull boxes where shown and where necessary to avoid excessive runs or too many bends between outlets. The conduit sizes shown may be increased if desired to facilitate the pulling of cables.

E. All conduit shall be concealed unless indicated otherwise. Install exposed conduit parallel with or at right angles to the building walls and support from walls or ceilings at intervals required by Code with approved galvanized iron clamps or hangers. Concealed conduit above the ceiling shall be supported independent of ceiling construction. Where ceilings of lay-in type are used, conduit must be installed high enough to permit removal of ceiling panels and lighting fixtures. Use threaded rods and hangers consisting of double-nutted threaded rods and "Unistrut" channels or angles of 12 gauge minimum steel for supporting multiple conduit.

F. Minimum size conduit for branch circuits shall not be smaller than 1/2". Home runs shall extend from outlets shown to panel designated. Home runs shown shall not be combined. Home run conduit shall not be smaller than 3/4".

G. At couplings, conduit ends shall be threaded so that they meet in the coupling. Right and left hand couplings shall not be used.

H. Provide watertight conduit hubs on conduit terminating in a box or cabinet exposed to the weather.

3.02 FLEXIBLE CONDUIT:

A. PVC extruded cover flexible conduit shall be used in making short flexible connections to rotating or vibrating machinery or equipment. The flexible conduit at these locations shall be as short as possible, but shall have a minimum length of 12".

B. A green stranded bonding jumper shall be installed outside of all flexible conduit that extends directly from a non-flex conduit to a rotating or vibrating machine. Where a junction box is used, the green stranded bonding jumper shall be installed inside the flexible conduit and attached to the junction box and to the machine. When the bonding jumper is installed outside of the flexible conduit, plastic wire straps shall be used 6" o.c. to secure the jumper to the flexible conduit.

3.03 WIRING

A. All conductors shall be installed in conduit. No conductors shall be pulled into the conduit until the conduit system is complete.

B. Conductors shall be continuous from outlet to outlet and from outlet to junction box or pull box. All splices and joints shall be carefully and securely made to be mechanically and electrically solid with pressure type connectors. Where connection is made to any terminals of more than 30 amperes capacity and where conductors larger than No. 10 AWG are connected to any terminal, copper terminal lugs shall be bolted to the conductors. Where multiple connections are made to the same terminal, individual lugs for each conductor shall be used.

C. Each conduit shall have a minimum of two (2) conductors pulled in unless that particular conduit is noted as being for systems other than electrical circuitry and/or future use or unless noted otherwise.

D. Conductors for lighting and receptacle circuits shall have color coded jackets. The wiring shall be color coded with the same color used with its respective phase throughout the entire job as follows:

E. The feeder and service entrance conductors shall be color coded by the use of colored plastic tape applied within 6" of each conductor end.

F. Branch circuit conductors shall not be smaller than No. 12 AWG and where the home run from center of load exceeds 100'-0", the conductors from home run outlet to panel shall be No. 10 AWG minimum.

G. Branch circuit wiring which supplies more than one fluorescent fixture through wireway of other fixtures shall be rated for use at 105 degrees C.

H. For branch circuits terminating in outlet without device, leave minimum of 12" of slack wire coiled for connection of equipment.

I. All conductors shall be identified with proper circuit numbers at terminals, junction boxes and at panelboards within 6" of conductor ends.

J. Stranded conductors, #10 and smaller, shall be terminated at screw type terminals with fork type insulated wire terminals applied with manufacturer's tool.

K. Conductor sizes are generally indicated in schedules and riser diagrams, otherwise follow rules of N.E.C.

3.04 GROUNDING

A. Ground connections shall be in accordance with the 2002 National Electrical Code.

B. Provide an insulated green bonding jumper from the grounding lug of all receptacles to a clip or a sheet metal screw in the outlet box. The ground wire installed behind the device mounting screws will not be acceptable.

3.05 CONNECTION TO EQUIPMENT: Equipment furnished by the Owner or under other Sections, such as mechanical, signs, kitchen equipment, etc., will be installed by others. Provide electrical service and make the electrical circuit connection to this equipment.

3.06 EQUIPMENT ANCHORING

A. All items of electrical equipment, such as switchboards, panelboards, etc., shall be securely anchored to the building structure. The anchoring shall be accomplished by utilizing a minimum size of 3/8" steel anchor bolts in the structure and to the item of equipment. A minimum of two (2) anchor bolts shall be provided on each side of each item of equipment with the following exceptions:

Exception No. 1: If the equipment manufacturer includes more than two (2) anchor holes per side in the base or base frame of the equipment item, then there shall be one anchor for each anchor hole.

Exception No. 2: If the equipment manufacturer recommends a particular quantity greater than two (2) per side, then that quantity of anchors shall be provided.

END OF SECTION

SECTION 16200 SERVICE AND DISTRIBUTION

PART 1 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section shall comply with the provisions of Section 16010.

B. Provide a complete electrical distribution system. The system shall include the secondary service entrance, feeders, panelboards, etc., to provide a complete system.

C. All distribution switchgear (branch circuit panelboards, etc.) shall be the unit responsibility of one manufacturer. All component parts of the above listed items shall be of the same manufacturer except where a written request for a deviation from this requirement has been approved prior to bid date.

D. Shop drawings for equipment specified in this Section shall show that all specified requirements have been incorporated.

E. All floor mounted distribution equipment shall be mounted on a 4" high concrete pad.

1.02 SECONDARY ELECTRICAL SERVICE

A. The secondary service to the building shall be 277/480 volts, 3 phase, 4 wire, 60 Hertz AC, as exists. Provide all conduit and wire as specified from the secondary terminals of the transformer to the main switchboard.

B. The contractor shall provide ground rods, ground cables, and ground wires, so as to provide a complete grounding system as per NEC 250.

C. Make all arrangements with the power company and pay all charges made by the power company for permanent electric service. Coordinate all termination points and requirements.

PART 2 PRODUCTS

2.01 BRANCH CIRCUIT PANELBOARDS

A. Panelboards (panels) shall be general purpose enclosures and shall be surface or flush mounted as indicated. Panels shall be of the automatic circuit breaker type, factory assembled by the manufacturer of the circuit breakers. Panels shall be for the voltage indicated with the quantity of poles and ampacity of circuit breakers shown.

B. Boxes and trim shall be made from code gauge steel. Boxes shall be of sufficient size to provide a minimum gutter space of 4" on all sides. Boxes shall be minimum 20" width and 5-3/4" depth.

C. Hinged door covering all device handles shall be included in all panel trim. Doors shall have flush-type cylinder lock and catch, except that doors over 48" in height shall have auxiliary fasteners at top and bottom of door in addition to flush-type cylinder lock and catch. Door hinges shall be concealed. All locks shall be keyed alike. Directory frame and card having a transparent cover shall be furnished with each panel door.

D. Trims for flush panels shall overlap the box by at least 3/4" all around. Surface trims shall have the same width and height as the box. Trims shall be mountable by a screwdriver without the need for special tools. After installation, trim mounting mechanism or hardware shall not be accessible when panel door is closed and locked.

E. All exterior and interior steel surfaces of the trim shall be cleaned and finished with gray paint over a rust-inhibiting phosphatized coating.

F. All interiors shall be completely factory assembled with protective devices, wire connectors, and shall be so designed that devices may be changed without machining, drilling or tapping.

G. Interiors shall be so designed that devices can be replaced without disturbing adjacent units and without removing the main bus connectors.

H. Bus bars for the mains shall be of tin plated aluminum sized in accordance with U.L. Standards. Full size bars shall be included. Bus bar taps for panels with single pole branches shall be arranged for sequence phasing of the branch circuit devices.

I. Phase bussing shall be full height without reduction. Cross and center connectors shall be of the same material as the bus.

J. The neutral bus shall utilize set-screws to bond the neutral wire to the neutral bus through holes drilled in the neutral bar. A sheet copper neutral bus utilizing flathead screws to hold the neutral wires will not be acceptable.

K. Spaces for future devices shall be included as indicated and shall be bussed for the maximum rated device that can be fitted into them.

L. All circuit breakers shall be manually operated, thermal-magnetic, automatic, of the ampacity and poles as indicated. They shall be quick-make, quick-break, both on manual and automatic operation. Breakers shall be over-the-center toggle operating type, with the handle going to a position between ON and OFF to indicate automatic tripping. All multi-pole breakers shall have internal common trip. Breakers shall have a minimum of 22,000 RMS symmetrical amperes interrupting capacity unless designated otherwise. The breakers furnished shall be determined by the specifications and by the minimum U.L. labeled RMS symmetrical amperes interrupting capacity at circuit voltage. All circuit breakers shall be bolted on and rigidly braced.

M. Panels having sub-feed lugs for feeding through shall have 8" minimum extra gutter space at the lug end and on one side.

N. Each panel as a complete unit shall have a short-circuit current rating equal to or greater than the equipment rating indicated.

O. Panels shall be as manufactured by Square D, Westinghouse, ITE/Siemens, or General Electric.

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide a typewritten directory under plastic for all panelboards with spares marked in pencil.

B. Provide all necessary hardware to level and secure the switchgear as required by the manufacturer's instructions. Make all electrical connections for supply and load circuits and leave in operating condition.

C. Clean enclosure of all switchgear of all foreign matter, including dust.

END OF SECTION

SECTION 16300 LIGHTING

PART 1 GENERAL

1.01 DESCRIPTION:

A. All work in this Section shall comply with the provisions of Section 16011.

B. Provide all lighting fixtures and lamps as specified herein and as shown.

C. All lamps shall be operating at the time of the final inspection.

D. Confirm exact locations of all lighting fixtures by coordination with the Architectural Reflected Ceiling Plans and mechanical equipment above or on the ceiling.

E. Confirm all ceiling types before ordering lighting fixtures.

F. Each lighting fixture shall have been tested and certified for proper operation by the fixture manufacture for the type mounting and ceiling on/in which it is installed.

G. Lamps and ballasts shall be compatible.

PART 2 PRODUCTS

2.01 LAMPS:

A. The type lamps shall be as specified with each lighting fixture and shall be suitable for use in the fixture for which it is specified.

1. The lamp catalog number is given as a standard of the quality and performance required. Equal lamps by General Electric, Sylvania or Phillips/Westinghouse will be acceptable. When a lamp manufacturer's name is used along with the catalog number in the lighting fixture schedule, it is considered unequaled by any other lamp and shall not be substituted. The lamp performance with energy conserving ballasts furnished under this Section shall be certified by a nationally recognized independent testing laboratory.

2. Energy conserving and standard (non-energy conserving) fluorescent lamps shall be by the same manufacturer.

B. Fluorescent Lamps:

1. Fluorescent lamps shall be as specified in Lighting Fixture Schedule, or 3500 K.

2. Floor lamps shall be listed by manufacturer as suitable for use on the ballasts intended for use.

C. Incandescent Lamps:

1. "A" type lamps shall be inside frosted, except where specified to be clear.

2. "R" and "PAR" type lamps shall have the beam type (spot or flood) as specified in the lighting fixture schedule.

3. Quartz tubes shall be frosted.

4. All incandescent lamps, except quartz tubes, shall be rated for 120 volt operation.

5. Incandescent lamps shall be as specified in Lighting Fixture Schedule.

D. High Intensity Discharge (HID) lamps shall be the voltage and type specified in the lighting fixture schedule.

2.02 BALLASTS:

A. Provide ballasts of the proper voltage rating to match the circuit voltage from which the units are supplied.

B. Fluorescent ballasts shall be the high power factor type, Class "A" sound rating, non-PCB, CBM certified and shall have an automatic resetting thermostat to provide Class P ballast protection.

C. Energy conserving fluorescent ballasts shall be CBM certified for full light output. Energy conserving rapid start lamp ballasts shall have an average input wattage of 86 watts when operating two (2) F40T12 rapid start fluorescent lamps in ambient of 77 F. Energy conserving ballasts shall be CBM certified for operation of standard fluorescent lamps as well as energy conserving lamps specified herein.

D. Ballasts for High Intensity Discharge (HID) lamps shall be Constant Wattage Autotransformer (CWA) type or equal type with 90% minimum power factor.

E. Ballast for Octron or other T-8 lamps shall be electronic ballast as manufactured by Howard Industries, Advance or equal.

2.03 DIFFUSERS:

A. Unless specified otherwise, all prismatic diffusers for fluorescent lighting fixtures shall be prismatic acrylic with a thickness of 0.125", measured from the back side to the peak of the prism.

B. All wraparound lenses shall be virgin acrylic, one-piece and injection molded.

2.04 LIGHTING FIXTURE TRIM:

A. Each recessed lighting fixture shall have a trim to match the type of ceiling (plaster, exposed grid, concealed spline, exposed panel, etc.) in which it is being installed, regardless of catalog number given.

B. Each lighting fixture recessed in a plastered ceiling of any type shall have a plaster frame.

2.05 LIGHT FIXTURE TYPES:

A. Most lighting outlets are lettered or groups of outlets are indicated by a letter.

B. Each lighting fixture shall have a manufacturer's label affixed and shall comply with the requirements of all authorities having jurisdiction.

C. The lighting fixtures that are indicated by the letters shall be as indicated on the Lighting Fixture Schedule.

2.06 RECESSED INCANDESCENT FIXTURES: All recessed incandescent fixtures shall comply with Article 410-65, C of the N.E.C.

2.07 LIGHTING CONTROL:

A. Provide a Photo/Control system for exterior lighting. Photocontrol shall operate to energize the circuits whenever natural lighting falls below 25 footcandles.

B. The time control center shall be a 7-day calendar dial type. Time switch dial shall permit different on-off settings for each day of the week with provision for omitting selected days. The time center shall have capability of controlling three circuits:

Circuit A: Dusk (photocell/on - preset(time switch) off
Circuit B: Dusk (photocell) on - dawn (photocell) off
Circuit C: Preset (time switch) on - preset (timeswitch) off.

The time control center shall be a Tork Model T-930L or approved equal.

C. Provide 30A multipole contactors as required to control exterior lighting.

D. Sequence of control for exterior lighting shall be as determined by the owner.

PART 3 EXECUTION

3.01 SUPPORT OF LIGHTING FIXTURES:

A. All lighting shall be supported from the building structure. The fixtures shall be supported in a manner that will insure the fixture weight being equally distributed from each support and the fixture remaining in a level position.

B. Fluorescent fixtures installed recessed in a suspended ceiling system shall be supported form the building structure with two (2) 12 gauge wires on diagonal corners of the fixture. In addition, the fixture shall be clipped to members of the ceiling suspension system.

C. Fluorescent fixtures installed in or on any ceiling other than a suspended ceiling system specifically mentioned above shall be supported with concealed steel rods. Rods shall be 1/4" diameter minimum and shall be located where recommended by the fixture manufacturer. Provide a minimum of two (2) supports for each 4' or 8' fixture chassis. Supports shall be maximum of 48" centers. For incandescent fixtures, steel hanging wire may be used by attaching the wire to the fixture mounting frame.

D. Pendant mounted incandescent fixtures shall be stem supported by a fixture stud mounted in the outlet box. Suspended fluorescent fixtures shall have mounting stems located as per the manufacturer's recommendations, but in no case shall have less than two (2) stems per chassis.

3.02 AIMING OF ADJUSTABLE LIGHT FIXTURES: All fixtures with lamp position, tilt, shutters, rotation, or other types of adjustment shall be rough adjusted at the time of installation. The Engineer or his representative will determine the final inspection. Fixtures serving areas where daylighting is predominant will be adjusted after sunset.

3.03 LIGHTING FIXTURES IN MILLWORK, IF AND WHERE REQUIRED:

A. Special attention shall be given to lighting fixtures indicated to be mounted within, under, on or otherwise incorporated into millwork or cabinetry.

B. Refer to the Architectural drawings and details for specific dimensions. This coordination shall occur prior to ordering fixtures to assure fixtures will fit the space limitations of the millwork.

C. This requirement is intended to preclude incurring additions to the Contract due to fixtures being too small or too large for the space.

END OF SECTION

SECTION 16420 EMERGENCY ELECTRICAL GENERATING SYSTEM

PART 1 GENERAL

1.01 RELATED DOCUMENTS: The General and Supplementary Conditions, and General Requirements (Division 1), apply to the work specified in this Section.

1.02 GENERAL:

A. The generator together with all required factory hardware, accessories, flexible fuel line(s), fuel "skid tank", muffler, exhaust line, solenoid(s), valves, pressure regulator(s), fuel strainer(s), battery, engine jacket heater, battery charger, remote alarm annunciator panel, etc. shall be provided and installed by the electrical contractor, under this Section.

1. The generator includes a combination engine-generator set, cooling fan, radiator, mounting rails, critical silencer output circuit breaker and all unit mount controls. The transfer switch is specified under another section.

2. The generator shall also include a factory constructed outdoor housing with vented doors, locks, etc.

B. Any additional non-factory related devices or accessories such as the anchor bolts, remote annunciator panel circuits, engine jacket heater circuits, battery charger circuits, ATS circuits, ground rod, ground rod clamp, grounding electrode conductor, etc. shall be provided and installed by the electrical contractor.

C. All conduit, wireways, wire, couplings, connectors, clamps, adapter or any other non-factory related electrical accessories shall be provided and installed by the electrical contractor.

1.03 SYSTEM DEFINITION:

A. This specification covers requirements for providing a factory built, prototype tested, production tested, field tested, complete and operable standby emergency electric generating system, including all devices and equipment specified herein, shown on the drawings, and/or as required for the service. Materials and equipment shall be new and current, delivered to the site completely wired, tested, and ready for installation. This system shall include the following:

1. Engine-generator set rated at 225 kW/281 kVA for the McComb District Office.

2. Engine-generator control console resiliently mounted on the generator set shall include complete engine start-stop control and monitoring system.

3. Starting battery with battery charger for the engine-generator set.

4. Mounted and loose accessories, control devices, and other equipment as specified herein and as shown on drawings.

5. Such other components, accessories, parts, tests, documents, and services, as needed to meet this specification.

B. SINGLE MANUFACTURER:

This equipment, including engine-generator sets shall be manufactured by Kohler or prior-approved equal. The emergency electric generating system described herein, including these components shall be factory built, factory tested, and shipped by this single source manufacturer, so there is one source of supply and responsibility for warranty, parts, and service. This manufacturer shall have a local representative who can provide factory trained servicemen, required stock of replacement parts, and technical assistance.

C. SAFETY STANDARD:

The electric generating system must meet all requirements of NFPA 110-1985 including design specifications, prototype test, one-step full-load pickup, and installation acceptance. The responsibility for performance to this specification includes the entire system and cannot be split up among individual suppliers of components comprising the system, but must be assumed solely by the supplier of the system. The manufacturer shall furnish complete system schematic wiring diagrams consisting of the engine-generator set and transfer switch as defined in this specification. All controls shall be the standard of the manufacturer, who is engaged in the manufacture of engine-generator sets, transfer switches, and accessories and has them available for sale on the open market. Control parts shall be identified by part numbers of this manufacturer and shall have second source listing where applicable. Control systems that are supplied by a sub-vendor or subcontractor of the vendor and not incorporated within the documentation drawings of the engine-generator manufacturer are not acceptable.

D. LITERATURE:

The manufacturer shall have printed literature and brochures describing the standard series specified (not a one of a kind fabrication). Unless specified otherwise herein, all performance and other information shall be as on the manufacturer's printed literature. Performance information shall be the result of test procedures in accordance with nationally recognized standards, plus such other procedures that are judged necessary by the manufacturer to insure maximum service reliability for emergency systems. A summary of this information shall be available upon request.

E. TESTING:

The intent of this specification is to provide equipment of proven reliability and compatibility. Three separate series of test shall be performed: Factory Prototype Model Tests, Factory Production Model Test, and Field Test.

1. Factory Prototype Model Tests: The electric generating system consisting of prime mover, generator, governor, coupling and all controls must have been tested as complete unit on representative engineering prototype model as required by NFPA 110-1985. The tests, being potentially damaging to the equipment tested, must not be performed on equipment to be sold, but on separate prototype modes as specified by NFPA 110-1985, paragraph 3-2.1 thru 3-2.1.2 and their accomplishments certified by means of documentation of the test accompanying submittal data. These tests shall have included:

    a. Maximum power level (maximum kW).
    b. Maximum motor starting capacity (maximum KVA) and voltage dip recovery within seven (7) cycles of applied load.
    c. Structural soundness (Short Circuit and Endurance Tests).

d. Torsiograph Analysis: The manufacturer of the engine-generator set shall verify that the engine-generator combination, as configured, is free from harmful torsional stresses. The analysis shall include correlation of empirical data from tests on a representative prototype unit. The empirical data must include spectrum analysis of the torsional transducer output within the critical speed range of the engine-generator set. Results of this analysis shall be made available on request. Calculations based on engine and generator separately are not acceptable.

e. Engine-generator liquid jacket cooling airflow.

f. Transient response and steady-state speed control and voltage regulation.

g. Generator temperature rise per NEMA-22.40.

h. Harmonic analysis and voltage waveform deviation per MIL-STD-f705B, method 601.4.

i. Three-phase/single phase, short-circuit test, depending on site, for mechanical and electrical strength. With system operating at rated volts, amps, power factor, and speed, the generator terminals must be short circuited ten times on all three phases for a duration of thirty seconds. Engine- generator set must build up and perform normally without manual interventions of any kind such as resetting of circuit breakers or other tripping devices when the short circuit is removed.

j. Failure mode test for voltage regulator. With engine-generator set operating at no load, rated speed and voltage, the AC sensing circuit to the regulator must be disconnected for a period of least one hour. The engine-generator set must be fully operative after the test, and without evidence of damage.

k. Endurance testing is required to detect and correct potential electrical and mechanical problems associated with typical operation.

2. Factory Production Model Tests: Before shipment of the equipment, the engine-generator set shall be tested under rated load and power factor for performance and proper functioning of control and interfacing circuits. Testing at unity power factor only (resistance banks only) is not acceptable, since kW out-put is affected by the higher generator efficiency at unity power factor, and the KVAR for motor starting and regulation load varies with power factor. Tests shall include:

a. Single step load pickup per NFPA 110-1985, paragraph 5-13.2.6.

b. Transient and voltage dip responses and steady state voltage and speed (frequency) checks. Optional Production Model Tests: These tests can be performed for an extra charge. Tests shall include:

c. Fuel consumption (No load, 1/4. 1/2, 1/3, and Full load).

d. Generator temperature rise by resistance method. The Engineer shall have the option of witnessing these tests. A summary of these test results shall be available upon request.

3. FIELD TESTS AFTER INSTALLATION

a. The complete installation shall be initially started and checked out for operational compliance by factory-trained representative of the engine-generator set manufacturer. The engine lubrication oil and antifreeze, as recommended by the manufacturer for operation under environmental conditions specified, shall be provided and installed by the engine-generator set supplier.

b. Upon completion of initial start-up and system checkout, the supplier of the system shall perform a field test, with the Engineer notified in advance, to demonstrate load carrying capability and voltage and frequency stability.

c. With the emergency load at normal operating level, a power failure is initiated by opening all switches or breakers supplying the normal power to the building area. Records shall be maintained throughout the tests of the time-of-day, coolant temperature, cranking time until prime mover starts and runs, time required to come up to operating speed, voltage and frequency overshoot, time required to achieve steady-state condition with all switches transferred to the emergency position, voltage, frequency, current, oil pressure, ambient air temperature, kilowatts, power factor, battery charger rate at 5 minute intervals for the first 15 minutes, and at 15 minute intervals thereafter. Continue this load test for 4 hours observing and recording load changes and the resultant effect of voltage and frequency. Return normal power, record the time of delay on retransfer for each switch (set for 15 minutes minimum) and the time delay on prime mover cool down period and shutdown. Upon completion of the above test, allow the prime mover to cool for 5 minutes.

d. Warranty (USA and Canada). The complete standby electric power system, including 1800 r/min engine-generator set equipped with set exerciser, and running time meter, shall be warranted for a period of five (5) years or fifteen hundred (1,500) operating hours, whichever occurs first, from the date of initial start-up. Multiple warranties for individual components (engine, generator, controls, etc.) will not be acceptable. Satisfactory warranty documents must be provided. This warranty shall be detailed in available written documents. In the judgement of the specifying authority, the manufacturer supplying the warranty for the complete system must have necessary financial strength and technical expertise with all components supplied to provide adequate warranty support.

e. Complete shop drawings, diagrams and details shall be prepared specifically for this project by Kohler or approved manufacturer, and submitted to the architect of record for distribution to the electrical engineer, general and electrical contractors. Standard and typical drawings will not be accepted.

PART 2 - EQUIPMENT

2.01 ENGINE-GENERATOR SET:

A. General: This system shall include one engine-generator set at McComb and as represented in the published specifications for that model. The set shall be rated for 230kw/288kva at 0.8PF, 60Hz. and shall be 3 phase, 4 wire, 2277/480 volts on a continuous standby basis. Each engine - generator set shall be mounted on a heavy duty steel base to maintain proper alignment between components, and each set shall incorporate vibration isolators of the type and quantity as specified by the set manufacturer.

B. Engine: Engine shall be stationary, liquid-cooled, spark ignited for fuel as specified. Engine shall be capable of driving the generator of this rating on a continuous standby basis for the duration of normal source interruptions per SAE J1349 conditions. The electrical contractor shall be responsible for field coordinating the provision and installation of gas pipe size, length, pressure requirements and point of termination.

C. Engine components shall include the following:

1. A 12 volt DC, solenoid shift, electric starter(s) as required by manufacturer.

2. Positive displacement, mechanical full pressures lubrication oil pump, full flow lubrication oil filter with replaceable element, pressure relief valve, dipstick oil level indicator.

3. Dry element air cleaner with replaceable element.

4. Engine speed isochronous governing system to control generator frequency +/- 0.25% of rated frequency under steady state load conditions, and capable of parallel operation with load sharing controls. Where electronic governing systems are factory installed as standard equipment, and without additional cost, the mechanical governing system shall not be required.

5. Engine mounted thermostatically controlled water jacket heater to aid in quick starting. Heater shall be rated single-phase, 1500 watts and be disconnected whenever the engine starts. Contractor shall provide proper circuit from normal utility power source.

6. Engine protection devices shall have sensing elements located on the engine to initiate the following alarms and engine shutdowns:

   o Low lubrication oil pressure shutdown with indicator
   o High coolant temperature shutdown with indicator
   o Overspeed shutdown with indicator
   o Overcrank lockout with indicator

7. Provide low coolant shutdown, which shall activate high engine temperature lamp and shutdown.

8. Engine starter battery charging alternator, with solid-state voltage regulator.

D. ENGINE COOLING SYSTEM

1. Engine shall be radiator cooled by engine mounted radiator system including belt-driven pusher fan, coolant pump, and thermostat temperature control. Performance of components shall be as required by the manufacturer.

2. The generator equipment supplier shall provide and install 50% ethylene glycol antifreeze solution to fill engine-cooling system at start-up.

E. ENGINE EXHAUST SYSTEM

1. Exhaust muffler shall be provided for each engine of size(s) as recommended by manufacturer. Muffler shall be of the critical type, mounted per manufacturer recommendations.

2. Flexible exhaust connection shall be provided as required for connection between engine exhaust manifold and exhaust line, in compliance with applicable codes and regulations.

3. All exhaust system components shall be properly sized to assure proper operation without excessive back-pressure when installed. Make provisions as required for pipe expansion and contraction.

F. ENGINE FUEL SYSTEM

1. The fuel system shall be diesel fuel.
2. A “day tank” fuel tank shall be constructed and mounted within the generator skid structure.

G. GENERATOR:

1. Generator shall be single-bearing, self-aligning, four-pole, synchronous type, revolving field, with amortisseur windings, with direct drive centrifugal blower for proper cooling and minimum noise, with temperature compensated solid-state voltage regulator, with brushless rotating rectifier exciter system. No brushes will be allowed. Generator shall be directly connected to engine flywheel housing and driven through a flexible coupling to insure permanent alignment; gear driven generators are not acceptable under this specification. Insulation shall meet NEMA standards for Class F type. The maximum temperature rise shall not exceed 100 degrees C at 40 degree C ambient. Generator design shall prevent potentially damaging shaft currents.

2. The three-phase, broad range, re-connectable generator shall have 12 leads brought out to allow connection by user to obtain any of the available voltages for the unit.

3. Voltage regulator shall be solid-state design and shall function by controlling the exciter magnetic field between stator and rotor to provide no load to full load regulation of rated voltage within +/- 2% during steady-state conditions. The engine-generator set and regulator must sustain at least 90% of no load voltage for ten (10) seconds with 250% of rated load at near zero power factor connected to its terminals. A rheostat shall provide a minimum of + 5% voltage adjustment from rated value.

4. The generator, exciter, and voltage regulator shall be designed and manufactured by the engine- generator set manufacturer so that the characteristics shall be matched to the torque curve of the prime mover. This design allows the prime mover to use its fullest power producing capacity (without exceeding it or over compensating) at speeds lower than rated, to provide the fasted possible system recovery from transient speed dips.

5. Exciter shall be three-phase, full-wave, rectified, with heavy-duty silicon diodes mounted on the common rotor shaft and sized for maximum motor starting loads.

6. Generator design shall be of the self-protecting type, as demonstrated by the prototype short-circuit test as described under "Testing" herein. All other generator performance criteria shall be equal to that of the specified equipment.

H. ENGINE-GENERATOR SET CONTROLS

1. Provide a lighted, unit mounted control module that is factory built, wired, tested, and mounted by the generator manufacturer.

2. Engine-generator set control shall include the following:

   a. Gauges and meters: oil pressure gauge, coolant temperature gauge, charge rate voltmeter and running time meter.
   b. Manual selector switch: RUN-OFF/RESET-AUTO

3. Remote, two-wire controls start-up terminals.

4. Manual reset safeguard breaker.

5. Automatic engine shut down for the following fault conditions:

   a. Overcrank
   b. Overspeed
   c. Low oil pressure
   d. High engine temperature

6. Indicator lamps shall be provided to signal the following functions:

   a. SYSTEM READY - indicates system is in "AUTO" mode
   b. PRE LOW OIL PRESSURE - indicates oil pressure is marginally low
   c. PRE HIGH ENGINE TEMPERATURE - indicates engine temperature is marginally high
   d. LOW OIL PRESSURE - indicates engine has shutdown because of critically low oil pressure
   e. HIGH ENGINE TEMPERATURE - indicates engine has shut down because of critically high temperature
   f. OVERSPEED - indicates engine has shut down because of excessive r/min
   g. OVERCRANK - indicates the starter has been locked out because cranking time was excessive
   h. LOW ENGINE TEMPERATURE - indicates engine temperature is marginally low for starting
   i. GENERATOR NOT IN AUTO - indicates control switch is not in the "AUTOMATIC" position.
   j. Provide two additional fault condition lamps to be designated later.

7. A fault-reset switch shall be provided to clear fault indications and allow restarting of the engine after shut down faults. The control design shall be such that the fault indication shall remain until reset. The fault indicator memory shall not be dependent on the presence of either A-C or D-C voltage and shall retain the fault status memory even through complete removal and replacement of the starting batteries. The fault-reset function shall operate only when the RUN-STOP- REMOTE switch is in the STOP position.

8. A locking screwdriver type potentiometer shall be provided to adjust the voltage + 5% from rated value.

9. Manual reset exciter field circuit breaker.

10. A locking screwdriver type potentiometer (electronic governor) shall be provided to adjust the speed + 2% from rated value.

11. AC voltmeter, 90 degree scale, 2-1/2" (61.25mm) flange, 2% switchboard meter.

12. AC ammeter, 90 degree scale, 2-1/2" (61.25mm) flange, 2% switchboard meter.

13. Frequency meter 45-65 Hz., 90 degree scale, 2-1/2" (61.25mm) flange, +0.6 Hz panel meter.

14. Four position AC meters phase selector switch to read line current and voltage in each phase with off position.

I. AUXILIARY EQUIPMENT:

1. Starting Battery: One (1) battery shall be supplied for each engine and shall be mounted in a battery rack within the engine-generator set skidbase.

2. Battery Charger: A voltage regulated battery charger shall be provided for each engine- generator set. Chargers shall be equipped with float, taper, and equalize charge setting. The charger power shall be supplied from the normal source; contractor shall provide circuits as required.

3. Vibration Isolators: Each engine-generator set shall be mounted on vibration isolators either internal or external to the set skid base.

4. A 120 VAC heater with thermostat shall be provided within the engine-generator set control panel to eliminate condensation.
Electrical contractor shall provide 120 volt circuit from normal utility source as required for both the heater and battery charger.

5. Remote Alarm Annunciator: Provide remote alarm annunciator for engine-generator set with one light indicator as follows:

   a. generator fault

6. Electrical contractor shall provide control circuits to the remote alarm annunciator as shown on the plans.

END OF SECTION

SECTION 16430 AUTOMATIC LOAD TRANSFER SWITCH

PART 1 GENERAL

1.01 RELATED DOCUMENTS: The General and Supplementary Conditions, and General Requirements (Division 1), apply to the work specified in this Section.

1.02 GENERAL

A. The automatic transfer switch together with all required factory hardware, accessories, indicators, enclosures, lugs, controls, etc. shall be provided by the generator manufacturer, and installed by the electrical contractor, under this Section.

B. The automatic transfer switch includes NEMA-3R enclosure, solid state logic control board, all on supervisory relays, test switch, indicating LED's, override switch, timers, area protection panel, high speed operating mechanism, and time delay relays. The generator and remote annunciator is specified under another section.

C. Any additional non-factory related devices or accessories such as the mounting hardware, support channel, external cabinet conduit, boxes, connectors, couplings, interface wiring between the remote annunciator panel, generator control panel, line power circuits, internal wiring between accessory relays, etc... shall be provided and installed by the electrical contractor.

D. Electrical contractor shall include in his price, all labor and equipment rental necessary to completely install the automatic transfer switch as indicated on the plans.

E. All conduit, wireways, wire, couplings, connectors, clamps, adapter or any other non-factory related electrical accessories shall be provided and installed by the electrical contractor.

1.03 SYSTEM DEFINITION:

A. The transfer switch shall be designed, built, tested, furnished and warranted by the manufacturer of the standby, standby continuous or prime power generating equipment to ensure one source of responsibility and equipment compatibility. Transfer switch manufacturer shall have been regularly engaged in the production of U.L. (Underwriters Laboratory) Standard 1008 transfer switches. The transfer switch shall be documented, and have been offered for sale on the open market for a minimum of five (5) years. The manufacturer shall provide factory-trained parts and service support through a factory authorized distributor that is regularly doing business in the area of the installation.

B. The manufacturer shall supply literature containing diagrams, parts lists and descriptions sufficient for the owner's personnel, or subcontract supplier to install, operate and perform normal maintenance on the equipment.

C. The automatic transfer switch shall be as indicated on the plans.

PART 2 TESTING

2.01 TESTING:

A. To provide proven reliability of the system, transfer switch shall be completely tested as follows:

1. Representative production samples of the transfer switch supplied, shall be demonstrable, through tests, the ability to withstand at least 10,000 mechanical operating cycles. An operating cycle shall consist of one (1) electrically operated transfer from normal to emergency and back to normal.

2. Transfer switch supplied shall be U.L. Listed per Standard 1008. The minimum WCR (Withstand and Closing Ratings) shall meet the requirements of U.L. Standard 1008 and shall be obtained without contact welding. Where the line side overcurrent protection is provided by fuses at 600 volts AC or less, the short circuit rating shall match that value as indicated on the plans.

B. The RMS (Root Mean Square) symmetrical fault current ratings shall be verified by U.L. witnessed tests on representative test samples. All WCR test shall be performed with the overcurrent protective devices located external to the transfer switch. Test conducted with overcurrent protective devices internal to the transfer switch, in such a manner that the transfer switch interrupts the current rather than withstanding the current, are not acceptable under this definition of withstand.

C. Production Model Tests and Field Tests: Perform these tests as described under "Factory Production Model Tests" and "Field Tests After Installation" under the "GENERAL" section individual engine- generator set "Sample Guide Specifications". A manufacturer's representative shall conduct a complete system operational test at the job site for the Specifying Engineer and for the owners operating personnel.

PART 3 RATINGS

3.01 RATINGS: Transfer switches supplied shall be rated as noted on drawings for across the line starting with no load stepping for all classes of load, both inductive and non-inductive at 600 volts and 250 volts tungsten lamp loads. No load diversification shall be allowed. Transfer switch shall be 60 Hz with solid neutral. Refer to drawings for the location of transfer switch. Transfer switches shall be rated for continuous operation in ambient temperatures of -18 degrees C (0 degree F) to 55 degrees C (130 degrees F).

PART 4 PRODUCTS

4.01 CONSTRUCTION:

A. The electrical operating means shall be one (1) operating coils rated for continuous operation, and both mechanically and electrically interlocked to provide positive, electrically guided action from normal to standby position. Maximum transfer time in either direction shall be six (6) cycles. Transfer switch shall not contain any integral overcurrent devices in the main power circuit, including molded case circuit breakers or fuses.

B. The main switch contacts shall be double-break design, solid silver cadmium oxide to resist burning and pitting and for long life operation. Contact pressure shall be maintained by coil springs not subject to weakening or distortion as part of the current path. Switch shall have individual heat resistance contact chambers to prevent cross-arcing.

C. Transfer switch shall have one (1) S.P.D.T. (Single Pole Double Throw), rated 10A at 600 volts auxiliary switch on both the normal and emergency sides, operated by the transfer switch. These auxiliary switches may be used to monitor transfer switch position using indicator lamps or for controlling other peripheral equipment.

D. Provide auxiliary relay(s) controlled by the auxiliary switch, to provide additional contact(s) for control of additional peripheral equipment where shown on the drawings.

E. Complete AL-CU (Aluminum-Copper) lugs, U.L. Listed and CSA Certified, shall be provided for both normal and emergency load positions. Wiring space at normal, emergency, and load lugs inside the transfer switch cabinet shall comply with 1993 NEC Table 373-6(a). Full rated neutral bar with lugs for normal, emergency, and load neutral conductors shall be provided inside the cabinet.

F. Unless noted or specified otherwise, transfer switch shall be mounted in a separate welded steel NEMA-3R cabinet, with a keyed lock on the door and with knockouts for conduit entry.

4.02 CONTROLS:

A. Control items (other than meters, switches, and indicating lamps) shall be mounted inside of the cabinet to prevent access by unauthorized personnel, but located to facilitate servicing.

B. Control circuit disconnect plugs shall be provided to de-energize control circuits to avoid the hazards of electrical shock to personnel while making adjustments.

C. The control shall be a printed circuit board with relay sockets for control functions. The line side phase loss relays shall be conventional plug-in industrial control electro-mechanical relays. The generator side control relay shall be a voltage sensitive electro-mechanical relay with a pickup rating designed to ensure rated voltage is available before transfer is initiated. Time delay features shall be implemented by adding plug-in solid-state timing relays to the pre-wired printed circuit board sockets and removing terminal strip jumper wires.

D. Under-voltage line side sensing shall be (3) phase, plug-in type adjustable solid-state close differential voltage sensitive relays to pre-wired printed circuit board sockets. Pickup and dropout point adjustments shall be:

E. Three phase - pickup 78% to 111% - dropout fixed at 8% below selected pick-up point.

F. Controls shall signal the engine-generator set to start upon a signal from the normal source voltage sensor(s).
An instantaneous pick-up relay shall be provided to force the generator to enter the emergency start-up cycle without delay.

G. After the normal voltage sensor(s) have locked into an emergency cycle, the load shall be transferred after the engine-generator set reaches approximately 90% of proper voltage. A solid-state time delay transfer relay shall be provided, adjustable from 0.3 to 30 seconds (factory set at 2 seconds), shall allow the engine-generator set to stabilize before application of the load.

H. A solid-state time delay retransfer, adjustable from 2 to 30 minutes (factory set at 15 minutes), shall allow normal power to stabilize before retransfer and allow H.I.D.'s to recover before quartz lighting is disconnected. Subsequent losses of utility power after an initial failure shall recycle the time delay stop of both the A.T.S. and generator for additional 15 minute periods until utility power is completely restored.

I. The operating power for transfer and retransfer shall be obtained from the source to which the load is being transferred. Controls shall provide an automatic transfer of the load from the emergency to the normal source if the emergency source fails when the normal source is available.

J. Selector and Test switches shall be provided inside the cabinet to provide the following positions and functions:

1. Selector Switch: STOP - Momentary position, stops operation of the transfer switch.

2. Test Switch: TEST - Simulates a normal power loss to control unit for testing of an engine-generator set, including transfer of load.

K. Where shown on the drawings or specified herein, the transfer switch shall be equipped with indicator lamps as follows:

Indicator lamps shall be provided to indicate "NORMAL" and "EMERGENCY" transfer switch positions.

L. Transfer switch shall have an Exerciser Clock to set day-of-week (one week dial minimum), time-of-day, and duration-of-time of engine-generator set(s) exercise period. A selector switch shall be included and set to "Simulate Power Failure" or "Test Engine Only".

END OF SECTION

SECTION 16552 LIGHTED DISPLAY SHELVING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES: Lighted display shelving including supports, brackets, shelving, lighting, and accessories for adjustable lighted display shelves as described in this Section.

A. The size and extent of display shelves is indicated on the Drawings.

1.02 RELATED SECTIONS: Section 08800 – Glazing and Division 16 – Electrical.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for each material and component, including data substantiating materials comply with requirements.

B. Shop Drawings: Submit for each type of lighted display shelving. Include sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcement, accessories, and installation details related to adjacent construction. Layout scale shall be at 3/4” = 1’-0” and detail scale shall be 3” = 1’-0”.

C. Submit installer’s qualifications and experience record.

D. Certification: Submit manufacturer's certification that all materials furnished for Project complies with requirements specified herein.

1.04 QUALITY ASSURANCE: Installer / Sub-Contractor shall have a minimum of 5 years experience in the installation of products specified in this Section and shall have completed Projects of similar size and scope of the Work of this Project.

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 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 equal to Sirius M. System products as manufactured by Con-Tech Lighting, 3865 Commercial Avenue, Northbrook, IL, 60062.

B. Substitutions shall fully comply with specified requirements and Section 01630-Product Options and Substitution Procedures

2.02 PRODUCTS

A. Vertical Supports: MST 1000-C (length as indicated on Drawings).

B. Light Fixtures: MSL635DS-C with MR8 lamp.

C. Shelf Brackets: MS803-C.

D. Transformer: Manufacture's standard for lighting loads applied.

E. Manufacturer's standard receivers, brackets, connectors, and accessories as required for a complete system as indicated on Drawings.

F. Glass shelves: 1/2 inch tempered glass. Refer to Section 08800 – Glazing.

PART 3 EXECUTION

1.01 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.

1.02 INSTALLATION: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations.

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.

B. Anchor work securely in place in configuration as indicated on Drawings.

C. Coordinate component parts with grounds, trim, and accessories. Join all parts with neat, precision fit.

1.03 ADJUSTING AND CLEANING

A. Verify accessories required for units are properly installed and operating units are adjusted and properly functioning.

B. Clean exposed metal and glass surfaces in accordance with manufacturer's instructions.

C. Protect installed Work from damage.

END OF SECTION

SECTION 16640 SECURITY SYSTEMS

PART 1 GENERAL

1.01 GENERAL:

A. Install as hereafter specified and as shown on the plans a complete and operating Access Control System. All components required for a complete operating system shall be furnished and installed.

B. The system shall be installed in conduit, and shall be connected and checked out by professional technicians, thoroughly familiar with the equipment being installed. Cables exposed to weather shall be encased in Sealtite or equal.

C. The Access Control System shall be a proprietary, state of the art system capable of integrating with the CCTV security control system and future Integrated Security Management and Monitoring System..

D. Contractor shall closely coordinate and schedule any existing equipment down time with the Owner. This may require late night or weekend work hours at no extra cost to the project..

E. New equipment shall be provided and installed at to accommodate direct integration with a future Integrated Security Management and Monitoring System.

1.02 Instructions:

A. Door controllers shall monitor a minimum of four (4) doors each and shall be located in Communications Rooms.

B. Card readers shall be provided as shown on the plans and shall be suitable for indoor/outdoor operation.

C. Request to exit devices shall be a momentary contact push button mounted on a single gang stainless steel plate or a plate as accepted by Architect.

D. Devices, raceways, junction boxes and wiring installation shall be coordinated and approved by Architect prior to beginning work. All wiring shall be concealed. All raceways shall be concealed or located to minimize objectionable visual impact in exposed areas.

E. Provide hardware wiring and connections to fire alarm system to release electric/magnetic door locks per code requirements.

F. Equipment rack(s) shall be sized as required to accommodate all headend equipment. Provide multi-outlet power strips as required.

G. All access controls and associated equipment shall be powered by emergency generator circuits.

H. Cable shall be suitable for the application. Cable shall be as manufactured by Belden. Cables manufactured by West Penn or Atlas shall be considered equal. Provide appropriate connectors as required. All cables are to be permanently marked at both ends. Identify cable markings on shop drawings and record drawings.

I. The contractor shall provide a one-year guarantee of the installed system against defects in material and workmanship. All labor and materials shall be provided at no expense to the Owner. Guarantee period shall begin on the date of acceptance by Owner.

J. The Contractor shall furnish a minimum of four hours of in-service training with the system. Operating manuals and user guides shall be provided at the time of the training.

K. The Contractor shall furnish manufacturer's manuals of the completed system including individual specifications sheets, inter-panel and intra-panel wiring diagrams. In addition, all information necessary for operation and proper maintenance of the system must be included.

L. Check-out and final connections shall be made by a factory trained technician in the employ of a manufacturer of the products installed. In addition, factory trained technicians shall demonstrate operation of the complete system and each major component to the Owner.

M. System Components shall be the following:

Quantity	Manufacturer	Cat. No.	Description
2	Advantor	AAM4-A	4 Door Controller
1	Advantor	RMOD-A	8 Point Relay Module
8	HID	Thinline II	Proximity Card Readers
8	Securitron	PB2E	Egress Button
1	Securitron	PB3ER	Push Button @ Reception Desk
6	Securitron	SAM	Shear Aligning Magnetic Locks
8	Securitron	B-24-4	24VDC Battery Pack
8	Securitron	BPS-24-4	24VDC 4 Amp Power Supply
2	Yuasa	12-18	18 A.H. Batteries
2	Securitron	MUNL-24	Mortise Unlatch for 24VDC Locks
6	Securitron	XMS	Exit Motion Sensor
As Required	West Penn	Cable	As Recommended by Manufacturer
As Required	Data Code	Pre Numbered	Proximity Cards

Other acceptable manufacturers shall be considered.

N. Doors at rooms 137 and 217 will get the following:

1-MUNL-24; 1-B-24-4; 1-BPS-24-2-4; 1-PB2E as well as cable (Verify with Architect).

Doors at rooms/exits 102,103,140B,148,149 & 151will get the following:

1-SAM; 1-B-24-4; 1-BPS-24-4; 1-XMS; 1-PB2E as well as cable (Verify with Architect).

END OF SECTION

SECTION 16721 FIRE ALARM AND DETECTION SYSTEM

1.01 GENERAL: Shall be installed in conduit. Conduit and wiring though not shown shall be furnished and installed to accomplish the intent of the system as shown on the drawings by symbols and this specification.

1.02 INSTRUCTIONS:

A. Fire Alarm System shall consist of a zoned, non-coded, supervised, general alarm system with automatic and manual detectors.

B. Actuation of any initiation device shall cause the following actions:

1. Activate general alarms (audible & visual)
2. Activate associated zone indicators (audible & visual)
3. Turn off power to all air supply units.

C. The system shall have the capacity to transmit signal to Central Fire reporting station. Furnish all necessary hardware required to accomplish this function and coordinate installation including the proper polarity reversing relays, if required.

D. System wiring shall be Class B as defined by NFPA. Any system circuit wiring ground or open, or any system component failure shall cause all trouble signals to operate. System components shall be protected against transient over voltages.

E. Smoke detectors of required size and type shall be furnished and installed in each of the air handling duct systems in the following locations.

In the main supply duct on the downstream side of filters. The detectors shall be furnished with necessary NC and NO contacts as needed for Division 15 Contractor to use for air handling unit shut down. Wiring and connection requirements for air handling unit shut down to be the responsibility of the Division 15 Contractor. Each detector shall have a remote alarm and test station installed where directed by the Architect/Engineer or as shown on the drawings.

F. A photoelectric smoke detector shall be located as indicated on plans. Each detector shall be equipped with an integral 135 degree, heat sensing element. No radioactive material shall be used.

G. Manual stations shall be non-coded, dual action stations located as shown on drawings. Stations shall be red in color and fabricated of high impact Lexan.

H. Main terminal cabinet shall be equipped with a drill switch which, when activated, shall cause only the general alarm audible and visual signals to activate but not other general alarm functions shall be affected.

I. Main terminal cabinet shall have battery standby complete with metered charger. Batteries shall be maintenance free sealed type capable of operating system for 24 hours. Charger shall be rated for recovery of batteries from full discharge to full charge in 24 hours or less.

J. Main terminal cabinet shall contain proper devices and circuitry to cause the general alarm bells to sound for (5) minute and then silence. Other alarm functions will not be affected.

K. System components shall be as manufactured by Simplex or equal approved by Architect/Engineer.

END OF SECTION

SECTION 16920

MOTOR CONTROLS AND WIRING

PART 1 - GENERAL

1.01 SCOPE:

A. All work specified in this Section shall comply with the provisions of Section 16011.

B. All motors shall be provided under Division 15.

C. All motor starters shall be furnished under Division 16 for each motor except for package units which will be furnished with integral starters. Motor starters shall be installed either in a Motor Control Center or separately mounted adjacent to the motor served, as indicated on plans.

D. Motor power wiring is defined as those conductors between the energy source and the motor. This power wiring shall be terminated at the motor terminals.

E. All control wiring required for automatic starting and stopping of motors shall be provided under Division 15 unless specifically shown on the electrical drawings.

F. Power wiring shall be connected through all line voltage control devices such as firestats and thermostats provided by Division 15.

PART 2 - PRODUCTS

2.01 MOTOR STARTERS:

A. Starters for motors 1/3 horsepower or smaller shall be manual unless remote or automatic starting is required, in which case the starters shall be magnetic, full voltage, non-reversing, single-speed, unless otherwise indicated. All other starters shall be magnetic.

B. Each starter for a three-phase motor shall be furnished with three (3) overload relays sized for the full load running current of the motor actually provided. Provide an external "RESET" button or "HAND-OFF-AUTO" selector switch as scheduled with red "RUNNING" light. Provide a green pilot light to indicate motor "STOPPED." Each pilot light shall have a legend plate indicating reason for signal.

C. Each overload relay shall have a normally open alarm contact which will close only when actuated by an overload (not to be confused with N.O. or N.C. auxiliary contacts). These contacts shall be properly wired to their respective blue pilot light provided on the starter front cover and having a "TRIPPED" legend plate.

D. Individually mounted motor starters shall be in a NEMA Type 1 general purpose enclosure in unfinished areas and shall be flush mounted in all finished areas. Each starter shall have a laminated nameplate to indicate Division 15 unit number, function and circuit number. Starters installed outdoors shall be NEMA 3R.

E. All motor starters, push buttons and pilot lights shall be of the same manufacture as the switchboard and shall be Westinghouse, Square D, Cutler Hammer, or ITE/Siemens.

2.02 COMBINATION STARTERS:

A. Combination starters shall consist of a circuit breaker or fused switch and a motor starter mounted in a common NEMA Type 1 general purpose enclosure.

B. The motor starter components shall be as specified in paragraph 2.01 for motor starters.

C. The circuit breaker component shall be a minimum 22,000 RMS interrupting capacity and shall be as required in Section 16200.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Provide power wiring to and install all motor starters, unless integrally factory mounted on a piece of equipment.

B. Provide power wiring to all motors except packaged units that are prewired between the starter and motor.

C. Where line voltage control devices are mounted at, on or inside a unit, such as aquastats, firestat for single phase devices, etc., the power wiring to the unit shall be connected through such a control device.

D. On final inspection, it shall be demonstrated to the Architect or his representative that each overload relay control circuit is properly wired and functioning correctly by manually tripping each overload relay individually, one at a time. This inspection procedure shall not involve removing of any wiring or disconnecting any current carrying parts.

END OF SECTION