May 5, 2023

PROJECT MANUAL
FOR

ST. BERNARD PARISH PUBLIC LIBRARY

Judge Perez Drive
St. Bernard Parish, Louisiana

Parish Project No: SBPG/NPL
MBA Project No. 11884
ABM Project No. 201803

Mathes Brierre ARCHITECTS + ABM ARCHITECTS BEAZLEY MOLIERE
A JOINT VENTURE

201 St. Charles Avenue, Forty-First Floor
New Orleans, Louisiana 70170-4100

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ADVERTISEMENT FOR BIDS

ST. BERNARD PARISH GOVERNMENT
DEPARTMENT OF PUBLIC WORKS
STATE OF LOUISIANA
PROJECT NO. **SBPG/NPL**

Sealed Bids will be received until the hour of **2:00 p.m., on Tuesday, June 6, 2023** at the St. Bernard Parish Government Department of Public Works, 1125 E. St. Bernard Highway, Chalmette, Louisiana, and opened at 2:00 p.m., at which time they will be publicly read, for furnishing all supervision, labor, materials, equipment, etc., and performing all work necessary for:

St. Bernard Parish Government
ST. BERNARD PARISH PUBLIC LIBRARY
Judge Perez Drive
St. Bernard Parish, Louisiana
Project No: SBPG/NPL

To be a valid delivery, Sealed Bids must be delivered electronic by Central Bidding or by hand to St. Bernard Parish Government Department of Public Works, 1125 E. St Bernard Highway, Chalmette, Louisiana during the normal business hours of 8:30 a.m. to 4:30 p.m. Monday through Friday on or before **2:00 p.m., Tuesday, June 6, 2023.**

Sealed bids delivered to any other St. Bernard Parish Government location or other room number prior to the bid receipt deadline will not be considered.

This project consists of furnishing all supervision, labor, equipment, and materials necessary to construct the New Public Library for St. Bernard Parish, located at 3121 East Judge Perez Drive, Meraux Louisiana 70075

Each bid must be accompanied by a certified check, cashier's check or bid bond acceptable to the Owner in the amount equal to at least five percent (5%) of the total amount bid and payable without condition to the Owner as a guarantee that the bidder, if awarded the contract, will promptly execute a contract in accordance with all terms and conditions of the Contract Documents.

A Pre-Bid Conference will be held on **Tuesday May 23, 2023 at 10:00 am,** at the St. Bernard Parish Government Department of Public Works, 1125 E. St Bernard Highway, Chalmette, Louisiana. All bidders and sub-contractors are encouraged to attend.

The drawings and specifications are on file and open for inspection at the St. Bernard Parish Government Department of Public Works, 1125 E. St Bernard Highway, Chalmette, Louisiana Complete bid documents in pdf format may be obtained on the FTP site. To obtain the FTP site and password for electronic copy e-mail Tommy Grey at TGrey@mathesbrierre.com with Contractors license number and e-mail address for receiving addenda, Hard copies are not available.

Bids may also be viewed and submitted online at www.centralauctionhouse.com.

St. Bernard Parish Government is an Equal Opportunity Employer. St. Bernard Parish Government also encourages all small and minority-owned firms and women's business enterprises (DBE's, including MBE's, WBE's and SBE's) to apply.

/s/Hillary J. Nunez, Jr.
Hillary J. Nunez, Jr.
Director
Department of Public Works

Publication: May 5, 2023
May 12, 2023
May 19, 2023

INSTRUCTIONS TO BIDDERS

ST. BERNARD PARISH GOVERNMENT

DEFINITION OF TERMS

D.01.00 Definition of Terms whenever used in these General Conditions or in other Contract Documents, the following terms shall have the meanings indicated, and these shall be applicable to both the singular and plural thereof.

D.01.01 A.A.S.H.T.O. American Association of State Highway and Transportation Officials. When A.A.S.H.T.O. is referred to in these Specifications it takes the meaning of the specification for materials and methods of testing specified by this association and the specification stated is considered to be a part of the Specifications as if written herein in full.

D.01.02 A.C.I. American Concrete Institute. When A.C.I. is referred to in these Specifications it takes the meaning of the specification for materials and methods of testing specified by this institute and the specification stated is considered to be a part of the Specifications as if written herein in full.

D.01.03 Addenda Written or graphic instruments issued prior to the opening of bids which clarify, correct, modify or change the bidding or Contract Documents.

D.01.04 Advertisement - The written instrument issued by the Architect or Engineer at the request of the Owner used to notify the prospective bidder of the nature of the Work. It becomes part of the Contract Documents.

D.01.05 Agreement -The written agreement or contract between the Owner and the Contractor covering the Work to be performed and the price that the Owner will pay. Other documents, including the Proposal, Addenda, Specifications, Drawings, surety, insurance, etc., are made a part thereof.

D.01.06 Application for Payment -The form approved by the Owner which is to be used by the Contractor in requesting incremental (progress) payments and which is to include information required by the contract documents and an affidavit of the Contractor. The affidavit shall stipulate that progress payments theretofore received from the Owner on account of the Work have been applied by Contractor to discharge in full of all Contractor's obligations reflected in prior applications for payment.

D.01.07 A.S.T.M. American Society of Testing Materials. When A.S.T.M. is referred to in these Specifications it takes the meaning of the specification for materials and methods of testing specified by this society and the specification stated is considered to be a part of the Specifications as if written herein in full.

D.01.08 Bid -The Bid submitted by the Bidder to the Owner on the Bid Form properly signed setting forth the Work to be done and the price for which the Bidder agrees to perform the Work.

D.01.09 Bidder - One who submits a bid directly to the owner.

D.01.10 Bidding Documents – Includes the Advertisement for Bids, Instructions to Bidders, the Bid Form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

D.01.11 Bonds - Bid, performance and payment bonds and other instruments of security, furnished by the Contractor and his surety in accordance with the Contract Documents.

D.01.12 Change Order - A written order to the Contractor signed by the Owner authorizing an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time after execution of the Agreement.

D.01.13 Contract Documents The Agreement, Addenda, Change Orders, Contractor's Bid and any documentation accompanying or post-bid documentation when attached as an exhibit, the Bonds, these general conditions, the Advertisement for Bid, notice to the Contractor, all supplementary conditions, the Specifications, the Drawings, together with all Modifications issued after the execution of the Agreement.

D.01.14 Contract Price - The total monies payable to the Contractor under the Contract Documents.

D.01.15 Contract Time - The number of consecutive calendar days stated in the Agreement for the completion of the Work.

D.01.16 Contractor - The person, firm or corporation with whom the Owner has executed the Agreement.

D.01.17 Defective -An adjective when modifying the word Work refers to Work which is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents or does not meet the requirements of any inspection, test or approval referred to in the Contract Documents or has been damaged prior to the Architect or Engineer 's recommendation or acceptance.

D.01.18 Drawings -The Drawings and Drawings which show the character and scope of the Work to be performed and which have been prepared or approved by the Owner and are referred to in the Contract Documents.

D.01.19 Field Order - A written order issued by the Owner or his agent who clarifies or interprets the Contract Documents.

D.01.20 Modification (a) A written amendment of the Contract Documents signed by both parties, (b) A Change Order, (c) A written clarification or interpretation issued by the Owner or his agent. Modification may only be issued after execution of the Agreement.

D.01.21 Notice of Award The written or verbal notice by Owner either direct to or through Architect or Engineer to the apparent successful Bidder stating that upon compliance by the apparent successful Bidder with the conditions precedent enumerated therein or enumerated in the Bid documents, within the time specified, Owner will sign and deliver the Contract Documents.

D.01.22 Notice to Contractor - Instructions, written or oral given by Owner or Architect or Engineer to Contractor and deemed served if given to the Contractor's superintendent, foreman or mailed to Contractor at his last known place of business.

D.01.23 Notice to Proceed - A written notice given by the Owner direct to or through the Architect or Engineer fixing the date on which the Contract Time will commence to run and on which the Contractor shall start to perform his obligation under the Contract Documents.

D.01.24 Owner - The Parish of St. Bernard acting herein through it's duly constituted and authorized representatives.

D.01.25 Project Representative - The authorized representative of the Owner who is assigned to the Project or any parts thereof.

D.01.26 Project - The entire construction to be performed as provided in the Contract Documents.

D.01.27 Proposal - The Bid submitted by the Bidder to the Owner on the Bid form signed properly setting forth the Work to be done and the price for which the Bidder agrees to perform the Work.

D.01.28 Shop Drawings All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, Subcontractor, Manufacturer, Supplier or Distributor and which illustrate the equipment, material or some portion of the Work.

D.01.29 Specifications - All of the documents listed in the "Table of Contents" to include the Instructions to Bidders, General Specifications, the Special Provisions and the Technical Specifications.

D.01.30 Subcontractor - An individual, firm or corporation having a direct Contract with the Contractor or with any other Subcontractor for the performance of a part of the Project Work.

D.01.31 Substantial Completion -The date as certified by the Owner or his agent when the construction of the Project or a specified part thereof is sufficiently complete in accordance with the Contract Documents so that the Project or specified part can be utilized for the purposes for which it was intended.

D.01.32 Successful Bidder – Means the lowest, qualified, responsible, and responsive Bidder to whom Owner (on the basis of Owner's evaluation as hereinafter provided) proposes to make an award.

D.01.33 Superintendent -Contractor's site representative. The person on the site who is in full and complete charge of the Work.

D.01.34 Work - Any and all obligations, duties and responsibilities necessary to the successful completion of the Project assigned to or undertaken by the Contractor under the Contract Documents, usually including the furnishing of all labor, materials, equipment and other incidentals.

1. COPIES OF BIDDING DOCUMENTS

A. Complete sets of Bidding Documents in the number and for the sum stated in the Advertisement for Bids may be obtained as stated in the Advertisement for Bids.

B. Complete sets of Bidding Documents must be used in preparing Bids; neither Owner nor Architect or Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents by Bidders and their Sub-bidders.

C. Owner and Architect or Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

D. No Bidding Documents will be issued within seventy-two (72) hours of the time set for receiving bids.

2. QUALIFICATIONS OF BIDDERS

A. All Bidders on the project must meet the provision of Louisiana Bid Law which requires a current Louisiana Contractor's Licenses for submitting a Bid for this project.

1. Contractors or contracting firms submitting bids in the amount of $50,000 or more shall certify that they are licensed contractors under Chapter 24 of Title 37 ACT 49 OF 2017 which amended R.S. 37:2163 requiring a contractor to certify that he holds an active license by displaying his license number on the bid envelope. If the bid does not display the contractor's license number the bid shall be automatically rejected.

2. Contractors shall be licensed for the classification of **Building Construction** for this bid. Contractors must verify their license meets the license classification required to complete in whole the work specified in the contract documents for this bid.

3. Bids in the amount of $50,000 or more, not submitted in accordance with this requirement, shall be rejected and shall not be read. Additional information relative to licensing may be obtained from the Louisiana State Licensing Board for Contractors, Baton Rouge, Louisiana.

B. The Owner may make such investigations deemed necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is responsible and is properly qualified to carry out the obligations of the contract and complete the work contemplated therein. Any conditions placed on a submitted bid shall result in rejection of such bid.

C. The following reasons may be considered as being sufficient for the disqualification of a Bidder and the rejection of his Bid Proposal or Proposals; however, this list is not all inclusive:

1. More than one Bid received for the same Work from an individual, firm or partnership, corporation, or association under the same or different names will not be considered. Reasonable grounds for believing that any Bidder is interested in more than one Bid for the same work will cause the rejection of all such Bids in which the Bidder is interested.

2. If there are reasonable grounds for believing that collusion exists among the Bidders, the Bids of participants in such collusion will not be considered. Participants in such collusion will receive no recognition as Bidders for any future work until any such participant shall have been reinstated as a qualified Bidder.

3. Default or delinquency and failure to have completed on time any contract in force with the Owner at the time of Bid opening.

4. If the Bidder has withdrawn his Bid from consideration after the Bids were opened at a previous Bid opening under this same project.

5. For failing to pay, or satisfactorily settle, all bills due all persons furnishing labor, equipment and supplies on former contracts; or for being in arrears on existing contracts; or being in litigation with the St. Bernard Parish; or having defaulted on a previous contract.

6. If determined the bid submitted is based on any verbal instructions contrary to the Bid Documents and addenda.

7. If determined that all of the Contractors Sub-bidders or prospective Subcontractors are NOT duly licensed in accordance with law.

D. Should a Bidder be disqualified, a written notice will be given which contains specific language stating the proposed disqualification with all reasons therefore.

3. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

A. It is the responsibility of each Bidder, before submitting a Bid, to (a) examine the Contract Documents thoroughly; (b) visit the site to become familiar with local conditions that may in any manner affect cost, progress, performance or furnishing of the Work, (c) consider federal, state and local laws, ordinances, rules and regulations that may in any manner affect cost, progress, performance or furnishing of the Work; (d) study and carefully correlate Bidder's observations with the Contract Documents; and (e) notify the Architect or Engineer and Owner of all conflicts, errors or discrepancies in the Contract Documents requiring correction, clarification or interpretation.

B. Reference is made to the Supplementary Conditions for identification of any supplementary conditions identified if included in the contract documents.

C. Information and data reflected in the Contract Documents with respect to underground facilities at or contiguous to the site are based upon information and data furnished to Owner and Architect or Engineer by owners of such underground facilities or others, and Owner does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise.

D. The lands upon which the Work is to be performed, rights-of-way and servitudes for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by Owner, unless otherwise provided in the Contract Documents.

E. On request in advance, Owner will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the site to its former condition upon completion of such explorations.

F. The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Section, that without exception the Bid is premised upon performing and furnishing the Work required by the Contract Documents and such means, methods, techniques, sequences or procedures of construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions of performance and furnishing of the Work.

4. INTERPRETATIONS AND ADDENDA

A. No interpretation of the meaning of the plans, specifications or other pre-bid documents will be made to any bidder orally.

B. All questions about the meaning or intent of the Contract Documents are to be directed to Architect or Engineer. Interpretations or clarifications considered necessary by Architect or Engineer in response to such questions will be issued by Addenda transmitted by acceptable means in accordance with State bid laws to all parties recorded by as having received the Bidding Documents. Only answers to questions by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

C. Addenda may also be issued to modify the Bidding Documents as deemed advisable by Owner or Architect or Engineer.

D. No Addenda will be issued within seventy-two (72) hours of the advertised bid time, exclusive of Saturdays, Sundays, and legal holidays, without extending the bid period for at least seven (7), but not more than twenty-one (21) working days.

E. Each Bidder shall ascertain from the Owner prior to submitting his bid that he has received all addenda issued, and he shall acknowledge their receipt on the Bid Form.

F. The Owner shall have the right to extend the bid date by up to (30) thirty days without the requirement of re-advertising. Any such extension shall be made by addendum issued by the Architect or Engineer.

G. Copies of addenda will be made available for inspection wherever Bid Documents are on file for that purpose.

5. BID SECURITY

A. Each Bid must be accompanied by Bid Security made payable to Owner in an amount of five percent (5%) of the Bidder's maximum Bid price and in the form of a Bid Bond issued by a surety meeting the requirements of the General Conditions and these Instructions to Bidders. At the option of the bidder may be a cashier's check, certified check or a satisfactory Bid Bond attached to the Bid Form. No Bid will be considered unless it is so guaranteed. Bid Security (Bid Bond) must be signed by the representative of the company bidding and the representative authorized by the Power of Attorney. Cashier's check or certified check must be made payable to the order of the Owner. Cash deposits will not be accepted. The Owner reserves the right to cash or deposit the cashier's check or certified check.

B. The Bid Security of the apparent Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required Payment and Performance Bonds, whereupon the Bid Security will be returned. If the apparent Successful Bidder fails to execute and deliver the Agreement and furnish the required Bonds within ten (10) days of the Notice of Award, Owner may annul the Notice of Award, and the Bid Security of that Bidder will be forfeited. The Bid Security of any Bidder whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the forty-sixth (46th) day after the Bid Opening, whereupon Bid Security of such Bidders will be returned. Bid Security of other Bidders will be returned approximately seven (7) days after the Bid Opening. The Owner and the Bidder may mutually agree to extend the forty-five (45) calendar day’s period for holding the Bids and the Bid Security.

C. The Bid Bond shall be written by a surety or insurance company currently on the U.S. Department of Treasury Financial Management Service list of approved bonding companies, which is published annually in the Federal Register, or by a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A.M. Best's Key Rating Guide, to write individual bonds up to ten percent (10%) of policyholder's surplus as shown in the A.M. Best's Key Rating Guide. Company must have a registered agent in the State of Louisiana.

6. CONTRACT TIME

A. The number of consecutive calendar days within which the Work is to be completed (the Contract Time) is set forth in the Agreement.

7. LIQUIDATED DAMAGES

A. Provisions for liquidated damages are set forth in the Agreement.

8. BID FORM

A. The Bid Form shall be completed in ink or by typewritten. All blanks on the Bid Form must be completed. Bid Forms must be signed properly and shall not be photocopied after signatures and submitted for consideration as a responsible bid submission. Signatures, printed names and printed titles shall not be photocopied and submitted as a responsible bid. Bid forms shall be signed by the authorized individual in ink and shall not be photocopied. Illegible or ambiguous printed or typed names therein may constitute justification for rejection of the Bid.

B. Form and Style of Bids

1.) Bids shall be submitted on the Louisiana Uniform Public Work Bid Form provided by the Architect or Engineer.

2.) All blanks on the Bid Form shall be filled in manually in ink or typewritten.

3.) Bid sums shall be expressed in both words and figures, and in case of discrepancy between the two, the written words shall govern.

4.) Any interlineation, alteration or erasure must be initialed by the signer of the bid or his authorized representative.

5.) Bidders are cautioned to complete all alternates should such be required in the Bid Form. Failure to submit alternate prices will render the bid non-responsive and shall cause its rejection.

6.) Bidders are cautioned to complete all unit prices should such be required in the Bid Form. Unit prices represent a price proposal to do a specified quantity and quality of work. Unit prices are incorporated into the base bid or alternates, as indicated on the Unit Price Form, but are not the sole components thereof.

7.) Bidders are strongly cautioned to ensure that all blanks on the bid form are completely and accurately filled in.

8.) Bidder shall make no additional stipulations on the Bid Form nor qualify his bid in any other manner.

9.). The Bid must contain an acknowledgment of receipt of all Addenda(s).

C. The authority of the signature of the person submitting the bid shall be deemed sufficient and acceptable under any of the following conditions:

(a) A corporate resolution or a copy of the detailed record from the Secretary of State business filings page submitted with the bid package as required by R.S. 38:2212(B)(5).

(b) Pursuant to R.S. 38:2212(B)(5). Written evidence of the authority of the person signing the bid for public works shall be submitted at the time of bidding. The authority of the signature of the person submitting the bid shall be deemed sufficient and acceptable if any of the following conditions are met:

(i) The signature on the bid is that of any corporate officer listed on the most current annual report on file with the secretary of state, or the signature on the bid is that of any member of a partnership, limited liability company, limited liability partnership, or other legal entity listed in the most current business records on file with the secretary of state.

(ii) The signature on the bid is that of an authorized representative as documented by the legal entity certifying the authority of the person.

(iii) The legal entity has filed in the appropriate records of the secretary of state of this state, an affidavit, resolution, or other acknowledged or authentic document indicating the names of all parties authorized to submit bids for public contracts. Such document on file with the secretary of state shall remain in effect and shall be binding upon the principal until specifically rescinded and canceled from the records of the office.

D. On any bid in excess of fifty thousand dollars ($50,000.00), the Contractor shall certify that he is licensed under La. R.S. 37: 2150-2173 and show his license number on the bid above his signature or his duly authorized representative.

E. The address of the bidder must be shown on the Bid Form.

9. SUBMISSION OF BIDS

A. Bids shall be submitted at or before the time and at the place indicated in the Advertisement for Bids. Any Bids received after the stated time will not be accepted under any circumstances. All envelopes containing the Bids must be sealed and marked on the exterior with the following:

- Louisiana Contractor's License Number
- "ST. BERNARD PARISH DEPARTMENT OF PUBLIC WORKS"
- Bidder's Name
- Return Address
- Project Name.

To be a valid delivery, Sealed Bids must be delivered electronic by Central Bidding or by hand to St. Bernard Parish Government Department of Public Works, 1125 East St. Bernard Highway, Chalmette, Louisiana during the normal business hours of 8:30 a.m. to 4:30 p.m. Monday through Friday on or before the time specified in the Advertisement for Bid.

B. Bid Proposals shall be received from Bidders only on the Bid Form in the Bidding Documents.

C. The price quoted for the Work shall be stated in figures and in writing on the Louisiana Uniform Public Work Bid Form and only in figures on the Louisiana Uniform Public Work Unit Price Form. The price in the Bid shall include all costs necessary for the complete performance of the Work in full conformity with the conditions of the Contract Documents, and shall include all applicable Federal, State, Parish, Municipal or other taxes. The price bid for the items listed on the Bid Form will include the cost of all related items not listed, but which are normally required to do the type of Work bid.

D. Bidders shall not attach any conditions or provisions to the Proposal.

E. The Contractor shall include in the Bid the cost of furnishing a Performance and Payment Bonds.

10. MODIFICATION AND WITHDRAWAL OF BIDS

A. Bid may not be modified, withdrawn or canceled by the Bidder during the time the Advertisement for Bids, for the period following the time and bid date designated for the receipt of bids, and Bidder so agrees in submitting his bid, except in accordance with R.S. 38:2214 which states, in part, "Bids containing patently obvious mechanical, clerical or mathematical errors may be withdrawn by the Contractor if clear and convincing sworn, written evidence of such errors is furnished to the public entity within forty eight (48) hours of the Bid Opening excluding Saturdays, Sundays and legal holidays". And the bid security will be returned.

B. Prior to the time and date designated for receipt of bids, bids submitted early may be modified or withdrawn only by notice to the party receiving bids at the place and prior to the time designated for receipt of bids.

C. Withdrawn bids may be resubmitted up to the time designated for the receipt of bids provided that they are then fully in conformance with these Instructions to Bidders.

D. Bid Security shall be in an amount sufficient for the bid as modified or resubmitted.

11. OPENING OF BIDS

A. Bids will be opened publicly.

B. Bids will be read aloud, and an abstract of the amount of the Base Bids will be made available to the Bidders after the opening of the Bids.

C The estimate of probable construction costs by announcing aloud the estimate at the bid opening.

12. REJECTION OF BIDS

A. R.S. 38:2214(B) provides that the public entity may reject for just cause any and all bids. including but not limited to:

1.) The public entity's unavailability of funds sufficient for the construction of the proposed public work;

2.) The failure of any bidder to submit a bid within an established threshold of the preconstruction estimates for that public work, as part of the bid specifications;

3.) A substantial change by the public entity prior to the award in the scope or design of the proposed public work;

4.) A determination by the public entity not to build the proposed public work within twelve months of the date for the public opening and reading of bids; and

5.) The disqualification by the public entity of all bidders.

13. BIDS TO REMAIN OPEN

A. All bids shall remain open for forty-five (45) calendar days after the day of the Bid opening, but Owner may, at its sole discretion, release any Bid and return the Bid Security prior to that date.

B. Extensions of time when Bids shall remain open beyond the forty-five (45) period may be made only by mutual agreement between the Owner, the apparent Successful Bidder and the surety for the apparent Successful Bidder.

14. POST BID INFORMATION SUBMITTALS

1. St. Bernard Parish Government Non-Collusion and Non-Solicitation Affidavit must be used and properly signed by the contractor and notarized by a licensed Notary Public having jurisdiction. Non-Collusion and Non-Solicitation Affidavit must be submitted to the Architect/Engineer within ten (10) calendar days of bid opening by the apparent low bidder. If the apparent low bidder does not submit the Non-Collusion and Non-Solicitation Affidavit as required by the bidding documents within ten (10) calendar days

of the bid opening, such bidder will be declared non-responsive and the bid will be awarded to the next lowest bidder and afford the next lowest bidder not less than ten (10) calendar days from the date the apparent low bidder is declared non-responsive, to submit the proper information/ documentation as required by the bidding documents, and may continue such process until the public identity either determines the low bidder or rejects all bids.

2. In accordance with La. R.S. 38:2227, La. R.S. 38:2212.10 and La. R.S. 23:1726(B) each bidder on this project must submit the completed Attestations Affidavit (Past Criminal Convictions of Bidders, Verification of Employees and Certification Regarding Unpaid Workers Compensation Insurance) form found within this bid package. The Attestations Affidavit form shall be submitted to the Owner within 10 calendar days after the opening of bids.

3. Should the Owner request additional information about the Bidder and proposed subcontractors, Bidder shall submit within ten (10) calendar days of Owner's request the specific additional information requested by the Owner to define in greater detail the Bidder's Bid Proposal for Owner's evaluation. Such information shall have the same legal significance as if submitted with the original Bid and, if the Bid is accepted, shall become legally binding on the Successful Bidder.

4. Schedule of Values and Proposed Project Schedule must be submitted to the Architect/Engineer within ten (10) calendar days of bid opening by the apparent low bidder. If the apparent low bidder does not submit the Schedule of Values and Proposed Project Schedule as required by the bidding documents within ten (10) calendar days of the bid opening, such bidder will be declared non-responsive and the bid will be awarded to the next lowest bidder and afford the next lowest bidder not less than ten (10) calendar days from the date the apparent low bidder is declared non-responsive, to submit the proper information/documentation as required by the bidding documents, and may continue such process until the public identity either determines the low bidder or rejects all bids.

5. A sworn affidavit must be must be submitted to the Architect/Engineer attesting to the bidder’s participation in a status verification system to ensure that all employees in the State of LA are legal citizens or legal aliens of the United States within ten (10) calendar days of bid opening by the apparent low bidder. If the apparent low bidder does not submit the E-Verification as required by the bidding documents within ten (10) calendar days of the bid opening, such bidder will be declared non-responsive and the bid will be awarded to the next lowest bidder and afford the next lowest bidder not less than ten (10) calendar days from the date the apparent low bidder is declared non-responsive, to submit the proper information/documentation as required by the bidding documents, and may continue such process until the public identity either determines the low bidder or rejects all bids.

   A Sample Affidavit for E Verification is included in the specifications.

15. AWARD OF CONTRACT (BASIS OF AWARD)

A. It is the intention of the Owner to award this contract to a Bidder competent to perform and complete the Work in a satisfactory manner and who proposes to employ

subcontractors, if any, competent to perform their portion of the Work in a satisfactory manner.

B. The Owner reserves the right to disregard all nonconforming, nonresponsive, unbalanced or conditional Bids. Bids which are unsigned or are not accompanied by the required Bid Security shall be irrevocably rejected. When one or more Bid is rejected, the reason therefore shall be given. Bids may be considered irregular and subject to rejection if they show serious omission, unauthorized alteration of form, unauthorized alternate bids, incomplete or unbalanced unit prices or irregularities of any kind. Also, Owner reserves the right to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified, possesses doubtful financial ability, or fails to meet any other pertinent standard or criteria established by Owner. Discrepancies between words and figures will be resolved in favor of words. Discrepancies in the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. If required, a Bidder shall furnish satisfactory evidence of his competence and ability to perform the Work stipulated in his Bid. Incompetence to properly perform the Work will constitute cause for rejection.

C. The Contractor will be required to establish to the satisfaction of the Owner the reliability and responsibility of the proposed Subcontractors to furnish and perform the work described in the sections of the Specifications pertaining to such proposed Subcontractor's respective trades. The General Contractor shall be responsible for actions or inactions of Subcontractors and/or material suppliers. The General Contractor is totally responsible for any lost time or extra expense incurred due to a Subcontractor's/or Material Supplier's failure to perform. Failure to perform includes, but is not limited to, a Subcontractor's financial failure, abandonment of the project, failure to make prompt delivery, or failure to do work up to standard. Under no circumstances shall the Owner mitigate the General Contractor's losses or reimburse the General Contractor for losses caused by these events.

D. Subcontractors and other persons and organizations selected by the Bidder must be used on the work for which they were proposed and shall not be changed except with the written approval of the Owner.

E. In evaluating Bids, Owner will consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data as may be requested in the Bid Form prior to Notice of Award.

F. Owner reserves the right to request further additional or specific information about the Bidder, and subcontractors. The owner will also consider the qualifications and experience of subcontractors, suppliers, and other persons and organizations proposed for those portions of the Work whose identity must be submitted as provided in this section and these Instructions to Bidders.

G. Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of Bidders, proposed subcontractors, suppliers, and other persons and

organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

H. If the contract is to be awarded, it will be awarded to the lowest responsible and responsive Bidder with the lowest Base Bid Lump Sum Price including any alternates.

I. In analyzing Bids, the Owner may take into consideration alternates and unit prices, if requested by the Bid forms.

J. If the Contract is awarded, the Owner shall give the successful Bidder written notice of the award within forty-five (45) days after the opening of the Bids.

16. NON-COLLUSION AND NON-SOLICITATION AFFIDAVIT

St. Bernard Parish Government Non-Collusion and Non-Solicitation Affidavit must be used and properly signed by the contractor and notarized by a licensed Notary Public having jurisdiction. Non-Collusion and Non-Solicitation Affidavit must be submitted to the Architect/Engineer within ten (10) calendar days of bid opening by the apparent low bidder. If the apparent low bidder does not submit the Non-Collusion and Non-Solicitation Affidavit as required by the bidding documents within ten (10) calendar days of the bid opening, such bidder will be declared non-responsive and the bid will be awarded to the next lowest bidder and afford the next lowest bidder not less than ten (10) calendar days from the date the apparent low bidder is declared non-responsive, to submit the proper information/ documentation as required by the bidding documents, and may continue such process until the public identity either determines the low bidder or rejects all bids.

17. SCHEDULE OF VALUES AND PROJECT SCHEDULE

Schedule of Values and Proposed Project Schedule must be submitted to the Architect/Engineer within ten (10) calendar days of bid opening by the apparent low bidder. If the apparent low bidder does not submit the Schedule of Values and Proposed Project Schedule as required by the bidding documents within ten (10) calendar days of the bid opening, such bidder will be declared non-responsive and the bid will be awarded to the next lowest bidder and afford the next lowest bidder not less than ten (10) calendar days from the date the apparent low bidder is declared non-responsive, to submit the proper information/documentation as required by the bidding documents, and may continue such process until the public identity either determines the low bidder or rejects all bids.

18. E VERIFICATION

A sworn affidavit must be must be submitted to the Architect/Engineer attesting to the bidder's participation in a status verification system to ensure that all employees in the State of LA are legal citizens or legal aliens of the United States within ten (10) calendar days of bid opening by the apparent low bidder. If the apparent low bidder does not submit the E-Verification as required by the bidding documents within ten (10) calendar days of the bid opening, such bidder will be declared non-responsive and the bid will be awarded to the next lowest bidder and afford the next lowest bidder not less than ten (10) calendar days from the date the apparent low bidder is declared non-responsive, to submit the proper information/documentation as required

by the bidding documents, and may continue such process until the public identity either determines the low bidder or rejects all bids.

A Sample Affidavit for E Verification is included in the specifications.

19. ATTESTATION AFFIDAVIT

A sworn affidavit must be submitted to the Architect/Engineer attesting to past criminal convictions, verification of employees, and certification regarding unpaid Workers Compensation Insurance of bidders within ten (10) calendar days of bid opening by the 0apparent low bidder. If the apparent low bidder does not submit the attestation affidavit as required by the bidding documents within ten (10) calendar days of the bid opening, such bidder will be declared non-responsive and the bid will be awarded to the next lowest bidder and afford the next lowest bidder not less than ten (10) calendar days from the date the apparent low bidder is declared non-responsive, to submit the proper information/documentation as required by the bidding documents, and may continue such process until the public identity either determines the low bidder or rejects all bids.

The Attestation Form is included in the specifications.

20. SYSTEM FOR AWARD MANAGEMENT

Sam.gov website is a national database for all recipients of federal funds. The website for the SAM system is at www.sam.gov. The website enables St. Bernard Parish Government to verify contractor eligibility of award of contract.

The ensuing contract for this bid solicitation may be eligible for FEMA reimbursement and/or Federal funding /reimbursement; therefore, all prospective bidders are encouraged to register. Applicants are required to renew their registration with SAM annually.

Apparent low bidder must register within ten (10) calendar days of bid opening. If the apparent low bidder is not registered as required by the bidding documents within ten (10) calendar days of the bid opening, such bidder will be declared non-responsive and the bid will be awarded to the next lowest bidder and afford the next lowest bidder not less than ten (10) calendar days from the date the apparent low bidder is declared non-responsive, to submit the proper information/documentation as required by the bidding documents, and may continue such process until the public identity either determines the low bidder or rejects all bids.

Bidder awarded the contract must maintain an active registration with Sam and throughout the entire period of performance of an award.

21. AGREEMENT AND EXECUTION

A. The standard Agreement form enclosed with the Contract Documents is a “SAMPLE” only, and shall not be construed as the executable agreement. It is enclosed with the Contract Documents for the guidance of the Owner and the Contractor. It has

important legal consequences and consultation with an attorney is encouraged with respect to its modifications or execution.

B. When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached. Within ten (10) days thereafter, Contractor shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner with the required Bonds and insurance certificates.

C. Failure of the successful Bidder to execute the Agreement and deliver the required Bonds within ten (10) days of the notice of the award shall be just cause for the Owner to annul the award and declare the Bid and any guarantee thereof forfeited.

D. At least four (4) counterparts of the Agreement and of such other Contract Documents as practicable shall be signed by the Owner and the Contractor. The Owner shall identify those portions of the Contract Documents not so signed and such identification shall be binding on both parties. The Owner and the Contractor shall each receive an executed counterpart of the Contract Documents.

22. PERFORMANCE/PAYMENT BOND

In order to insure the faithful performance of each and every condition, stipulation and requirement of the Contract and to indemnify and save harmless the Owner from any and all damages, either directly or indirectly arising out of any failure to perform same, the successful Bidder to whom the Contract is awarded, shall furnish a Performance/Payment Bond in an amount of at least equal to one hundred percent (100%) of the Contract Price. The Contract shall not be in force or binding upon the Owner until such satisfactory Bonds has been provided. The Surety Company shall be approved by the Owner and the cost of the Bonds shall be paid for by the Contractor unless otherwise stipulated.

23. QUALIFICATIONS OF SURETY COMPANIES

In order to be acceptable to the Owner, a surety company issuing one hundred percent (100%) Performance/Payment Bonds, called for in these Specifications, shall meet and comply with the following minimum standards:

A. Surety must be currently licensed to do business in the State of Louisiana and shall comply with the provisions of Louisiana State Law.

B. No Surety Company will be accepted as a bondsman who has no permanent agent or representative in the State upon whom notices referred to in these Specifications may be served. Services of said notice on said agent or representative in the State shall be equal to service of notice on the President of the Surety Company, or such other officer as may be concerned.

C. To be acceptable as Surety on a Contract with the Parish of St. Bernard, the company must hold Certificate of Authority from the United States Treasury Department as acceptable surety on Federal Bonds. This provision does not limit penal sum of bonds which surety companies may execute. Net retention, however, cannot exceed

underwriting limitation placed on surety by Treasury Department and excess risk must be protected by Certificate of Re-Insurance or Co-Insurance furnished to Owner within forty-five (45) days of date of execution of Contract.

D. Surety bond shall be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the Federal Register, or by a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A.M. Best's Key Rating Guide, and a Class 8 or better General Policy Holders Rating all in accordance to the latest A.M. Best Company Rating, to write individual bonds up to ten percent (10%) of policy-holder's surplus as shown in the A.M. Best's Key Rating Guide.

E. No surety or insurance company shall write a bond which is in excess of the amount indicated as approved by the U.S. Department of the Treasury Financial Management Service list or by a Louisiana domiciled insurance company with an A- rating by A.M. Best, up to a limit of ten percent (10%) of policyholder's surplus as shown by A.M. Best in the State of Louisiana.

F. Surety shall have been in business and have a record of successful continuous operations for at least five (5) years.

G. Attorneys-in-fact who sign Performance/Payment Bonds must file with such bond a certified copy of their power of attorney to sign such bond.

H. Agents of surety companies must list their name, address, and telephone number on all bonds.

I. Bonds shall be countersigned by a person who is contracted with the surety company as an agent, who is licensed as an insurance agent in Louisiana, and who resides in the State of Louisiana.

J. The life of the bonds shall extend twelve (12) months beyond the date of final payment and shall contain a waiver of alteration to the terms of the Contract, extensions of time, and/or forbearance on the part of the Owner, all to assure prompt removal and replacement of all defective material, equipment, components thereof, workmanship, etc. and to assure payment of any damage to property of Owner or others as a result of such defective materials, equipment, workmanship, etc.

K. Should the Contractor's Surety, even though approved and accepted by the Owner, subsequently remove its agency or representative from the State or become insolvent, bankrupt, or otherwise fail, the Contractor shall furnish a new Bond in another company approved by the Owner, at no cost to the Owner. The new Bond shall be executed under the same terms and conditions as the original Bond.

L. The Contractor's bondsman shall obligate himself to all the terms and covenants of these Specifications and of contracts covering the Work executed hereunder. The Owner reserves the right to do extra Work or make changes by altering, adding to or deducting from the Work under the conditions and in the manner herein before described without notice to the Contractor's surety and without in any manner

affecting the liability of bondsman or releasing him from any of his obligations hereunder.

M. The Bond shall also secure for the Owner the faithful performance of the Contract in strict accordance with Drawings and Specifications. It shall protect the Owner against all lien laws of the State and shall provide for payment of reasonable attorney's fees for enforcement of Contract and institution or concursus proceedings, if such proceedings become necessary. Likewise, it shall provide for all additional expenses of the Architect or Engineer occurring through failure of the Contractor to perform.

N. The surety of the Contractor shall be and does hereby declare and acknowledge himself by acceptance to be bound to the Owner as a guarantor, jointly and in solido with the Contractor, for fulfillment of terms as set forth in these Specifications.

24. INDEMNIFICATION, HOLD HARMLESS AGREEMENT

A. The Contractor shall indemnify and hold harmless the Owner and the Architect or Engineer from any and all suits, costs, penalties or claims for infringement by reason of use or installation of any patented design, device, material or process, or any trademark and copyright in connection with the Work agreed to be performed under this Contract, and shall indemnify and hold harmless the Owner and the Architect or Engineer for any costs, expenses and damages which it may be obliged to pay by reason of any such infringement at any time during the prosecution or after completion of the Work.

25. ASSIGNMENT

A. Neither party to this Contract shall assign or sublet his entire interest in this Contract without written consent of the other, nor shall the Contractor assign any monies due or to become due to him under this Contract without previous written consent of the Owner, nor without the consent of the surety unless the surety has waived its right to notice of assignment.

26. PROTESTS

Owner is responsible for resolution of protests of contract award, claims, disputes, alleged patent infringements, alleged license fees and other related procurement matters in accordance with sound business judgment and good administrative practice. The following procedures shall be used for this purpose:

A. Any party with a direct financial interest adversely affected by Owner's procurement decision shall file a protest under this Article or be barred further relief.

B. A protest must meet the following criteria: (a) be in writing (oral protests shall not be permitted); (b) adequately state the basis of the protest and the relief requested; and (c) be received by Owner within seven (7) days from the date the basis of the protest was, or should have been known.

C. Owner shall take actions on protests within forty-five (45) days of the receipt thereof. Owner may defer the protested procurement upon receipt of a procedurally adequate protest, provided that, in any event, award of a contract or subcontract or procurement of a sub-item may be permitted, at the Owner's sole discretion, where it will not materially affect resolution of the protest.

D. A protest shall be limited to (a) issues arising from the procurement provisions of the Contract and (b) state or local law. No protest may be filed with respect to basic project design.

E. The Owner's Attorney will establish procedures for resolution of protests. The Owner will rely for resolution of the protest, on decisions issued under Louisiana Law, as well as decisions issued by other states, Federal courts, the U.S. Comptroller General or other Federal agencies with extensive procurement expertise, if Louisiana Law is not clearly established.

27. COORDINATION OF DRAWINGS, SPECIFICATIONS AND SPECIAL PROVISIONS

The Drawings, Specifications, Standard and Supplementary General Conditions, Special Provisions and all supplementary Drawings and documents are essential parts of the Contract. A requirement occurring in one is just as binding as though occurring in all. They are intended to be complementary and to describe and provide for the complete work. In case of discrepancy, figured dimensions (unless obviously incorrect) shall govern over scaled dimensions. Specifications shall govern over Drawings. Special Provisions shall govern over both Drawings and Specifications. Technical Specifications shall govern over Standard Specifications.

A. If Contractor finds a conflict, error or discrepancy in the Contract Documents he shall call it to the Architect or Engineer attention, in writing, at once and before proceeding with the Work affected thereby; however, he shall not be liable to Owner or Architect or Engineer for his failure to discover any conflict, error or discrepancy in the Specifications or Drawings. The general notes on the Drawings shall be considered special provisions. Figure dimensions on Drawings shall govern over scale dimensions, and detail Drawings shall govern over general Drawings. Any Work that may reasonably be inferred from the Specifications or Drawings as being required to produce the intended result shall be supplied whether or not it is specifically called for. Work, materials or equipment described herein which so applied to this Project are covered by a well known technical meaning or specification shall be deemed to be governed by such recognized standards unless specifically excluded.

B. Unless otherwise provided in the Contract Documents, the Architect or Engineer will furnish to the Contractor, free of charge not to exceed four (4) copies of Drawings and Specifications for the execution of Work. The Drawings and Specifications are the property of the Owner and Architect or Engineer and are to be returned to him when they have served the purpose for which they are intended. The Contractor shall keep one copy of all Drawings and Specifications, including revisions, Addenda, details, Shop Drawings, etc. on the Work in good order available to the Owner, the Architect or Engineer, their representatives or the regulatory agency of the governmental body having jurisdiction in the area of the Work.

C. The Contractor shall not take advantage of any apparent error or omission in the Drawings or Specifications. In the event the Contractor discovers any apparent error

or discrepancy, he shall immediately call upon the Architect or Engineer for his interpretation. The Architect or Engineer will make such corrections and decisions in writing as deemed necessary to carry out the intent of the Drawings or Specifications. In the event the Architect or Engineer is non-responsive to the request the contractor may contact the Owner to assist with facilitation of a response.

28. St. Bernard Parish Government General Insurance Requirements.

Any person or company contracting with the St Bernard Parish Government (hereafter referred to as "The Contractor") shall purchase and maintain, for the duration of the contract, insurance for any and all claims including but not limited to injuries to persons or damages to property which may arise from or in connection with the performance of the work by the Contractor, its agents, representatives, volunteers, employees or subcontractors, etc.

A. *MINIMUM* SCOPE AND LIMITS OF INSURANCE

1. **Workers Compensation**
   Workers Compensation insurance shall be in compliance with the Workers Compensation law of the State of Louisiana. Employers Liability is included with a minimum limit of $500,000 per accident/per disease/per employee.

   If work is to be performed over water and involves maritime exposure, applicable LHWCA, Jones Act, or other maritime law, coverage shall be included and include crewmembers or vessels including transportation, wages, and maintenance with the Employers Liability limit increased to a minimum of $1,000,000.Coverage with an "In Rem" endorsement should the work to be performed involve watercraft.

2. **Commercial General Liability**
   Commercial General Liability insurance, Broad Form Damage, including Personal and Advertising Injury Liability, Contractual Liability for Contractor's obligation assumed hereunder, Independent Contractors Coverage, Premises/Operations and Products/Completed Operations. There shall be a minimum limit per occurrence of $1,000,000 and a minimum general aggregate of $2,000,000. The Insurance Services Office (ISO) Commercial General Liability occurrence coverage form CG 00 01 (or current form approved for use in Louisiana), or equivalent, is to be used in the policy. Claims-made form is unacceptable.

   If applicable, coverage for occurrences results from blasting, explosion or collapse, damage to underground property and injury or destruction of any property resulting there from.

3. **Environmental Pollution Liability**

   Pollution Liability insurance, including gradual release as well as sudden and accidental shall have a minimum limit of not less than $1,000,000 per claim $2,000,000 Aggregate. Higher limits may be required based on work being performed. This policy should be on an Occurrence basis. Coverage should include the contractor's self-performed work and extend to that of their contractors.

   A claims-made form will be acceptable with a policy period inception date of no later than the first day of anticipated work under this contract and an expiration date of no earlier than 30

days after anticipated completion of all work under the contract shall be provided. There shall be an extended reporting period of at least 24 months, with full reinstatement of limits, from the expiration date of the policy.

4. **Commercial Automobile Liability**
Commercial Automobile Liability Insurance shall have a minimum combined single limit per occurrence of $1,000,000. ISO form number CA 00 01 (or current form approved for use in Louisiana), or equivalent, is to be used in the policy. This insurance shall include third-party bodily injury and property damage liability for owned, hired and non-owned automobiles.

5. **Excess Umbrella**
Excess Umbrella insurance may be used to meet the minimum requirements for General Liability and Automobile Liability only.

6. **Aircraft & Watercraft Liability**

When used by contractor in connection with the work described hereunder, such insurance to include all leased, hired or other non-owned aircraft or watercraft.

Minimum Liability Limits:	Aircraft:	$10,000,000
	Watercraft:	Limits up to the value of the vessel or $5,000,000, whichever is greater.

Watercraft to have "In Rem" endorsement. Protection and Indemnity Insurance on all watercraft owned, operated and/or chartered by a contractor.

7. **Professional Liability (Errors & Omissions) Insurance**

Insurance shall be maintained appropriate to the Contractors profession, with limits no less than $1,000,000 per occurrence or claim and $2,000,000 aggregate. St. Bernard Parish Government
does not have to be named as an additional Insured on this policy.

8. **Flood Insurance**

Flood insurance is required on all *eligible* construction contracts.

a. If at the time of the contract, there is a current NFIP flood insurance policy in effect that the St. Bernard Parish Government purchases through the NFIP but the construction cost increases the value of the building within the $500,000 NFIP limit, the contractor is responsible for any additional NFIP premium to bring the coverage up to the greater of the fully-completed project value or the amount of the construction contract including any amendments or change orders, including content coverage, if such is part of the construction contract.

b. If at the time of the contract, there is a current NFIP flood insurance policy in effect that the St. Bernard Parish Government purchases through the NFIP, Excess Flood Insurance is required if the construction cost increases the value of the location above the NFIP $500,000 maximum policy limit. Coverage shall be equal to the greater of the fully-completed project value or the amount of the construction contract including any amendments or change orders and shall be upon the entire work included in the

contract, including content coverage, if such is part of the construction contract.

Excess Flood Insurance may be provided by the contractor as part of a Builders Risk policy in lieu of a separate Excess Flood policy but either type of flood insurance coverage is acceptable.

c. If St. Bernard Parish Government does not have a current NFIP flood insurance policy in place, the contractor shall obtain flood insurance. Coverage may be through the NFIP for the first layer up to the $500,000 maximum policy limits allowed. Should the fully-completed project value or the amount of the construction contract including any amendments or change orders exceed the $500,000 NFIP maximum policy limit, an Excess Flood insurance policy or Builders' Risk policy which includes flood insurance coverage is required, including content coverage, if such is part of the construction contract.

d. Contractor shall be responsible for obtaining the elevation certificate should one be needed to secure insurance coverage. For new construction, upon completion of the job, the contractor shall furnish the St. Bernard Parish Government with an elevation certificate for each building which is part of the contract.

9. **Builder's Risk**

Builder's Risk Insurance shall be in an amount equal to the greater of the fully-completed project value or the amount of the construction contract including any amendments or change orders and shall be upon the entire work included in the contract. The policy shall provide coverage equivalent to the ISO form number CP 10 20, Broad Form Causes of Loss (extended, if necessary, to include "all perils" of wind, named storm, earthquake, flood collapse, vandalism/malicious mischief, and theft, including theft of materials whether or not attached to any structure). The policy must include architects' and engineers' fees necessary to provide plans, specifications and supervision of work for the repair and/or replacement of property damage caused by a covered peril, not to exceed 10% of the cost of the repair and/or replacement.

The policy must include coverage for the Owner, Contractor and any subcontractors as their interests may appear.

The Contractor shall:

a. Be responsible for all deductibles and self-insured retentions;
b. Be responsible for all work in progress until final completion;
c. Procure and maintain for the duration of the work and until acceptance by owner, an All Risk Builders Risk Policy, including Flood and Named Windstorms;
d. Name the St. Bernard Parish Government as a Loss Payee or Named Insured;
e. Provide proof of coverage.

B. DEDUCTIBLES AND SELF-INSURED RETENTIONS

The Contractor shall be responsible for all deductibles and self-insured retentions. Any deductibles or self-insured retentions must be declared to and accepted by the St. Bernard Parish Government.

C. OTHER INSURANCE PROVISIONS

The policies are to contain, or be endorsed to contain, the following provisions:

1. General Liability and Automobile Liability Coverage

    a. The St. Bernard Parish Government, its officers, agents, employees and volunteers shall be named as an Additional Insured with a Waiver of Subrogation as regards negligence by the contractor. ISO Form CG 20 10 (or current form approved for use in Louisiana), or equivalent, is to be used when applicable. The coverage shall contain no special limitations on the scope of protection afforded to the parish.

    b. The Contractor's insurance shall be primary as respects the St. Bernard Parish Government, its officers, agents, employees and volunteers. Any insurance or self-insurance maintained by the St. Bernard Parish Government shall be excess and non-contributory of the Contractor's insurance.

    c. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the policy limits.

2. Workers Compensation and Employers Liability Coverage

    The insurer shall agree to waive all rights of subrogation against the St. Bernard Parish Government, its officers, agents, employees and volunteers for losses arising from work performed by the Contractor for the St. Bernard Parish Government.

3. All Coverage

    a. Coverage shall not be canceled, suspended, or voided by either party (the Contractor or the insurer) or reduced in coverage or in limits except after 30 days written notice has been given to the St. Bernard Parish Government. Ten-day written notice of cancellation is acceptable for non-payment of premium. Notifications shall comply with the standard cancellation provisions in the Contractor's policy.

    b. Neither the acceptance of the completed work nor the payment thereof shall release the Contractor from the obligations of the insurance requirements or indemnification agreement.

    c. The insurance companies issuing the policies shall have no recourse against the St. Bernard Parish Government for payment of premiums or for assessments under any form of the policies.

    d. Any failure of the Contractor to comply with reporting provisions of the policy shall not affect coverage provided to the St. Bernard Parish Government, its officers, agents, employees and volunteers.

    e. If the Contractor maintains higher limits than the minimum show herein, the St. Bernard Parish Government shall be entitled to coverage to the higher limits maintained by the Contractor.

f. If the Contractor does not maintain proper coverage, he will be given notice to stop work and informed that any such stoppage is a violation of the contract and that the contractor is liable for any losses or delays.

D. ACCEPTABILITY OF INSURERS

All required insurance shall be provided by a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located. Insurance shall be placed with insurers with a A.M. Best's rating of A-:VI or higher.

If at any time an insurer issuing any such policy does not meet the minimum A.M. Best rating, the Contractor shall obtain a policy with an insurer that meets the A.M. Best rating and shall submit another Certificate of Insurance as required in the contract.

E. VERIFICATION OF COVERAGE

Contractor shall furnish the St. Bernard Parish Government with Certificates of insurance reflecting proof of required coverage. The Certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The Certificates are to be received and approved by the St. Bernard Parish Government y before work commences and upon any contract renewal thereafter.

In addition to the Certificates, Contractor shall submit the declarations page and the cancellation provision endorsement for each insurance policy. The St. Bernard Parish Government reserves the right to request complete certified copies of all required insurance policies at any time.

Upon failure of the Contractor to furnish, deliver and maintain such insurance as above provided, this contract, at the election of the St. Bernard Parish Government, may be suspended, discontinued or terminated. Failure of the Contractor to purchase and/or maintain any required insurance shall not relieve the Contractor from any liability or indemnification under the contract.

F. SUBCONTRACTORS

The Contractor shall include all subcontractors as an insured under its policies OR shall be responsible for verifying and maintaining the Certificates provided by each subcontractor. Subcontractors shall be subject to all of the requirements stated herein. The St. Bernard Parish Government reserves the right to request copies of subcontractor's Insurance policies or Certificates of Insurance at any time.

G. WORKERS COMPENSATION INDEMNITY

In the event Contractor is not required to provide or fails to provide workers compensation coverage, the parties hereby agree that Contractor, its owners, agents and employees will have no cause of action against, and will not assert a claim against, the St. Bernard Parish Government, its departments, agencies, agents and employees as an employer, whether pursuant to the Louisiana Workers Compensation Act or otherwise, under any circumstance.

The parties also hereby agree that the St. Bernard Parish Government, its departments, agencies, agents and employees shall in no circumstance be, or considered as, the employer or statutory employer of Contractor, its owners, agents and employees. The parties

further agree that Contractor is a wholly independent contractor and is exclusively responsible for its employees, owners, and agents. Contractor hereby agrees to protect, defend, indemnify and hold the St. Bernard Parish Government, its departments, agencies, agents and employees harmless from any such assertion or claim that may arise from the performance of this contract.

H. INDEMNIFICATION/HOLD HARMLESS AGREEMENT

Contractor agrees to protect, defend, indemnify, save, and hold harmless, the St. Bernard Parish Government, all Departments, Agencies, Boards and Commissions, its officers, agents, servants, employees, and volunteers, from and against any and all claims, damages, expenses, and liability arising out of injury or death to any person or the damage, loss or destruction of any property which may occur, or in any way grow out of, any act or omission of Contractor, its agents, servants, and employees, or any and all costs, expenses and/or attorney fees incurred by Contractor as a result of any claims, demands, suits or causes of action, except those claims, demands, suits, or causes of action arising out of the negligence of the St. Bernard Parish Government, Departments, Agencies, Boards, Commissions, its officers, agents, servants, employees and volunteers. Contractor agrees to investigate, handle, respond to, provide defense for and defend any such claims, demands, suits, or causes of action at its sole expense and agrees to bear all other costs and expenses related thereto.

NOTE: Certain jobs may have risks and exposures that require additional or specific insurance requirements. If there are any questions, please contact Stephanie Bradbury, Risk Manager for the St. Bernard Parish Government at 504-278-4246 or email at sbradbury@sbpg.net.

29. LABOR, WORKING HOUR

A. No work shall be done between 7:00 p.m. and 7:00 a.m., nor on Saturdays, Sundays, or legal holidays without prior written permission from the ARCHITECT OR ENGINEER.

B. Requests to work during other than regular working hours must be submitted to the ARCHITECT OR ENGINEER at least forty-eight (48) hours, excluding Saturdays, Sundays, and legal Holidays, in advance of the period proposed for such overtime work and shall set forth the proposed schedule for overtime work to give the ARCHITECT OR ENGINEER ample time to arrange for his/her personnel to be at the site of the work.

30. PERIODIC PAY REQUESTS

A. Pay Requests are to be prepared in accordance with the procedures established under the contract, generally once a month routed and reviewed through the Architect or Engineer or Owners Project Manager for the contract.

B. Payment for Earnings will be made in accordance with the contract, but the contractor's pay request must show one line item for the cost for materials/supplies purchased as the Parish's Agent, the second line item for an amount arrived at by the

mathematical subtraction of “materials/supplies purchased” from the amount earned and the grand total of the these two line items.

C. The Contract Price may only be changed by a Modification by Change Order to the executed Agreement. Any claim for an increase in the Contract Price shall be based on written notice delivered to the Owner within fifteen (15) days of the occurrence of the event giving rise to the claim. Notice to the amount of the claim with supporting data shall be delivered within twenty-one (21) calendar days of such occurrence unless Owner, by written notice to the Contractor, requires less time to ascertain additional cost or time extension; or by written notice to the Contractor St. Bernard Parish allows an additional period of time to ascertain accurate cost data.

31. OWNER FURNISHED EQUIPMENT

A. All materials and equipment shall be furnished by the Contractor, except as otherwise noted.

B. The Owner will furnish to the contractor for installation the equipment noted on the drawings, specifications, etc., and as indicated in the Advertisement for Bids.

32. SUBSTITUTE MATERIALS OR PRODUCTS

A. In unusual cases where a closed specification has been justified for prior acceptance by the Owner, the naming of that product in the Drawings and Specifications will be followed by wording indicating that no substitution is permitted.

B. Otherwise, where the Drawings and Specifications identify a product by a specific brand, make, manufacturer or definite specification, it is to establish the required quality standard for the product regarding style, type, and character, materials of construction, function, accessories, dimensions, appearance and durability. Products which are determined to be equivalent by the Architect or Engineer will be acceptable. Products which are specified by a specific brand, make or manufacturer's name may also be specified by its applicable model or catalog number or other product designation.

D. The intent of the Specifications is, to the greatest extent, to list materials and products of predominant origin within the United States. The Contractor is encouraged, but not required, to acquire materials and products of predominant origin within the United States.

33. Sub-Contractors

If it becomes necessary for the prime Contractor to use subcontractors, the Parish requests the prime Contractor to use Louisiana vendors as well as St. Bernard Parish vendors, including small and emerging businesses, a small entrepreneurship or a veteran or service-connected disabled veteran-owned small entrepreneurship, if practical. In all events, any subcontractor used by the prime should be identified to the Parish.

34. Civil Rights Compliance

Contractor must comply with Title VI of the Civil Rights Act of 1964. Contractor agrees not to discriminate in its employment practices, and will render services under the contract and any contract without regard to race, color, religion, sex, national origin, veteran status, political affiliation or disabilities. Any act of discrimination by Contractor, or failure to comply with these statutory obligations when applicable shall be grounds for termination of the contract.

35. Small and Minority Owned Business and Women Business

Contractor must make positive efforts to use small and minority owned business and women business enterprises as required by 2 CFR 200.

Contracting with Small and Minority Businesses, Women's Business Enterprises, and Labor Surplus Area Firms

A non-Federal entity that is a state agency or agency of a political subdivision of a state and its contractors must take all necessary affirmative steps to assure that minority businesses, women's business enterprises, and labor surplus area firms are used when possible. Affirmative steps must include:

1. Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

2. Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;

3. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises;

4. Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises;

5. 5. Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce; and

6. 6. Requiring the prime contractor, if subcontracts are to be let, to take the affirmative steps listed in paragraphs (1) through (5) of this section.

36. Anti-Kickback Clause

The Contractor hereby agrees to adhere to the mandate dictated by the Copeland “Anti-Kickback” Act which provides that each Contractor or subgrantee shall be prohibited from inducing, by any

means, any person employed in the completion of work, to give up any part of the compensation to which he is otherwise entitled.

37. Clean Air Act

The contractor hereby agrees to adhere to the provisions which require compliance with all applicable standards, orders or requirements issued under Section 306 of the Clean Air Act which prohibits the use under non-exempt Federal contracts, grants or loans of facilities included on the EPA list of Violating Facilities.

38. Energy Policy and Conservation Act

The contractor hereby recognizes the mandatory standards and policies relating to energy efficiency which are contained in the State energy conversation plan issued in compliance with the Energy Policy and Conservation Act (P.L. 94-163).

39. Clean Water Act

The contractor hereby agrees to adhere to the provisions which require compliance with all applicable standards, orders or requirements issued under Section 508 of the Clean Water Act which prohibits the use under non-exempt Federal contracts, grants or loans of facilities included on the EPA list of Violating Facilities.

40. Anti-Lobbying and Debarment Act

The Contractor will be expected to comply with Federal statues required in the Anti-Lobbying Act and the Debarment Act.

41. Federal Funded Projects

The Contractor must comply with 2 CFR 200

END OF SECTION

Project Name **St. Bernard Parish Public Library**
Judge Perez Drive
St. Bernard Parish, Louisiana

Bid Open Date: _____

BIDDERS CHECK LIST

Check off each box as you complete the instructions.

__ Bid form must be completed in full and signed properly for consideration as a responsive bidder.

__ Satisfactory evidence of the authority of the person signing on behalf of the individual, firm or partnership must be attached. In the case of a corporation, said authority must be in the form of a corporate resolution as specified on the Louisiana Uniform Public Work Bid Form. The sample corporate resolution provided in the bid documents may be used.
Bids by partnerships must be executed in the partnership name and signed by a partner, whose title and signature must appear on the bid form.

__ Bidders must acknowledge all addenda. (See the Louisiana Uniform Public Work Bid Form)

__ Bid security in the form of a bid bond, certified check or cashier's check as prescribed by LA RS 38:2218.A is attached to and made a part of this bid. (See the Louisiana Uniform Public Work Bid Form) Bid Security (Bid Bond) must be signed by the representative of the company bidding and the representative authorized by the Power of Attorney.

__ If any bid is $50,000.00 or more, Louisiana Contractor's License Number must be affixed to the outside of the bid envelope and to the bid form as well as where specified otherwise in the bid documents.
The bid form requires contractor license number – the form does not differ if a bid is above or below $50,000.

__ The following will be clearly identified and included on the bid submittal envelope:

- Louisiana Contractor's License Number
- St Bernard Department of Public Works
- Bidder's Name
- Return address
- Project Name

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: St. Bernard Parish Government
Department of Public Works
1125 E. St. Bernard Highway
Chalmette, Louisiana

BID FOR: **St. Bernard Parish Public Library**
Judge Perez Drive
St. Bernard Parish, Louisiana
Parish Project No. SBPG/NPL

The undersigned bidder hereby declares and represents that she/he: a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: Mathes Brierre Architects + Architects Beazley Moliere and dated: May 5, 2023

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:** (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) _____ .

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid" * but not alternates) the sum of:

_____ Dollars ($ _____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____ Dollars ($ _____)

Alternate No. 2 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____ Dollars ($ _____)

Alternate No. 3 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____ Dollars ($ _____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

_____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

THE FOLLOWING ITEMS ARE TO BE INCLUDED WITH THE SUBMISSION OF THIS LOUISIANA UNIFORM PUBLIC WORK BID FORM:

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

**** A CORPORATE RESOLUTION OR WRITTEN EVIDENCE** of the authority of the person signing the bid for the public work as prescribed by LA R.S. 38:2212(B)(5).

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA R.S. 38:2218(A) attached to and made a part of this bid.

CORPORATE RESOLUTION

EXCERPT FROM MINUTES OF MEETING OF THE BOARD OF DIRECTORS OF _____, INCORPORATED.

AT THE MEETING OF DIRECTORS OF _____,
INCORPORATED, DULY NOTICED AND HELD ON _____, 202__,
A QUORUM BEING THERE PRESENT, ON MOTION DULY MADE AND SECONDED.
IT WAS:

RESOLVED. THAT _____, BE AND IS HEREBY APPOINTED, CONSTITUTED AND DESIGNATED AS AGENT AND ATTORNEY-IN-FACT OF THE CORPORATION WITH FULL POWER AND AUTHORITY TO ACT ON BEHALF OF THIS CORPORATION IN ALL NEGOTIATIONS, BIDDING, CONCERNS AND TRANSACTIONS WITH THE PARISH OF ST. BERNARD OR ANY OF ITS AGENCIES, DEPARTMENTS, EMPLOYEES OR AGENTS, INCLUDING BUT NOT LIMITED TO THE EXECUTION OF ALL BIDS, PAPERS, DOCUMENTS, AFFIDAVITS, BONDS, SURETIES, CONTRACTS AND ACTS AND TO RECEIVE AND RECEIPT THEREFOR ALL PURCHASE ORDERS AND NOTICES ISSUED PURSUANT TO THE PROVISIONS OF ANY SUCH BID OR CONTRACT, THIS CORPORATION HEREBY RATIFYING, APPROVING, CONFIRMING AND ACCEPTING EACH AND EVERY SUCH ACT PERFORMED BY SAID AGENT AND ATTORNEY-IN-FACT.

I HEREBY CERTIFY THE FOREGOING TO BE A TRUE AND CORRECT COPY OF AN EXCERPT OF THE MINUTES OF THE ABOVE DATED MEETING OF THE BOARD OF DIRECTORS OF SAID CORPORATION, AND THE SAME HAS NOT BE REVOKED OR RESCINDED.

_____
SECRETARY-TREASURER

_____
DATE

NON-COLLUSION AND NON-SOLICITATION AFFIDAVIT

PROJECT: St. Bernard Parish Public Library
Judge Perez Drive
St. Bernard Parish, Louisiana

STATE OF LOUISIANA

PARISH OF ST. BERNARD

BEFORE ME, the undersigned authority, personally came and appeared,
_____,
(Name of Authorized Representative of Bidder)
who after being by me duly sworn, deposed and said that he is the fully authorized _____of _____ (hereinafter referred to as bidder), the party who submitted a bid for _____ which bid was received by St. Bernard Parish on _____ and said affiant further said:

(1) That bidder employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the bidder whose services in connection with the construction of the public building or project or in securing the public contract were in the regular course of their duties for bidder; and

(2) That no part of the contract price received by bidder was paid or will be paid to any persons, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the bidder whose services in connection with construction of the public building or project were in the regular course of their duties for bidder.

(3) Said bid is genuine and the bidder has not colluded, conspired or agreed, directly or indirectly, with any other bidder to offer a sham or collusive bid.

(4) Said bidder has not in any manner, directly or indirectly, agreed with any other person to fix the bid price of affiant or any other bidder, or to fix any overhead profit or cost element of said bid price, or that of any other bidder, or to induce any other person to refrain from bidding.

(5) Said bid is not intended to secure an unfair advantage of benefit from the Parish of St. Bernard or in favor of any person interested in the proposed contract.

(6) All statements contained in said bid are true and correct.

AFFIDAVIT

(7) Neither affiant nor any member of his company has divulged information regarding said bid or any data relative thereto to any other person, firm or corporation.

_____
Authorized Signature

SWORN TO AND SUBSCRIBED

BEFORE ME THIS _____

DAY OF _____, 202___

_____
NOTARY PUBLIC

SAMPLE
Employment Status Verification
AFFIDAVIT
For
St. Bernard Parish Government

STATE OF _____

PARISH/COUNTY OF _____

BEFORE ME, the undersigned authority, personally came and appeared,

_____, (Affiant) who after being duly sworn, deposed and said that

he/she is the fully authorized _____ of _____

(Entity), the party who submitted a Bid entitled _____,

to St. Bernard Parish. (Choose one of the following):

_____ Affiant further said:

(1) Entity is registered and participates in a status verification system to verify that all employees in the State of Louisiana are legal citizens of the United States or are legal aliens.

(2) Entity shall continue, during the term of the contract, to utilize a status verification system to verify the legal status of all new employees in the State of Louisiana.

(3) Entity shall require all subcontractors to submit to the Entity a sworn affidavit verifying compliance with statements (1) and (2).

_____ Affiant further said that neither Entity nor subcontractors of Entity have any employees in the State of Louisiana.

_____
Signature of Affiant

SWORN TO AND SUBSCRIBED
BEFORE ME ON THIS _____
DAY OF _____, 20____.

_____
NOTARY PUBLIC

_____ _____

Name of Project **Project No.**

STATE OF _____

PARISH OF _____

ATTESTATIONS AFFIDAVIT

Before me, the undersigned notary public, duly commissioned and qualified in and for the parish and state aforesaid, personally came and appeared Affiant, who after being duly sworn, attested as follows:

LA. R.S. 38:2227 PAST CRIMINAL CONVICTIONS OF BIDDERS

A. No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes:

(a) Public bribery (R.S. 14:118)
(b) Corrupt influencing (R.S. 14:120)
(c) Extortion (R.S. 14:66)
(d) Money laundering (R.S. 14:23)

B. Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

(a) Theft (R.S. 14:67)
(b) Identity Theft (R.S. 14:67.16)
(c) Theft of a business record (R.S.14:67.20)
(d) False accounting (R.S. 14:70)
(e) Issuing worthless checks (R.S. 14:71)
(f) Bank fraud (R.S. 14:71.1)
(g) Forgery (R.S. 14:72)
(h) Contractors; misapplication of payments (R.S. 14:202)
(i) Malfeasance in office (R.S. 14:134)

LA. R.S. 38:2212.10 Verification of Employees

A. At the time of bidding, Appearer is registered and participates in a status verification system to verify that all new hires in the state of Louisiana are legal citizens of the United States or are legal aliens.

B. If awarded the contract, Appearer shall continue, during the term of the contract, to utilize a status verification system to verify the legal status of all new employees in the state of Louisiana.

C. If awarded the contract, Appearer shall require all subcontractors to submit to it a sworn affidavit verifying compliance with Paragraphs (A) and (B) of this Subsection.

Name of Project	**Project No.**

LA. R.S. 23:1726(B) Certification Regarding Unpaid Workers Compensation Insurance

A. R.S. 23:1726 prohibits any entity against whom an assessment under Part X of Chapter 11 of Title 23 of the Louisiana Revised Statutes of 1950 (Alternative Collection Procedures & Assessments) is in effect, and whose right to appeal that assessment is exhausted, from submitting a bid or proposal for or obtaining any contract pursuant to Chapter 10 of Title 38 of the Louisiana Revised Statutes of 1950 and Chapters 16 and 17 of Title 39 of the Louisiana Revised Statutes of 1950.

B. By signing this bid /proposal, Affiant certifies that no such assessment is in effect against the bidding / proposing entity.

NAME OF BIDDER	**NAME OF AUTHORIZED SIGNATORY OF BIDDER**
DATE	**TITLE OF AUTHORIZED SIGNATORY OF BIDDER**

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER/AFFIANT

Sworn to and subscribed before me by Affiant on the _____ day of _____ , 20___ .

Notary Public

AGREEMENT

THIS AGREEMENT, made the _____day of _____, 202___, by and between the St. Bernard Parish Government, St. Bernard Parish, Louisiana, referred to in these Contract Documents as "OWNER" acting, as the context requires, either on its own behalf or as the governing authority of the political subdivision which has the legal authority and responsibility for this agreement and for whom the Work is being performed, and acting through its President and his authorized agents, and _____ (*CONTRACTOR's legal name*) referred to in these Contract Documents as "CONTRACTOR" (the "Agreement"):

WITNESSETH THAT:

WHEREAS, in accordance with law, OWNER has caused the Contract Documents to be prepared and an Invitation to Bid to be published for and in connection with the **St. Bernard Parish Public Library, Judge Perez Drive, St. Bernard Parish, Louisiana, Parish Project No: SBPG/NPL .**

WHEREAS, CONTRACTOR, in response to the Invitation to Bid, has submitted to OWNER, in the manner and at the time specified, a sealed bid in accordance with the Instructions to Bidders; and

WHEREAS, OWNER, in the manner prescribed by law, has publicly opened, examined, and canvassed the bids submitted, and has determined CONTRACTOR to be entitled to the award for the Work in accordance with the law and has duly awarded to CONTRACTOR a contract therefor, for the sum or sums named in CONTRACTOR's bid.

NOW THEREFORE, in consideration of the compensation to be paid to CONTRACTOR and of the mutual agreements herein contained, the parties to these presents have agreed and hereby agree, OWNER, for itself and its successors, and CONTRACTOR for itself, and its successors and assigns, as follows:

ARTICLE I.

A. Owner, through the Parish President of St. Bernard Parish, **Guy S. McInnis**, does hereby grant and confirm unto CONTRACTOR the Contract to perform the Work under **St. Bernard Parish Public Library, Judge Perez Drive, St. Bernard Parish, Louisiana, Parish Project No: SBPG/NPL** , in accordance with the CONTRACTOR's written bid proposal dated _____, a copy of which is attached hereto and made a part hereof.

B. The CONTRACTOR shall perform all Work, including the assumption of all obligations, duties and responsibilities necessary to the successful completion of the Contract and the furnishing of all materials and equipment required to be incorporated in and to form a permanent part of the Work; tools, equipment, supplies, transportation,

facilities, labor, superintendence and services required to perform the Work; and Bond, insurance and submittals; all as indicated or specified in the Contract Documents to be performed or furnished by CONTRACTOR for the Work included in and covered by OWNER's official award of this Contract to CONTRACTOR; such award being based on the acceptance by OWNER of CONTRACTOR's bid.

ARTICLE II.

The Project has been designed by **Mathes Brierre Architects + Architects Beazley Moliere,** who is hereinafter called ARCHITECT/ENGINEER and who is to act as OWNER's representative, to assume all duties and responsibilities and to have the rights and authority assigned to ARCHITECT/ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE III.

A. All notices, letters, and other communications directed to OWNER shall be delivered or addressed and mailed (along with one copy), postage prepaid to the ARCHITECT/ENGINEER at the address in the Invitation to Bid, with one additional copy addressed and mailed to:

St. Bernard Parish Government
Department of Public Works
1125 E. St Bernard Highway
Chalmette, Louisiana 70043

B. In addition, one copy of all correspondence directed to the ARCHITECT/ENGINEER shall be sent to the OWNER. The business address of CONTRACTOR given in this Agreement and CONTRACTOR's office in the vicinity of the Work are both hereby designated as the places to which all notices, letters, and other communications to CONTRACTOR will be mailed or delivered. CONTRACTOR shall notify ARCHITECT/ENGINEER and OWNER of any change of address immediately.

ARTICLE IV.

That OWNER shall pay to CONTRACTOR for performance of the Work embraced in this Contract, in accordance with the Contract Documents, and CONTRACTOR shall accept as full compensation therefor, the sum (subject to adjustment as provided in the Contract Documents) of _____ Dollars ($_____) for all Work covered by and included in the Contract award and designated in the foregoing Article I; payment thereof to be made in current funds in the manner provided in the Contract Documents.

Notwithstanding anything to the contrary in the foregoing, CONTRACTOR acknowledges and agrees that, pursuant to the applicable Laws and Regulations, this Agreement is subject to an annual appropriation dependency requirement to the effect that

the renewal and/or continuation of this Agreement is contingent upon the appropriation of funds to fulfill the requirements of the Agreement. If the OWNER fails to appropriate sufficient monies to provide for payments under this Agreement, the Agreement shall terminate on the last day of the last fiscal year for which funds were appropriated. This ground for termination is in addition to any other grounds that are identified in the Bid Documents, General Conditions, Instruction to Bidders, Special Provisions, etc.

Estimated quantities are not guaranteed, and determinations of actual quantities and classification are to be made by ARCHITECT/ENGINEER.

ARTICLE V.

A. All work designed on the Plans and in the Specifications shall be executed and completed in all details (Final Acceptance) within **365 consecutive calendar days** from the date specified in the "Order to Proceed" as the starting date for the Contract Time. The time allowed for completion of this project includes days of inclement weather as provided below and any time required for final clean-up of this project site. If agreed to by both parties in a written change order, the contract time may be extended 30 calendar days, or a fraction thereof.

B. The CONTRACTOR shall note that abnormal weather conditions shall not be an automatic cause for time extension. The Contract Time specified above includes an allowance for normal adverse weather days. The following schedule of monthly normal adverse weather conditions is based on locally collected rainfall data and constitutes the baseline for monthly weather time evaluations. Presented are the average number of days during each month that at least a tenth of an inch of rainfall was recorded over a five year evaluation period. Unless other specified, the Contractor's project work schedule shall reflect these anticipated adverse weather delays in all weather-related activities:

Monthly Anticipated Adverse Weather Days*

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
9	6	7	7	8	13	17	11	6	6	6	9

*Calendar Days, based on a five-day work week

ARTICLE VI.

A. OWNER and CONTRACTOR recognize and agree that time is of the essence of this Agreement and that the Work must be completed in every respect appropriate within the applicable time limits set forth in the Contract Documents, commencing from the date specified in the Contract Documents. OWNER and CONTRACTOR further understand and agree that it is difficult at this time to estimate the damage which the delay in completion of the Work would cause the OWNER and that, accordingly, if the CONTRACTOR shall neglect, fail, or refuse to complete the Work in accordance with the Contract Times specified in the Contract Documents, or any extension thereof granted by the OWNER in

accordance with the applicable provisions of the Contract Documents then, in addition to the other stipulated damages provided for in Article VII below, the CONTRACTOR agrees, as a part of the consideration for the award of this Contact, that OWNER shall be entitled to receive the amount or amounts per day set forth in paragraph B below from CONTRACTOR, not as a penalty but as stipulated ("liquidated") damages for delay for such breach of contract, such amounts being specifically herein agreed upon in advance as the measure of damages to the OWNER on account of such delay in the completion of the Work.

B. The CONTRACTOR shall owe OWNER liquidated damages in the amount of **One Thousand Eight Hundred** dollars **($ 1,800.00**) for each and every calendar day after the time specified in Article V for Substantial Completion of the Work until the Work is determined to be substantially complete in accordance with the Contract Documents. After Substantial Completion, if the CONTRACTOR shall neglect, fail, or refuse to complete the Work within the time specified in Article V for final completion, or any proper extension thereof granted by the OWNER, CONTRACTOR shall owe OWNER liquidated damages in the amount of **One Thousand Eight Hundred** dollars **($ 1,800.00**) for each day after the time specified in Article V for final completion until the Work is determined to be finally completed in every respect in accordance with the Contract Documents.

C. The number of calendar days in default shall be calculated exclusive of the day on which the applicable completion time was specified and shall include each and every other calendar day up to and including the day that the CONTRACTOR has been determined to satisfy its obligation for the applicable degree of completion under the Contract Documents.

D. CONTRACTOR further agrees that the expiration of the Contract Time shall, ipso facto, constitute a putting in default where CONTRACTOR has failed to complete the Work in accordance with the applicable Contract Times, and OWNER need not formally place the CONTRACTOR in default, the CONTRACTOR hereby expressly waiving any and all notices of default.

E. CONTRACTOR agrees and consents that the liquidated damages may be deducted from progress payments payable to CONTRACTOR pursuant to the Contract Documents and that CONTRACTOR shall accept the Contract Price, reduced by the aggregate amount of the liquidated damages so deducted, in full satisfaction of all Work executed under the Contract Documents.

ARTICLE VII.

NOT USED IN THIS CONTRACT

ARTICLE VIII.

CONTRACTOR shall submit Applications for Payment in accordance with the General Conditions. Applications for Payment will be processed by

ARCHITECT/ENGINEER as provided in the General Conditions.

OWNER shall make progress payments on account of the Contract Unit Price on the basis of CONTRACTOR's Applications for Payment as recommended by ARCHITECT/ENGINEER, as provided below. All such payments will be measured by the schedule of values (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.

Upon receipt of the Final Application for Payment, OWNER shall pay the remainder of the Contract Price as recommended by ARCHITECT/ENGINEER as provided in the General Conditions and relevant Special Provisions.

Pursuant to LSA-R.S. 38:2248, OWNER shall retain the following percentages of each progress payment until payment is due under the terms and conditions governing retainage payment:

CONTRACT AMOUNT	RETAINAGE
$0 - $499,999.99	10%
$500,000 or greater	5%

ARTICLE IX.

The Contract Documents which comprise the agreement between OWNER and CONTRACTOR, concerning the Work, consist of the documents listed in the Table of Contents, if any, and the documents identified below:

1. This Agreement.
2. Performance, Payment, and other Bonds.
3. Insurance Certificates
4. Notice to Proceed
5. Standard General Conditions of the Construction Contract
6. Special Provisions
7. Contract Documents (drawings and specifications) bearing the title **St. Bernard Parish Public Library, Judge Perez Drive, St. Bernard Parish, Louisiana, Parish Project No: SBPG/NPL ,** Addenda numbers to _____, inclusive
8. Bid Form
9. Documentation submitted by CONTRACTOR prior to Notice of Award.
10. The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All Written Amendments and other documents amending, modifying or supplementing the Contract Documents pursuant to the General Conditions.

The documents listed above are attached to this Agreement (except as expressly noted otherwise above).

ARTICLE X.

In order to induce OWNER to enter into this Agreement, the CONTRACTOR makes the following representations:

1. CONTRACTOR has visited the Sites, has familiarized himself with and is satisfied as to the nature and extent of the Contract Documents, Work, locality, and as to all general, local and Site conditions and federal, state, and local Laws, and Regulations, which may affect cost, progress, performance or furnishing of the Work.

2. CONTRACTOR has examined and carefully studied the Contract Documents (including the Addenda listed in Article IX) and the other related data identified in the Bidding Documents including "technical data."

3. CONTRACTOR understands that no subsurface explorations have been performed by the OWNER for use on this contract and therefore understands that all subsurface explorations necessary for the Contractor's use under this contract shall be performed by the Contractor at its own expense. CONTRACTOR acknowledges that OWNER and ARCHITECT/ENGINEER do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Contract Documents with respect to Underground Facilities at or contiguous to the Site. CONTRACTOR has obtained and carefully studied (or assumes responsibility for having done so) all such additional supplementary examinations, investigations, explorations, test, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site or otherwise which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto. CONTRACTOR does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the performance and furnishing of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.

4. CONTRACTOR is aware of the general nature of work to be performed by OWNER and others at the Site(s) that relate to the Work as indicated in the Contract Documents.

5. CONTRACTOR has correlated the information known to CONTRACTOR, information and observations obtained from visits to the Sites, reports and

drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.

6. CONTRACTOR has given ARCHITECT/ENGINEER written notice of all conflicts, errors, ambiguities or discrepancies that CONTRACTOR has discovered in the Contract Documents and the written resolution thereof by ARCHITECT/ENGINEER is acceptable to CONTRACTOR, and the Contract Documents are generally sufficient to indicate and convey an understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE XI.

Terms used in this Agreement which are defined in the Contract Documents will have the meanings indicated in the General Conditions unless otherwise defined herein or the context otherwise requires.

No assignment, sublet or transfer by a party hereto of any rights under or interest in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), nor without the consent of the surety unless the surety has waived its right to notice of assignment and, unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

OWNER and CONTRACTOR each binds itself, its partners, successors, assigns, legal representatives, sureties, or guarantors, if any, to the other party hereto, its partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

This Agreement shall be deemed to be a contract made under the laws of the State of Louisiana, and for all purposes shall be interpreted in its entirety in accordance with the laws of said State. CONTRACTOR and all parties hereto agree that the sole and exclusive venue for any suit or proceeding brought pursuant to this contract shall be the 34th Judicial District Court for the Parish of St. Bernard.

Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the day and year first above written in the presence of the undersigned witnesses and each signatory warrants by its signature that it has the appropriate authority to sign this Agreement.

_____
(CONTRACTOR)

By: _____(SEAL & ATTEST)

Title: _____ _____
Date: _____ _____

Address for giving notices:

_____

_____

License No. _____

PARISH OF ST. BERNARD
STATE OF LOUISIANA _____(SEAL & ATTEST)
(OWNER)

By: _____ _____
Guy S. McInnis,
Parish President
ST. BERNARD PARISH

_____

GENERAL SPECIFICATIONS AND CONDITIONS FOR ST. BERNARD PARISH

INDEX TO GENERAL SPECIFICATIONS

AND CONDITIONS FOR ST. BERNARD PARISH

GENERAL PROVISIONS

GENERAL SPECIFICATIONS

PART II
SECTION 1: SUBCONTRACTS

01.01 Contractor shall not employ any Subcontractor or other person or organization (including those who are to furnish the principal items of materials or equipment), whether initially or as a substitute, against whom Owner or Engineer may have reasonable objection. A Subcontractor or other person or organization identified in writing to Owner and Engineer by Contractor prior to the Notice of Award and not objected to in writing by Owner or Engineer prior to the Notice of Award will be deemed acceptable to Owner and Engineer. Acceptance of any Subcontractor, other person or organization by Owner or Engineer shall not constitute approval of all work by subcontractor not in conformance with Contract Documents. If Owner or Engineer after due investigation has reasonable objection to any Subcontractor, other person or organization proposed by Contractor after Notice of Award, Contractor shall submit an acceptable substitute and the Contract Price shall be increased or decreased by the difference in cost occasioned by such substitution, and an appropriate Change Order shall be issued. Contractor shall not be required to employ any Subcontractor, other person or organization against whom he has reasonable objection. Contractor shall not without the consent of Owner and Engineer make any substitution for any Contractor, other person or organization who has been accepted by Owner and Engineer unless Engineer determines that there is good cause for doing so.

01.02 Contractor shall be fully responsible for all acts and omissions of his Subcontractors and of persons and organizations for whose acts any of them may be liable to the same extent that he is responsible for the acts and omissions of persons directly employed by him. Nothing in the Contract Documents shall create any contractual relationship between Owner or Engineer and any Subcontractor or other person or organization having a direct Contract with Contractor, nor shall it create any obligation on the part of the Owner or Engineer to pay or to see to the payment of any monies due any Subcontractor.

01.03 Nothing in the Contract Documents shall be construed to control the Contractor in dividing the Work among approved Subcontractors or delineating the Work to be performed by any trade.

01.04 The Contractor agrees to specifically bind every Subcontractor to all of the applicable terms and conditions of the Contract Documents prior to beginning Work. Every Subcontractor, by undertaking to perform any of the Work, shall there by automatically be deemed bound by such terms and conditions.

01.05 The Contractor shall indemnify and hold harmless the Owner and the Engineer and their agents and employees from and against all claims, damages, losses and expenses including Attorney's fees arising out of or resulting from the Contractor's failure to bind every Subcontractor and Contractor's surety to all of the applicable terms and conditions of the Contract Documents.

01.06 The Contractor shall be responsible for determining that all of his Sub-bidders or prospective Subcontractors are duly licensed in accordance with Louisiana Law.

PART II
SECTION 2: SHOP DRAWINGS, BROCHURES AND SAMPLES

02.01 After checking and verifying all field measurements, Contractor shall submit to Engineer for approval, five copies (or at Engineer's option, one reproducible copy) of all Shop Drawings, which shall have been checked by and stamped with the approval of Contractor and identified as Engineer may require. The data shown on the Shop Drawings will be complete with respect to dimensions, design criteria, materials of construction and the like to enable Engineer to review the information as required.

02.02 Contractor shall also submit to Engineer for review with such promptness as to cause no delay in Work, all samples as required by the Contract Documents. All samples will have been checked by and stamped with the approval of Contractor, identified clearly as to material, manufacturer, any pertinent catalog numbers and the use for which intended. At the time of each submission, Contractor shall in writing call Engineer's attention to any deviations that the Shop Drawings or samples may have from the requirements of the Contract Documents.

02.03 Engineer will review with reasonable promptness Shop Drawings and samples, but his review shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The review of a separate item as such will not indicate approval of the assembly in which the item functions. Contractor shall make any corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and resubmit new samples for review. Contractor shall direct specific attention in writing or on

resubmitted Shop Drawings to revisions other than the corrections called for by Engineer on previous submissions. Contractor's stamp of approval on any Shop Drawing or sample shall constitute a representation to Owner and Engineer that Contractor has either determined and verified all quantities, dimensions, field construction criteria, materials catalog numbers and similar data or he assumes full responsibility for doing so, and that he has reviewed or coordinated each Shop Drawing or sample with the requirements of the Work and the Contract Documents.

02.04 Where a Shop Drawing or sample submission is required by the Specifications, no related Work shall be commenced until the submission has been reviewed by Engineer. A copy of each reviewed Shop Drawing and each inspected sample shall be kept in good order by Contractor at the site and shall be available to Engineer.

02.05 Engineer's review of Shop Drawings or samples shall not relieve Contractor from his responsibility for any deviations from the requirements of the Contract Documents unless Contractor has in writing called Engineer's attention to such deviation at the time of submission and Engineer has given written approval to the specific deviation, nor shall any review by Engineer relieve Contractor from responsibility for errors or omissions in the Shop Drawings. The mere submittal of shop drawings which contain therein deviations from the requirements of plans, specifications and/or previous submittals in itself does not satisfy this requirement.

PART II
SECTION 3: RECORD DRAWINGS

The Contractor shall provide the following information in the form of record drawings:

03.01 The Contractor shall furnish one neat and legibly marked set of Record Drawings (11” x 17”), unless otherwise directed, at the completion of each work order that shows the locations, dimensions, and quantities of pay items installed. The Record Drawings shall be reproducible and contain all actual construction, including any additional approved work. The data shown on the Record Drawings shall be complete with respect to locations, dimensions, design criteria, materials of construction and the like to enable Engineer to review the information as required. Record Drawings shall include installation dates of all construction material.

03.02 The record drawings should differentiate work issued in the original work order from work issued as field changes. All field changes should have attached supporting documentation indicating that additional work was issued and authorized by the Owner.

PART II
SECTION 4: PROSECUTION AND PROGRESS

04.01 Contractor shall conduct the Work in such a manner and with sufficient materials, equipment and labor as is considered necessary to insure its completion within the time limit specified.

04.02 The Owner shall issue an order to proceed to the Contractor within ten (10) days from the date of execution of the Contract. The Contractor is to commence Work under the Contract within ten (10) days from the date the order to proceed is issued by the Owner.

04.03 The Contractor, immediately after being awarded the Contract, shall prepare and submit for the Engineer's approval an estimated progress schedule for the Work. The progress schedule shall be related to the entire Project. This schedule shall indicate the dates for the starting and completion of the various stages of construction and shall be revised as required. The Contractor shall not start Work or request partial payment until the Work schedule has been submitted to the Engineer for approval.

The Work schedule shall be in the form of a "Critical Path Method" (C.P.M.) acceptable to the Engineer, or, on smaller projects with the approval of the Engineer, a bar chart showing all of the construction activities can be substituted for the C.P.M.

04.04 Whenever it appears apparent to the Contractor that his Work completed will vary more than ten percent (10%) from the Work estimated to be completed on the Work schedule, then a revised schedule of Work shall be submitted to the Engineer for approval. No estimate for payment submitted by the Contractor shall be approved by the Engineer if it differs by more than 10% from the last revised Work schedule submitted. Revised progress schedules shall reflect the time extensions given to the Contractor.

04.05 In order to assure prompt review and approval of the estimate, the Contractor is advised to submit a revised substantiating C.P.M. or bar graph with each request for payment.

04.06 Failure of the Contractor to submit an estimated progress schedule or to complete timely and on schedule the Work shown on the progress schedule excludes any and all cause of claim by the Contractor for accelerated completion damages.

PART II
SECTION 5: OWNER'S RIGHT TO PROCEED WITH PORTIONS OF THE WORK

05.01 Upon failure of the Contractor to comply with any notice given in accordance with the provisions hereof, the Owner shall have the alternative right, instead of assuming charge of the entire Work, to place additional forces, tools, equipment and materials on parts of the Work. The cost incurred by the Owner in carrying on such parts of the Work shall be payable by the Contractor, such Work shall be deemed to be carried on by the Owner on account of the Contractor, and the Contractor shall be allowed therefore the Contract Price. The Owner may retain the amount of the cost of such Work from any sum or sums due, or to become due to Contractor under this Agreement.

05.02 Owner may perform additional Work related to the Project by himself, or he may let other direct contracts therefore which shall contain General Conditions similar to these. Contractor shall afford the other contractors who are parties to such different contract (or Owner, if he is performing the additional Work himself) reasonable opportunity for the introduction and storage of materials and equipment and the execution of Work, and shall properly connect and coordinate his Work with theirs.

05.03 If any part of Contractor's Work depends for proper execution or results upon the Work of any such other contractor (or Owner), Contractor shall inspect and promptly report to Engineer in writing any defects or deficiencies in such Work that render it unsuitable for such proper execution and results. His failure so to report shall constitute an acceptance of the other Work as fit and proper for the relationship of his Work except as to defects and deficiencies which may appear in the other Work after the execution of his Work.

05.04 Whatever Work is being done by the Owner, other Contractors or by this Contractor, the respecting the rights of various interests involved shall be established by the Engineer.

05.05 Contractor shall do all cutting, fitting and patching of his Work that may be required to make its several parts come together properly and fit it to receive or be received by such other Work. Contractor shall not endanger any Work of others by cutting, excavating or otherwise altering their Work and will only cut or alter their Work with the written consent of Engineer and of the other contractors whose Work will be affected.

05.06 If the performance of additional Work by other contractors or Owner is not noted in the Contract Documents prior to the execution of the Contract, written notice thereof shall be given to Contractor prior to starting any such additional Work. If Contractor believes that the performance of such additional Work by Owner or others involves him in additional expense or entitles him to an extension of the Contract Time, he may make a claim therefore. The claim must be in writing to the Owner within thirty (30) days of receipt of written notice from the Owner of the planned additional Work by others.

PART II
SECTION 6: TIME OF COMPLETION

06.01 The Work covered by the Plans, Specifications and Contract Documents must be completed sufficient for acceptance within the number of calendar days specified in the Proposal and/or the Contract, commencing from the date specified in the Work Order. It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the time of completion is an essential condition of this Contract, and it is further mutually understood and agreed that if the Contractor shall neglect, fail or refuse to complete the Work within the time specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay the Owner the amount specified in the Contract, not as a penalty, but as liquidated damages for such breach of contract for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the Work.

06.02 Prior to final payment, the Contractor may, in writing to the Owner, certify that the entire Project is substantially complete and request that the Owner or his agent issue a certificate of Substantial Completion. See Section 23.

06.03 The Owner may grant an extension of time to the Contractor for unusual circumstances which are beyond the control of the Contractor and could not reasonably be foreseen by the Contractor prior to Bidding.

06.04 Request for time extensions must be made in writing to the Engineer within seven (7) days following the event occasioning the delay. The Engineer shall be the sole judge of the validity of any claims for extension of time.

06.05 Apart from extension of time for unavoidable delays, no payment or allowance of any kind shall be made to the Contractor as compensation for damages because of hindrance or delay for any cause in the progress of the Work, whether such delay is avoidable or unavoidable.

PART II
SECTION 7: LIQUIDATED DAMAGES

7.01 In case the Work is not completed in every respect within the time that may be extended, it is understood and agreed that per diem deductions at the sum stipulated in the Proposal and/or Contract shall be made from the total Contract Price for each and every calendar day after and exclusive of the day of which completion was required, and up to the completion of the Work and acceptance thereof by the Owner. It is understood and agreed that time is of the essence to this Contract, and the above sum being specifically herein agreed upon in advance as the measure of damages to the Owner on account of such delay in the completion of the Work. It is further agreed that the expiration of the term herein assigned or as may be extended for performing the Work shall, ipso facto, constitute a putting in default, the Contractor hereby waiving any and all notice of default. The Contractor agrees and consents that the Contract Price, reduced by the aggregate of the entire damages so deducted, shall be accepted in full satisfaction of all Work executed under this Contract.

PART II
SECTION 8. LABOR, MATERIALS, EQUIPMENT, SUPERVISION, PERMITS AND TAXES

8.01 The Contractor shall provide and pay for all labor, materials, equipment, supervision, subcontracting, transportation, tools, fuel, power, water, sanitary facilities and all incidentals necessary for the completion of the Work in substantial conformance with the Contract Documents.

8.02 The Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. He shall at all times maintain good discipline and order at the site.

8.03 Unless otherwise specifically provided for in the Specifications, all workmanship, equipment, materials, and articles incorporated in the Work covered by this Contract are to be new and of the best grade of their respective kinds for the purpose intended. Samples of materials where furnished under this Contract, shall be submitted for approval to the Engineer when and as directed.

8.04 Whenever a material or article required is specified or shown on the plans by using the name of a proprietary product or of a particular manufacturer or vendor, any material or article which shall perform adequately the duties imposed by the general design will be considered equal, and satisfactory, providing the material or article so proposed is of equal substance and function and that all technical data concerning the proposed substitution be approved by the Engineer prior to the Bidding. The Engineer shall be the sole judge of quality and suitability.

8.05 Materials shall be stored so as to insure the preservation of their quality and fitness for the Work, and in a manner that leaves the material accessible to inspection. Materials or equipment may not be stored on the site in a manner such that it will interfere with the continued operation of streets and driveways or other contractors working on the site.

8.06 The Contractor by entering into the Contract for this Work sets himself forth as an expert in construction and he shall supervise and direct the Work efficiently and with his best skill and attention. He shall be solely responsible for the means, methods, techniques, sequences and procedures of construction.

8.07 Contractor shall keep on the Work at all times during its progress a competent resident Superintendent, who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The Superintendent will be Contractor's representative at the site and shall have authority to act on behalf of Contractor. All communications given to the Superintendent shall be as binding as if given to the Contractor.

8.08 Any foreman or workman employed on this Project who disregards orders or instructions, does not perform his Work in a proper and skillful manner, or is otherwise objectionable, shall, at the written request of the Engineer, be removed from the Work and shall be replaced by a suitable foreman or workman.

8.09 The Contractor shall personally see to it that all subcontracts and divisions of the Work are executed in a proper and workmanlike manner on scheduled time, and with due and proper cooperation.

8.10 Failure of the Contractor to keep the necessary qualified personnel on the Work shall be considered cause for termination of the Contract by the Owner.

8.11 Only equipment in good working order and suitable for the type of Work involved shall be brought onto the job and used by the Contractor. The Contractor is solely responsible for the proper maintenance and use of his equipment and shall hold the Owner and the Engineer harmless from any damages or suits for damages arising out of the improper selection or use of equipment. No prime piece of equipment necessary for the completion of the Work shall be removed from the job site without approval of the Engineer.

8.12 All Federal, State and local taxes due or payable during the time of Contract on materials, equipment, labor or transportation, in connection with this Work, must be included in the amount bid by the Contractor and shall be paid to proper authorities before acceptance. The Contractor shall furnish all necessary permits and certificates and comply with all laws and ordinances applicable to the locality of the Work. The cost of all inspection fees levied by the Political Body or Board having to inspect and accept the Work for maintenance shall be paid for by the Contractor.

8.13 The Contractor must provide in a form suitable to the Owner, an affidavit stating that all applicable sales taxes for materials used on this project have been paid.

8.14 During the period that this Contract is in force neither party to the Contract or the Engineer shall solicit for employment or employ an employee of the other or of the Engineer.

8.15 All materials or equipment shown on the drawings or included in these specifications shall be furnished unless written approval of a substitute is obtained from the Engineer.

8.16 Unless specified for reasons of conformity with existing products Engineer shall consider a request for a substitution of a product which, in the opinion of the Engineer, is functionally equal to that specified provided that such a request for substitution is made to the Engineer in writing at least ten (10) calendar days in advance of receipt of bids. The burden of proof of the equality of the proposed substitute is upon the proposer and only that information formally submitted shall be used by the Engineer in making his decision.

8.17 The decision of the Engineer shall be given in good faith and shall be final.

PART II
SECTION 9: QUANTITIES OF ESTIMATE, CHANGES IN QUANTITIES, EXTRA WORK

9.01 NOT REQUIRED FOR THIS CONTRACT

9.02 ~~The Owner shall have the right to make alterations in the line, grade, plans, form or dimensions of the Work herein contemplated, provided such alterations do not change the total cost of the Project, based on the originally estimated quantities, and the unit prices bid by more than twenty-five percent (25%) and provided further that such alterations do not change the total cost of any major item, based on the originally estimated quantities and the unit price bid by more than twenty-five percent (25%). (A major item shall be construed to be any item, the total cost of which is equal to or greater than ten percent (10%) of the total Contract Price, computed on the basis of the Proposal quantity and the Contract unit price). Should it become necessary, for the best interest of the Owner, to make changes in excess of that herein specified, the same shall be covered by supplemental agreement either before or after the commencement of the Work and without notice to the sureties. If such alterations diminish the quantity of Work to be done, they shall not constitute a claim for damages for anticipated profits for the Work dispensed with, but when the reduction in amount is a material part of the Work contemplated, the Contractor shall be entitled to compensation as determined by the Engineer for overhead and equipment charges which he may have incurred in expectation of the quantity of Work originally estimated, unless specifically otherwise provided herein; if the alterations increase the amount of Work, the increase shall be paid according to the quantity of Work actually done and at the price established for such Work under this Contract except where, in the opinion of the Engineer, the Contractor is clearly entitled to extra compensation.~~

9.03 Without invalidating the Contract, the Owner may order extra Work or make changes by altering, adding to, or deducting from the Work, the Contract sum being adjusted accordingly and the consent of the surety being first obtained when necessary or desirable. All the Work of the kind bid upon shall be paid for at the price stipulated in the Proposal, and no claims for any extra Work or material shall be allowed unless the Work is ordered in writing by the Owner.

9.04 Extra Work for which there is no price or quantity included in the Contract shall be paid for at a unit price of lump sum to be agreed upon in advance in writing by the Engineer and Contractor and approved by the Owner, or where such price and sum cannot be agreed upon by both parties, or where this method of payment is impracticable, the Owner may order the Contractor to do such Work on a Force Account Basis.

9.05 In computing the price of extra Work on a Force Account Basis, the Contractor shall be paid for all foremen and labor actually engaged on the specific Work at the current local rate of wage for each and every hour that said foremen and labor are engaged in such Work, plus a reasonable negotiated percentage mutually agreed to between Contractor and Owner of the total thereof for superintendence, use of tools and profit, and in addition the Contractor shall be allowed an amount to cover Workmen's Compensation and all other Federal, State or Municipal Employer payroll taxes. The Contractor shall furnish satisfactory evidence of the rate or rates of such insurance and tax.

9.06 For all material used, he shall receive the actual cost of such material delivered at the site of the Work, as shown by original receipted bill, to which shall be added a reasonable negotiated percentage mutually agreed to between Contractor for superintendence, use of tools and profit.

9.07 For any equipment used that is owned by the Contractor, the Contractor shall be allowed a rental based upon the latest prevailing rental price, but not to exceed a rental price as determined by the Associated Equipment Distributors (A.E.D. Green Book).

9.08 The Contractor shall also be paid the actual costs of transportation for any equipment which he owns and which he has to transport to the Project for the extra Work.

9.09 If the Contractor is required to rent equipment for extra Work, but not required for Contract items, he will be paid the actual cost of rental and transportation of such equipment, to which no percent shall be added. The basis upon which rental costs are to be charged shall be agreed upon in writing before the Work is started. Actual rental and transportation costs shall be obtained from receipted invoices and freight bills.

9.10 No compensation for expenses incurred in executing extra Work, other than herein specifically mentioned, will be allowed.

9.11 A record of extra Work on Force Account basis shall be submitted to the Engineer on the day following the execution of the Work, and no less than three copies of such record shall be made on suitable forms and signed by both the Engineer or his representative on the Project and the Contractor. All bills for materials used on extra Work shall be submitted to the Engineer by the Contractor upon certified statements to which will be attached original bills covering the costs of such materials.

9.12 Payment for extra Work of any kind will not be allowed unless the same has been ordered in writing by the Engineer.

PART II
SECTION 10: STATUS OF THE ENGINEER

10.01 The Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in these Contract Documents and shall not be extended without written consent of Owner and Engineer.

10.02 Engineer will make visits to the site at intervals to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. Engineer's efforts will be directed towards providing for Owner a greater degree of confidence that the completed Work will conform to the Contract Documents. On the basis of such visits and on-site observations as an experienced and qualified design professional, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defects and deficiencies in the Work. It is understood and agreed by all parties to this agreement that the Engineer, in making only periodic visits to the site, can observe only a small portion of the Contractor's work and the Engineer does not guaranty in any manner that the work meets the requirements of the plans and specifications, such guaranty being the responsibility of the Contractor.

10.03 Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work there under. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the execution and progress of the Work shall be referred initially to Engineer in writing with a request for a formal

decision in accordance with this paragraph, which Engineer will render in writing within a reasonable time. Written notice of each such claim, dispute and other matter shall be delivered by the claimant to Engineer and the other party to the Agreement within fifteen days of the occurrence of the event giving rise thereto, and written supporting data will be submitted to Engineer and the other party within forty-five days of such occurrence unless Engineer allows an additional period of time to ascertain more accurate data. In his capacity as interpreter and judge Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

10.04 Engineer will issue with reasonable promptness such written clarifications or interpretations of the Contract Documents (in the form of Drawings or otherwise) as Engineer may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If Contractor believes that a written clarification or interpretation justifies an increase in the Contract Price or Contract Time, Contractor may make a claim therefore as provided.

10.05 The rendering of a decision by Engineer pursuant to paragraph 10.03 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided) will be a condition precedent to any exercise by Owner or Contractor of such rights or remedies as either may otherwise have under the Contract Documents or at law in respect of any such claim, dispute or other matter.

10.06 Engineer as the Owner's representative will have authority to disapprove or reject Work which is Defective, and will also have authority to require special inspection or testing of the Work as provided whether or not the Work is fabricated, installed or completed. The Engineer does not have the authority to stop work.

10.07 In connection with Engineer's responsibility for Shop Drawings and samples, see Section 02.

10.08 In connection with Engineer's responsibility in respect of Applications for Payment, etc., see Section 22.

10.09 Engineer will be the interpreter of the requirements of the Contract Documents and the judge of the performance there under. In his capacity as interpreter and judge he will exercise his best efforts to insure faithful performance by both Owner and Contractor. He will not show partiality to either and will not be liable for the result of any interpretation or decision rendered in good faith. Claims, disputes and other matters relating to the execution and progress of the Work or the interpretation of or performance under the Contract Documents shall be referred to Engineer for decision; which he will render in writing within a reasonable time. Neither Engineer's authority to act under this Article or elsewhere in the Contract Documents nor any decision made by him in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of Engineer to Contractor, any Subcontractor, any material man, fabricator, supplier, surety or any of their agents or employees or any other person performing any of the Work.

10.10 Engineer will not be responsible for Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and he will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents. Engineer will not be responsible for the acts or omissions of Contractor, or any Subcontractors, or any of their agents or employees, or any other persons at the site or otherwise performing any of the Work.

The Contractor and his surety understands and agrees that the Engineer has no obligation to the Contractor to see that the Contractor completes his work in accordance with the plans and specifications and that the Engineer's site visits are for the benefit of the Engineer and the Owner and not of the Contractor.

10.11 The Engineer under this Contract is performing services solely for the Owner, no benefit is conferred upon any other party and no claim against the Engineer shall accrue to any party other than the Owner as a result of the performance or nonperformance of Engineering services and all parties to this contract including surety agree that subrogation of the Owner's rights does not give any other party including surety a right to claim against Engineer.

10.12 Conferences between the Engineer, the Contractor, Subcontractor and other interested parties will be held periodically at the time and place as selected by the Engineer. The Contractor's Superintendent, as well as a person in authority to make decisions, must be present as well as authorized and accredited representative of the various Subcontractors and other persons and parties of interest.

PART II

SECTION 11: INJURIES TO PERSONS AND PROPERTY

11.01 The Contractor shall be held alone responsible for all injuries to persons and for all damages to the property of the Owner or others caused by or resulting from the negligence of himself, his employees or his agents, regardless of whether or not it is caused solely or in part by a party indemnified hereunder during the progress of or in connection with the prosecution of the Work, whether within the limits of the Work or elsewhere under the Contract proper or as extra Work. This requirement will apply continuously and not be limited to normal working hours or days. The Engineer's construction review is for the purpose of checking the Work product produced and does not include review of the methods employed by the Contractor or to the Contractor's compliance with safety measures of any nature whatsoever. The Contractor agrees to pay reasonable attorneys fees, and other reasonable attendant costs of both the Owner and the Engineer in the event it becomes necessary for the Owner and/or the Engineer to employ an attorney to enforce this section of the Specifications or to protect themselves against suit over the Contractor's responsibilities.

11.02 The Contractor must protect and support all water and gas pipes or other properties which are liable to be damaged during the execution of his Work. He shall take all reasonable and proper precautions to protect persons, animals and vehicles or the public from injury, and wherever necessary, shall erect and maintain a fence or railing around any excavation, and place a sufficient number of lights about the Work and keep them burning from twilight until sunrise, and shall employ one or more watchmen as an additional security whenever they are needed. He must, as far as practicable and consistent with good construction, permit access to private and public property and leave fire hydrants, catch basins, streets, etc., free from encumbrances. He must restore at his own expense all injured property caused by any negligent act of omission or omissions on his part or on the part of his agent, including sidewalks, curbing, sodding, pipes, conduits, sewers, buildings, fences, bridges, retaining walls, tanks, power lines, levees or any other building or private property to a condition as good as it was when he entered upon the Work.

11.03 In case of failure on the part of the Contractor to restore such property or make good such damage, the Owner may upon forty-eight (48) hours notice proceed to repair, or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any monies due or which may become due under his Contract.

11.04 Contractor shall indemnify and hold harmless Owner and Engineer and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the Work, caused in whole or in part by any negligent act or omission of Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused solely or in part by a party indemnified hereunder.

11.05 In any and all claims against Owner or Engineer or any of their agents or employees by any employee of Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 11.04 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts.

11.06 No road shall be closed by the Contractor to the public except by written permission of the Owner and except while so closed, the Contractor shall maintain traffic over, through and around the Work included in his Contract, with the maximum practical convenience, for the full twenty-four hours of each day of the Contract, whether or not Work has ceased temporarily. The Contractor shall notify the Engineer at the earliest possible date after the Contract has been executed, and in any case before the starting of any construction that might in any way inconvenience or endanger traffic, so that the necessary arrangements may be determined.

11.07 The convenience of the general public and of residents along the Work shall be provided for in a reasonable, adequate and satisfactory manner. Where existing roads are not available for use as detours, unless otherwise provided, all traffic shall be permitted to pass through the Work. In such cases the vehicles of the travel in public shall have precedence over Contractor's vehicles to the end that the traveling public's vehicles shall not be unduly delayed for the convenience of the Contractor. In order that all necessary delay to the traveling public may be avoided, the Contractor shall provide and station competent flagmen whose sole duties shall consist of directing and controlling the movement of public traffic either through or around the Work.

11.08 The Contractor shall arrange his Work so that no undue or prolonged blocking of business establishments will occur.

11.09 Material and equipment stored on the right of way or Project site shall be so placed and the Work at times shall be so conducted as to insure minimum danger and obstruction to the traveling public.

11.10 During grading operations when traffic is being permitted to pass through construction, the Contractor shall provide a smooth, even surface that will provide a satisfactory passageway for use of traffic. The road bed shall be sprinkled with water if necessary to prevent a dust nuisance, provided the dust nuisance is a result of the Work.

11.11 Fire hydrants shall be accessible at all times to the Fire Department. No material or other obstructions shall be placed closer to a fire hydrant than permitted by ordinances, rules or regulations or within fifteen (15) feet of a fire hydrant, in the absence of such ordinance, rules or regulations.

11.12 The Contractor shall not, without the written permission of the Owner, do Work for a resident or property owner abutting the Work at the time that this Work is in progress.

11.13 No Work of any character shall be commenced on railroad right of way until the Railroad Company has issued a permit to the Owner and has been duly notified by the Contractor in writing (with a copy forwarded to the Engineer) of the date he proposes to begin Work, and until an authorized representative of the Railroad Company is present, unless the Railroad Company waives such requirements. All Work performed by the Contractor within the right of way limits of the railroad shall be subject to the inspection and approval of the chief engineer of the Railroad Company, or his authorized representative and any precautions considered necessary by said chief engineer to safeguard the property, equipment, employees and passengers of the Railroad Company shall be taken by the Contractor without extra compensation. The Contractor shall, without extra compensation, take such precautions and erect and maintain such tell-tale or warning devices as the Railroad Company considers necessary to safeguard the operation of its trains. The temporary vertical and horizontal clearance specified by the chief engineer of the Railroad Company in approving these shall be maintained at all times. No steel, brick, pipe or any loose material shall be left on the ground in the immediate vicinity of the railway track. Before any Work is done within Railroad right of way, the Contractor shall provide, and pay all costs of any special insurance requirements of the Railroad.

11.14 The Contractor, shall, without extra compensation, provide, erect, paint and maintain all necessary barricades. Also, without extra compensation, the Contractor shall provide suitable and sufficient lights, torches, reflectors or other danger signals and signs, provide a sufficient number of watchmen and flagmen and take all the necessary precautions for the protection of the Work and safety of the Public.

11.15 The Contractor shall erect warning signs beyond the limits of the Project, in advance of any place on the Project where operations interfere with the use of the road by traffic, including all intermediate points where the new Work crosses or coincides with the existing road. All barricades and obstructions shall be kept well painted and suitable warning signs shall be placed thereon. All barricades and obstructions shall be illuminated at night and all lights or devices for this purpose shall be kept burning from sunset to sunrise.

11.16 Whenever traffic is maintained through or over any part of the Project, the Contractor shall clearly mark all traffic hazards. No direct payment will be made for barricades, signs and illumination therefore, or for watchmen or flagmen.

11.17 In accordance with generally accepted construction practices, the Contractor will be solely and completely responsible for conditions on the job site, including safety of all persons and property during performance of the Work. This requirement will apply continuously and not be limited to normal working hours. The duty of the Engineer to conduct construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures, in, or near the construction site.

PART II
SECTION 12: SANITARY PROVISIONS

12.01 The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of his employees as may be necessary to comply with the rules and regulations of the State Health Agency or of the other authorities having jurisdiction, and shall permit no public nuisance.

PART II
SECTION 13: RIGHTS-OF-WAY

13.01 The Owner will furnish the Contractor with all necessary rights of way for the prosecution of the Work. The rights of way herein referred to shall be taken to mean only permission to use or pass through the locations or space in any street, highway, public or private property in which the Contractor is to prosecute the Work.

13.02 It is possible that all lands and rights of way may not be obtained as herein contemplated before construction begins, in which event the Contractor shall begin his Work upon such land and rights of way as the Owner may have previously acquired. Any delay in furnishing these lands by the Owner shall be deemed proper cause for adjustment in the Contract amount and/or in the time of completion.

PART II
SECTION 14: PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE

14.01 The Contractor shall not enter upon private property for any purpose without first obtaining permission from the Owners and Lessees. The Contractor shall use every precaution necessary for the preservation of all public and private property, monuments, highway signs, telephone lines, other utilities, etc., along and adjacent to the Work; shall use every precaution necessary to prevent damage to pipes, conduits, and other underground structures; and shall protect carefully from disturbance or damage all land monuments and property marks until an authorized agent has witnessed or otherwise referenced their location and shall not remove them until directed. The street and highway signs and markers that are to be affected by the Work, shall be carefully removed when the Work begins and stored in a manner to keep them clean and dry. The Contractor must obtain all necessary information in regard to existing utilities, and shall give notice in writing to the owners or the proper authorities in charge of streets, gas, water, pipes, electric, sewers and other underground structures, including conduits, railways, poles and pole lines, manholes, catch basins, fixtures, appurtenances, and all other property that may be affected by the Contractor's operations, at least forty-eight (48) hours before his operations will affect such property. The Contractor shall not hinder or interfere with any person in the protection of such Work or with the operation of utilities, at any time. When property or the operation of railways, or other public utilities are endangered, the Contractor shall at his own expense, maintain flagmen or watchmen and any other necessary precautions to avoid interruption of service or damage to life or property, and he shall promptly repair, restore, or make good any

injury or damage caused by his negligent operations in an acceptable manner. The Contractor must also obtain all necessary information in regard to the installation of new cables, conduits, and transformers, and make proper provisions and give proper notifications, so that these can be installed at the proper time without delay to the Contractor or unnecessary inconvenience to the Owner.

14.02 The Contractor shall not remove, cut or destroy trees, shrubs, plants, or grass that are to remain in the streets or those which are privately owned, without the proper authority. Unless otherwise provided in the Special Provisions or the Proposal, the Contractor shall replace and replant all plants, shrubs, grass and restore the grounds back to its original good condition to the satisfaction of the Owner and the property owner. The Contractor shall assume the responsibility of replanting and guarantees that plants, shrubs, grass will be watered, fertilized and cultivated until they are in a growing condition. No direct payment will be made for removing and replanting of trees, shrubs, plants or grass unless such items are set forth in the Proposal.

14.03 When or where direct damage or injury is done to public or private property by or on account of any negligent act, omission, neglect or otherwise of the Contractor, he shall make good such damage or injury in an acceptable manner.

PART II
SECTION 15: CONTRACTOR'S RESPONSIBILITY FOR WORK

15.01 Until final acceptance of the Work by the Owner as evidence by approval of the final estimate, the Work shall be in the custody and under the charge and care of the Contractor and he shall take every necessary precaution against injury or damage to any part thereof by the action of the elements or from the non-execution of the Work; unless otherwise provided for elsewhere in the Specifications or Contract. The Contractor shall rebuild, repair, restore and make good, without extra compensation, all injuries or damages to any portion of the Work occasioned by any of the above causes before its completion and acceptance, and shall bear the expenses thereof. In case of suspension of the Work from any cause whatever, the Contractor shall be responsible for all materials and shall properly store them, if necessary, and shall provide suitable shelter from damage and shall erect temporary structures where necessary. If in the opinion of the Engineer, any Work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or any of his Subcontractors to so protect his Work, such materials shall be removed and replaced at the expense of the Contractor.

15.02 The Contractor shall give all notice and comply with all Federal, State and local laws, ordinances and regulations in any manner affecting the conduct of the Work, and all such orders and decrees as exist, or may be enacted by bodies or tribunals having any jurisdiction or authority over the Work, and shall indemnify and hold harmless the Owner and the Engineer against any claim or liability arising from, or based on, the violation of any such law, ordinance, regulation, order or decree, whether by himself, his employees or Subcontractors.

PART II
SECTION 16: TESTS AND INSPECTIONS, CORRECTION & REMOVAL OF DEFECTIVE WORK

16.01 Contractor warrants and guarantees to Owner that all materials and equipment will be new unless otherwise specified and that all Work will be of good quality and free from faults or defects and in accordance with the requirements of the Contract Documents. All unsatisfactory Work, all faulty or Defective Work and all Work not conforming to the requirements of the Contract Documents at the time of acceptance shall be considered Defective. Prompt notice of all defects shall be given to the Contractor.

16.02 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any Work to specifically be inspected, tested or approved by some public body, Contractor shall assume full responsibility therefor, pay all costs in connection therewith and furnish Engineer the required certificates of inspection, testing or approval. All other inspections, tests and approval required by the Contract Documents shall be performed by organizations acceptable to Owner and Contractor and the costs thereof shall be borne by the Contractor unless otherwise specified.

16.03 Contractor shall give Engineer timely notice of readiness of the Work for all inspections, tests or approvals. If any such Work required so to be inspected, tested or approved is covered without written approval of Engineer, it must, if requested by Engineer, be uncovered for observation, and such uncovering shall be at Contractor's expense unless Contractor has given Engineer timely notice of his intention to cover such Work and Engineer has not acted with reasonable promptness in response to such notice.

16.04 Neither observations by Engineer nor inspections, tests or approvals shall relieve Contractor from his obligations to perform the Work in accordance with the requirements of the Contract Documents.

16.05 Engineer and his representatives and other representatives of Owner will at reasonable times have access to the Work. Contractor shall provide proper and safe facilities for such access and observation of the Work and also for any inspection or testing thereof by others.

16.06 If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for his observation and replaced at Contractor's expense. If any Work has been covered which Engineer has not specifically requested to observe prior to its being covered, or if Engineer considers it necessary or advisable that covered Work be inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose or otherwise make available for observations, inspection or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is Defective, Contractor shall bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, including compensation for additional professional services, and an appropriate deductive Change Order shall be issued. If, however, such Work is not found to be Defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction.

16.07 If the Work is Defective, or Contractor fails to supply sufficient skilled workmen or suitable materials or equipment, or if the Contractor fails to make prompt payments to Subcontractors or for labor, materials or equipment, Owner may order Contractor to stop the Work, or any portion thereof, until the cause of such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor or any other party.

16.08 Prior to approval of final payment, Contractor shall promptly, without cost to Owner and as specified by Engineer, either correct any Defective Work, whether or not fabricated, installed or completed, or if the Work has been rejected by Owner, remove it from the site and replace it with non-defective Work. If Contractor does not correct such Defective Work or remove and replace such rejected Work within a reasonable time, all as specified in a written notice from Engineer, Owner may have the deficiency corrected or the rejected Work removed and replaced. All direct or indirect costs of such correction or removal and replacement including compensation for additional professional services, shall be paid by Contractor, and an appropriate deductive Change Order shall be issued. Contractor shall also bear

the expense of making good all Work of others destroyed or damaged by his correction, removal or replacement of his Defective Work.

16.09 If, after the approval of final payment and prior to the expiration of one year after the date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any Work is found to be Defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions, either correct such Defective Work, or if it has been rejected by Owner, remove it from the site and replace it with non-defective Work. If Contractor does not promptly comply with the terms of such instructions, Owner may have the Defective Work corrected or the rejected Work removed and replaced, and all direct and indirect costs of such removal and replacement, including compensation for additional professional services, shall be paid by Contractor.

16.10 If, instead of requiring correction or removal and replacement of Defective Work, Owner (and, prior to approval of final payment, also Engineer) prefers to accept it, he may do so. In such case, if acceptance occurs prior to approval of final payment, a Change Order shall be issued incorporating the necessary revisions in the Contract Documents, including appropriate reduction in the Contract Price, or, if the acceptance occurs after approval of final payment, an appropriate amount shall be paid by Contractor to Owner.

16.11 If Contractor should fail to prosecute the Work in accordance with the Contract Documents, including any requirements of the progress schedule, Owner, after seven days written notice to Contractor, may, without prejudice to any other remedy he may have, make good such deficiencies and the cost thereof including compensation for additional professional services shall be charged against Contractor. In which case, a Change Order shall be issued incorporating the necessary revisions in the Contract Documents including an appropriate reduction in the Contract Price. If the payments then or thereafter due Contractor are not sufficient to cover such amount, Contractor shall pay the difference to Owner.

16.12 The Engineer may appoint assistants to make periodic visits to the site and observe the progress and quality of the executed Work. These assistants shall be governed by the same restrictions placed on the Engineer by these Specifications. The governing body of the Federal, State or local government exercising authority in the area of the Work may appoint representatives to observe the progress and quality of the Work. Contractor shall cooperate with and assist these representatives in the performance of their duties.

16.13 The Contractor shall be responsible for the faithful execution of his Contract and the presence or absence of the Owner's or Government's Representative is in no manner to be presumed to relieve in any degree the responsibility or obligation of the Contractor.

16.14 The Contractor shall notify the Owner and the Governmental Agency having jurisdiction as to the exact time at which he proposes to begin Work so the Owner may provide for inspection of all materials, foundations, excavations, equipment, etc., and all or any part of the Work and to the preparation or manufacture of materials to be used whether within the limits of the Work or at any other place.

16.15 The Owner or his representatives shall have free access to all parts of the Work and to all places where any part of the materials to be used are procured, manufactured or prepared. The Contractor shall furnish the Owner all information relating to the Work and the material therefor, which may be deemed necessary or pertinent, and with such samples of materials as may be required. The Contractor, at his own expense, shall supply such labor and assistance as may be necessary in the handling of materials for proper inspection or for inspection of any Work done by him.

16.16 No verbal instructions given to the Contractor by the Owner, Engineer, Project Representative or any of their agents shall change or modify the written Contract. Contractors shall make no claims for additional payments or time based upon verbal instructions.

PART II
SECTION 17: SUBSURFACE CONDITIONS

17.01 It is understood and agreed that the Contractor is familiar with the subsurface conditions that will be encountered and his price bid for the Work includes all of the costs involved for Work in these conditions and it is furthermore agreed that he has taken into consideration, prior to his Bid and its acceptance by Owner, all of the subsurface conditions normal or unusual that might be encountered in the location of the Work.

17.02 Should the Contractor encounter during the progress of the Work subsurface conditions at the site materially differing from those shown on the Drawings or indicated in the Specifications, the attention of the Engineer and the Owner shall be directed to such conditions before they are disturbed. If the Engineer finds that they materially differ from those shown on the Drawings or indicated in the Specifications, he shall at once make such changes in the Drawings or Specifications as he may find necessary, and any increase or decrease in cost or extension of time resulting from such changes shall be adjusted in the same manner as provided for changes for extra Work. The Contractor shall submit breakdowns of all costs in a manner as instructed and approved by the Engineer.

PART II
SECTION 18: REMOVAL AND DISPOSAL OF STRUCTURES AND OBSTRUCTIONS

18.01 Bidder shall thoroughly examine the site of the Work and shall include in his Bid the cost of removing all structures and obstructions in the way of the Work.

18.02 The Contractor shall remove any existing structures or part of structures, fence, building or other encumbrances or obstructions that interfere in any way with the new constructions. Compensations for the removal of any structure shall be made only if the item(s) to be removed were listed as pay item(s) on the Proposal.

18.03 If called for in the Special Conditions, all privately and publicly owned materials and structures removed shall be salvaged without damage and shall be piled neatly and in an acceptable manner upon the premises if it belongs to an abutting property owner, otherwise at accessible points along the improvements. Materials in structures which are the property of the Owner or property of any public body, private body or individual which is fit for use elsewhere, shall remain property of the original Owner. It shall be carefully removed without damage, in sections which may be readily transported and shall be materials of Owner, State or Municipality and stored on or beyond the right of way. The Contractor will be held responsible for their care and preservation for a period of ten (10) days following the day the last or final portion of the materials stored at a particular location are placed thereon. When privately owned materials are stored beyond the right of way, the Contractor will be held responsible for their care and preservation for a period of ten (10) days (computed as set forth above), provided, however, that as of the day the ten (10) days responsibility period for care and preservation of the materials begins, the Contractor must furnish the Engineer with evidence satisfactory to the latter the proper owner of the materials has been duly notified by the Contractor that the said

Owner must assume responsibility for his materials on the date following the Contractor's ten (10) day responsibility.

PART II
SECTION 19: OWNER'S RIGHT TO OCCUPANCY

19.01 The Owner shall have the right to use at any time, any and all portions of the Work that have reached such a stage of completion as to permit such occupancy, provided such occupancy does not hamper the Contractor or prevent his efficient completion of the Contract, or be construed as constituting an acceptance of any part of the Work.

19.02 The Owner shall have the right to start the construction of houses or of other building concurrent with the Contractors work.

PART II
SECTION 20: SURVEY HORIZONTAL AND VERTICAL CONTROL

20.01 The Owner shall provide engineering surveys for construction to establish reference points which in his judgment are necessary to enable Contractor to layout and proceed with his Work. Contractor shall be responsible for surveying and laying out the Work and shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of the Engineer. Contractor shall report to Engineer whenever any reference point is lost or destroyed and the Engineer shall decide if the reference point shall be replaced by his or the Contractor's forces.

20.02 The Contractor shall establish lines and grades with his own forces in sufficient number and location for the proper execution of the Work.

20.03 If the Contractor, during the construction, damages the established property corners and P.C.'s and he requests the Engineer to re-stake same in order to complete their project, this expense will be borne by the Contractor.

PART II
SECTION 21: TERMINATION OF THE CONTRACT, OWNER'S AND CONTRACTOR'S RIGHT TO STOP WORK

21.01 If the Contractor should be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should persistently or repeatedly refuse or should fail except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he should fail to make prompt payment to Subcontractors or for material or labor, or persistently disregard laws, ordinances or the instructions of the Engineer, or otherwise be guilty of a substantial violation of any provision of the Contract, then the Owner, upon the certificate of the Engineer that, in his judgment, sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor ten (10) day written notice, terminate the employment of the Contractor and take possession of the premises and of all materials, tools and appliances thereon and finish the Work by whatever method he may deem expedient.

21.02 Failure of the Contractor to start the Work within the time limit specified herein or substantial evidence that the progress being made by the Contractor is insufficient to complete the Work within the specified time shall be ground for termination of the Contract by the Owner.

21.03 Before the Contract is terminated, the Contractor and his surety will first be notified in writing by the Owner of the conditions which make termination of the Contract imminent. Ten (10) days after this is given, if a satisfactory effort has not been made by the Contractor or his surety to correct the conditions, the Owner may declare the Contract terminated and notify the Contractor and his surety accordingly.

21.04 Upon receipt of notice from the Owner that the Contract has been terminated, the Contractor shall immediately discontinue all operations. The Owner may then proceed with the Work in any lawful manner that he may elect until it is finally completed.

21.05 The right is reserved to take possession of any machinery, implements, tools or materials of any description that shall be found upon the Work, to account for said

equipment and materials, and to use same to complete the Project. When the Work is thus finally completed, the total costs of same will be computed. If the total cost is less than the Contract price, the difference will be paid to the Contractor or his surety.

21.06 In case of termination, all expenses incident to ascertaining and collecting losses under the Bond, including Engineering and legal services, shall be assessed against the Bond.

21.07 If the Work should be stopped under any order of any court or public authority, for period of sixty (60) days, through no act or fault of the Contractor or anyone employed by him, or if the Owner shall fail to pay the Contractor within a reasonable time any sum certified by the Engineer, then the Contractor may, upon ten (10) days written notice to the Owner, stop Work or terminate this Contract and recover from the Owner payment for all Work executed and any loss sustained upon any plant or materials and reasonable profit and damages.

21.08 In the case of termination of this contract for any fault, neglect or breach of contract, Contractor agrees to indemnify Owner for any and all expenses, including professional fees, engineering cost, advertising expenses, court costs, legal fees or other costs incurred by the Owner in or as a result of the termination of this contract and, the securing by Owner of the services of others to complete the work. Additionally Contractor shall in such event be liable to and shall indemnify for any difference in costs above the amount of this contract incurred by the Owner in obtaining such completion of the work.

PART II
SECTION 22: PAYMENTS TO THE CONTRACTOR

22.01 Monthly certificates for partial payment, in a form approved by the Engineer, shall be transmitted to the Owner upon receipt from the Contractor and acceptance by the Engineer. These certificates shall be equal to ninety five percent (95%) of both the Work performed and materials stored at the site. Partial payment certificates shall include only Work, materials and equipment that are included in official Work order and which meet the requirements of plans, Specifications and Contract Documents. These monthly estimates shall show the amount of the original estimate for each item, the amount due on each item, the gross total, the retained percentage, the amount previously paid and the net amount of payment due.

22.02 After final completion and acceptance by the Owner of the entire Work, the Engineer shall issue to the Contractor Certificate of Payment in sum sufficient to increase total payments of the Contract Price minus retainage.

a. Contract price up to $499,999.00 – 10% of the Contract price.

b. Contract price of $500,000.00 or greater – 5% of the Contract price.

22.03 The final payment certificate of the remaining retainage of the Contract Price, minus any deduction for deficient or Defective Work or balance due, will be issued by the Engineer forty-five (45) days after filing acceptance in the Mortgage Office of the Parish and a Clear Liens and Privilege Certificate has been secured. Before issuance of the final payment certificate, the Contractor shall deposit with the Engineer a certificate from the Ex-Officio Recorder of Mortgages from the Parish in which the Work is performed to the effect that no liens have been registered against Contract Work.

22.04 When, in the opinion of the Contractor, the Work provided for and contemplated by the Contract Documents has been substantially completed the Contractor shall notify the Engineer in writing that the Work is substantially complete and request a final inspection. The Engineer shall proceed to perform such final inspection in company with the Owner. Any and all Work found by this inspection to be Defective or otherwise not in accordance with the plans and Specifications shall be corrected to the entire satisfaction of the Owner and at the expense of the Contractor. If the Contract is found to be incomplete in any of its details, the Contractor shall at once remedy such defects, and payments will be withheld and formal acceptance delayed until such Work has been satisfactorily completed.

22.05 If payment is requested on the basis of materials and equipment not incorporated in the Work, but delivered and suitably stored and protected from damage and theft at the site, the Request for Payment shall also be accompanied by such data, satisfactory to the Owner, as will establish Owner's title to the material and equipment and protect his interest therein, including applicable insurance.

22.06 Each subsequent Request for Payment shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied to discharge in full all of Contractor's obligations reflected in prior Request for Payment.

22.07 Each subsequent request for payment shall include an affidavit by Contractor that Contractor, all subcontractors, agents, material suppliers and all other persons supplying material to the project upon which St. Bernard sales taxes are lawfully due have paid these taxes and that all supplies and materials purchased for this project and for which Contractor has been paid have had all lawfully due St. Bernard sales taxes paid.

22.08 The Bid Proposal, unless otherwise modified in writing, and the Contract constitutes a complete Project. The Contract prices constitute the total compensation payable to Contractor and the cost of all of the Work and materials, taxes, permits and incidentals must be included into the Bid submitted by the Contractor and included into those items listed on the Proposal.

22.09 Any additional supporting data required by the Engineer in order to substantiate Contractor's request for payment shall be furnished by Contractor at no cost to the Owner.

22.10 Owner may withhold from payment to Contractor as may be necessary to protect himself from loss on account of:

(1) Defective and/or inferior work.
(2) Damage to the property of Owner or others caused by Contractor.
(3) Failure by Contractor to make payments properly to sub-contractors or to pay for labor, materials or equipment used on this project.
(4) Failure by Contractor to pay taxes due on materials used on this project.
(5) Damage by Contractor to another Contractor.

PART II
SECTION 23: ACCEPTANCE AND FINAL PAYMENT(S)

23.01 Upon receipt of written notice from Contractor that the work is substantially complete and usable by Owner or the Public in suitable manner, the Engineer and the Contractor shall jointly inspect the work.

23.02 If the Engineer by his inspection determines that the work is not substantially complete in a suitable manner for use by the Owner or the Public then he shall so notify the Contractor and the Owner in writing, stating his reason.

23.03 If the Engineer by his inspection determines that the work is substantially complete he shall prepare a list of all items not satisfactorily completed and shall notify the Contractor and Owner in writing that the work is substantially complete and, subject to satisfactorily resolution of those items on the list (punch list), is complete.

23.04 Upon determination of substantial completeness with punch list the contract time is interrupted and the Contractor is given a reasonable time not to exceed thirty (30) consecutive calendar days to effect final completion by correcting or completing all of those items listed on the punch list. If the items on the punch list are not completed in a satisfactory manner within the thirty day period then the contract time will begin to run again and will include for purposes of determining liquidated damages the thirty day period the grace period being withdrawn.

23.05 Upon receipt by Owner of written determination by Engineer that all work embraced by the contract has been completed in a satisfactory manner the Owner shall provide a written acceptance to Contractor who shall record Owner's written acceptance with the recorder of Mortgages, the Parish of St. Bernard, paying all costs therefore.

23.06 Retainage monies, minus those funds deducted in accordance to the requirements of Paragraph 22.10, shall be due Contractor not earlier than forty-six (46) days after recordation of certificate of Owner's acceptance provided the following:

(1) Contractor shall secure and submit clear lien and privilege certificate, signed and sealed by the Recorder of Mortgages, Parish of St. Bernard and dated at least forty-six (46) days after recordation of certificate of acceptance.

23.07 After securing the clear lien and privilege certificate the Contractor shall prepare final application for payment and submit to Engineer. The Engineer shall approve or state his objections in writing and forward to Owner for payment.

PART II
SECTION 24: NOTICE AND SERVICE THEREOF

24.01 Any notice to the Contractor from the Owner or from the Engineer relative to any part of this Contract shall be in writing and shall be considered delivered and the service thereof completed when said notice is posted; by registered mail, to the said Contractor at his last given address, or delivered in person to said Contractor or his authorized representative on the Work.

PART II
SECTION 25: INTENTION OF THESE GENERAL SPECIFICATIONS

25.01 These General Conditions shall be applicable to all contracts entered into by and between the Owner and Contractors for public improvements, except as they may be altered or amended with the consent of the representative of Owner, and provided for in the Special Provisions of each contract. Contractor shall be presumed to have full knowledge of these General Provisions which shall be applicable to all contracts whether he has obtained a copy thereof or not.

PART II
SECTION 26: SEVERABILITY

26.01 If any one or more or part of any of the provisions contained in the Specifications and Contract for the Work shall for any reason be held invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provisions of this Agreement, but it shall be construed as if such invalid, illegal, or unenforceable provision or part of a provision had never been contained herein.

26.02 CHANGING THESE SPECIFICATIONS: Only upon the recommendation of the ENGINEER and subject to the approval of the OWNER and the CONTRACTOR can these GENERAL SPECIFICATIONS be changed or modified.

PART II
SECTION 27: LAW OF THE STATE OF LOUISIANA

27.01 The Contract Documents shall be governed by the Law of the State of Louisiana.

27.02 The Contractor agrees to pay reasonable attorney's fees and other reasonable attendant costs, in the event that it becomes necessary for the Owner to employ an attorney in order to enforce compliance with or any remedy relating to any covenants, obligations, or conditions imposed upon the Contractor by this Agreement.

27.03 The 34th Judicial District of the State of Louisiana shall be the Court of Original Jurisdiction of any litigation originated under this contract.

PART II
SECTION 28: TRAFFIC CONTROL

28.01 Contractor shall apply for required permits and submit to the Louisiana Department of Transportation and Development (LA DOTD) a traffic control management plan prior to commencement of activities requiring traffic lane closures. Contractor shall be responsible for any and all permits and costs required by LADOTD for lane closures needed to perform the work shown on the contract documents. Contractor shall apply for all permits required by LADOTD expeditiously as to not delay construction activities. Contractor shall coordinate submittal of the traffic control management plan with construction activities so as not to delay start up and completion of the work per the agreed to construction duration. Traffic control measures shall comply with all current LA DOTD standards, details and requirements. Contractor shall also contact the St. Bernard Parish School Board, St. Bernard Parish Sheriff's Office, Fire Department, Ambulance and 911 services notifying each agency of upcoming traffic interruptions from planned lane closures. See attached blank permit form following this section.

END OF SECTION

Three (3) copies of the drawings must accompany this permit application.

When applicable, the following supplement is also required and shall become a part of this permit: Railroad Supplement

ENTERED IN COMPUTER FILE

_____
INITIAL AND DATE

Permit Number _____

CONTROL _____ **SECTION** _____

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

PROJECT PERMIT

(Required by State Law) Rev 5/13

A copy of this permit shall be available at the site where and when work is performed.

Whereas _____,
(Print or type name of applicant)

hereinafter termed applicant, requests a permit for the use and occupancy of the right-of-way of State Highway No. _____

in _____ Parish, located as follows:

from: _____ Lat: _____ Long: _____

to: _____ Lat: _____ Long: _____
(in Decimal Degrees, e.g. Lat:-30.459, Long: -91.178)

for the installation, operation and maintenance of the following described project (use additional sheets as necessary):

Estimated number of times this facility will be accessed each year after construction has been completed, including meter readings: _____

By signing this permit, applicant/permittee hereby acknowledges receiving a copy of the permit, the general conditions and standards, and the Standards for Installation of Facilities on State Highways, and agrees to comply with all provisions contained therein and all applicable laws, rules and regulations.

DOTD USE ONLY:
Permit is subject to the following conditions (use additional sheets as necessary):

RECOMMENDED FOR APPROVAL
(Check box if review required)

☒ District Permit Specialist / Date

☒ District Area Engineer / Date

☐ District Water Resources Engineer / Date

☐ District Administrator (or Designee) / Date
Print Name _____

Applicant must notify District Permit Specialist at phone number: _____
prior to beginning work and after work is completed.
Final inspection and approval by: _____

Issue Date: _____

Installation to be completed by: _____
(Date)

Permit must be signed by the owner or lessee of the property. Contractor may NOT acquire permit

_____
(Agency Representative Signature) (Date)

_____
(Name of Person Signing Permit) (Printed or Typed)

_____
(Title)

_____
(Street or P.O. Box)

_____
(City or Town) (State) (Zip Code)

_____
(Telephone Number)

_____
(E-mail Address)

DOTD APPROVAL:

_____
Headquarters Right-of-Way Permit Engineer / Date or
District Administrator (or Designee) / Date

Print Name _____

HEADQUARTERS (original) pc: DISTRICT pc: PERMITTEE

The following general conditions and standards shall apply:

FIRST: That, the rights and privileges granted herein shall be nonexclusive and shall not be construed to be any broader than those expressly set out in Acts of the Legislature of the State of Louisiana, regardless of the language used in this permit and that any facilities placed on the highway right-of-way shall be placed in accordance with existing laws and the standards of the Department.

SECOND: That, all facilities thereto, after having been erected, shall at all times be subject to inspection and the right is reserved to require such changes, additions, repairs, relocations and removal as may at anytime be considered necessary to permit the relocation, reconstruction, widening and maintaining of the highway and to provide proper and safe protection to life and property on or adjacent to the highway, or in the interest of safety to traffic on the highway and that the cost of making such changes, additions, repairs and relocations shall be borne by the applicant, and that all of the cost of the work to be accomplished under this permit shall be borne by the permittee who agrees to hold the Department harmless therefor.

THIRD: That, the proposed facilities or their operation or their maintenance shall not unreasonably interfere with the facilities or the operation or maintenance of the facilities of other persons, firms or corporations previously issued permits of use and occupancy, and the proposed facilities shall not be dangerous to persons or property using or occupying the highway or using facilities constructed under previously granted permits of use and occupancy; and that the Department's records of prior permits are available, it being the duty of the applicant to determine the existence and location of all facilities within the highway right-of-way.

FOURTH: That, installations within the highway right-of-way shall be in accordance with applicable provisions contained in the following: AASHTO Guide for Accommodating Utilities within Highway Right of Way, Code of Federal Regulations 23 (CFR 23), National Electrical Safety Code C2, and the 1996 Federal Telecommunications Act. Those facilities not included in the above mentioned documents shall be in accordance with accepted practice. Where standards of the Department exceed those of the above cited codes, the standards of the Department shall apply, The Department reserves the right to modify its policies as may be required if conditions warrant.

FIFTH: That, data relative to the proposed location, relocation and design of fixtures or appurtenances as may be required by the Department shall be furnished to the Department by the applicant free of cost, and that the permit applicant shall make any and all changes or additions necessary to make the proposed facilities thereto satisfactory to the Department.

SIXTH: That, cutting and trimming of trees, shrubs, etc., shall be in accordance with the Department's EDSM IV.2.1.6 and Vegetation Manual, as revised.

SEVENTH: That, the applicant agrees to defend, indemnify, and hold harmless the Department and its duly appointed agents and employees from and against any and all claims, suits, liabilities, losses, damages, costs or expenses, including attorneys' fees sustained by reason of the exercise of this permit, whether or not the same may have been caused by the negligence of the Department, its agents or employees, provided, however, that the provisions of this last clause (whether or not the same may have been caused by the negligence of the Department, its agents or employees) shall not apply to any personal injury or property damage caused by the sole negligence of the Department, its agents or employees, unless such sole negligence shall consist or shall have consisted entirely and only of negligence in the granting of a permit or permits.

EIGHTH: That, the applicant is the owner of the facility for which a permit requested, and is responsible for maintenance of such: and any permit granted by the Department is granted only insofar as the Department had the power and right to grant the same.

NINTH: That, any permit granted by the Department is subject to revocation at any time.

TENTH: That, signing for warning and protection of traffic in instances where workmen, equipment or materials are in close proximity to the roadway surfacing, shall be in accordance with requirements contained in the Department's Manual on Uniform Traffic Control Devices. No vehicles, equipment and/or materials shall operate from, or be parked, stored or stock piled on any highway, median, or in an area extending from the outer edge of the shoulder of the highway on one side to the outer edge of the shoulder of the highway on the opposite side or in the median of any divided highway.

ELEVENTH: That, all provisions and standards contained herein relative to the installation of utilities shall apply to future operation, service and maintenance of utilities.

TWELFTH: That, drainage in highway side and cross ditches must be maintained at all times. The entire highway right-of-way affected by work under a permit must be restored to as good a condition as existed prior to beginning work to the complete satisfaction of the Departments R/W Permit Engineer.

THIRTEENTH: Any non-metallic or non-conductive underground facility must be installed with a non-corrosive metallic wire or tape placed directly over and on the center of the facility for its entire length within highway right-of-way. Wire or tape must be connected to all facilities.

FOURTEENTH: Prior to performing any excavations, the applicant is required to call Louisiana One Call. If installing any underground facilities such as cable or conduits, the applicant must be a member of Louisiana One Call. In addition, the applicant must contact DOTD at 1-800-259-4929 or DOTD-FiberLocates@la.gov at least 24 hours prior to performing any excavation on DOTD Right-of-way (either for installation or maintenance).

STANDARDS FOR INSTALLATION OF FACILITIES ON STATE HIGHWAYS

GENERAL

(1) All materials and workmanship shall conform to the requirements of the applicable industry code and to Department specifications.

(2) All safety precautions for the protection of the traveling public must be observed. Undue delay to traffic will not be tolerated.

(3) All excavations within the limits of the right-of-way shall be backfilled and tamped in six inch layers to the density of the adjacent undisturbed soil. Where sod is removed or destroyed, it shall be replaced within one week. Where existing spoil material is, at the discretion of the Department, unsuitable for backfill, select material shall be furnished in lieu thereof and the existing material disposed of by approved methods.

(4) Any clearing and grubbing which may be required by the applicant shall be represented by a plan covering any such actions as well as erosion control measures which may be required to vegetate the area under such clearing and grubbing. The applicant is authorized to retain all cleared timber. The applicant shall follow-up with an erosion control, seeding plan approved by DOTD.

(5) Access to the lines shall be first from the land side, second from the interchange (longitudinally) and third from the highway (to be approved in each instance).

(6) Repairs under the roadway will not be allowed if such repairs necessitate open cutting the highway. If a problem occurs with a line crossing, the utility company must install a new crossing. The utility company must bear 100% of the cost.

(7) The DOTD District Permit Office shall be contacted and notified and shall give approval whenever the cable must be accessed, including routine maintenance. For routine maintenance, three (3) days notice shall be given. In emergency situations, as much notice as possible must be given.

(8) Repeater boxes shall be placed as far outside of the right-of-way as possible, unless where otherwise approved by the Department, and in an area that will allow easy access for maintenance.

(9) Parallel installations shall be located on a uniform alignment to the right-of-way line and within six (6) inches of the approved alignment.

SUMMARY OF WORK SECTION 01010

1.01 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Supplementary Conditions, and other Division 1 - General Requirements apply to the work specified in this Section.

B. Division 1 Sections describe the administrative and procedural requirements and are as follows:
1. 01010 - Summary of Work
2. 01030 - Alternates
3. 01200 - Project Meetings
4. 01300 – Submittals
5. 01400 – Procedures and Quality Control
6. 01410 – Testing Laboratory Services
7. 01500 - Construction Facilities and Temporary Controls
8. 01600 - Materials and Equipment
9. 01700 - Project Closeout

1.02 PROJECT IDENTIFICATION

A. The work contemplated and covered in these Specifications and the accompanying Drawings consist of the Contractor furnishing all labor, materials, equipment, supervision, and all other services required including all work reasonably intended in the Contract Documents for:

ST. BERNARD PARISH PUBLIC LIBRARY
Judge Perez Drive
St. Bernard Parish, Louisiana
MBA Project No. 11884
ABM Project No. 201803

B. The drawings which accompany and compliment the Specifications are identified on drawing title sheet.

1.03 GENERAL WORK DESCRIPTION

A. Scope of Services: The work of this Contract, except as otherwise specified shall include all labor, materials, equipment and facilities necessary to produce the required result, all transportation and services, and all materials and equipment incorporated and intended to be incorporated in such results. The Work includes all fees, taxes, permit costs, insurance premiums, and costs for overhead, superintendence, temporary facilities, and other direct and indirect costs and expenses incidental to the performance of the Work.

B. Note: The building must be completely enclosed, including roof and watertight to prevent intrusion of rain before any drywall installation commences. Millwork, wood doors and finish materials shall not be installed until building is enclosed, either with permanent or temporary walls to remain until permanent walls are erected and watertight, including roof, and also the building is climatized by the building HVAC systems being operable or other temporary mechanical systems to maintain the dry bulb temperatures between 55 and 78 degrees F and relative humidity at less than 55 % during installation.

C. The Contractor shall be responsible for correcting non-conforming concrete floor substrates (excessive moisture/humidity content, etc. adversely affecting the proper bonding of the finish flooring to the substrate) using materials compatible with the specified flooring systems and as approved by the flooring manufacturer. Such correction of non-conforming concrete floor substrates shall be made without additional cost or time added to the Construction Contract.

D. The Architect and his consultants will incur additional expenses if the Contract Time is extended due to the fault of the Contractor. The Owner will withhold monies from the Contractor's established retainage on this Contract and shall use those monies to pay for additional expenses incurred during each day of delay. If the retainage or any part thereof is not sufficient to cover those noted additional expenses, the Contractor shall be responsible for any excess above the retainage amounts. The additional expenses will be derived by hourly rates of $180.00/hour for a principal and $115.00/hour for the construction contract administrator not to exceed $300.00/day, plus all normal reimbursable expenses. All expenses will be substantiated with timesheets. This cost is not part of, but in addition to any liquidated damages

1.04 EXISTING CONDITIONS

A. The Contractor shall accept the area of the work in it's present condition and carefully examine the area of the work and determine for himself all existing conditions visually discernable and/or reasonably expected from his understanding of the Construction Documents and/or reasonably inferable from the Contract Documents or his particular knowledge of this particular type of project, and shall be responsible for same. No activity by the Contractor shall jeopardize the usefulness of the existing building to the Owner at any time during the construction period.

1.05 CONTRACTOR'S USE OF PREMISES

A. Confine operations at site to areas within the limits of the work of this Contract.

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 the Owner.

1.06 INTERPRETATION OF DOCUMENTS

A. The Contractor shall notify the Architect of any ambiguity, inconsistency or error which he may discover upon examination of the Construction Documents or of the site and local conditions. If the Contractor performs any work knowing it to be contrary to applicable laws, ordinances rules and regulations, and without such notice to the Architect, he shall assume full responsibility therefore and shall bear all costs attributable thereto.

B. During construction the "Request For Information" form, a copy following this section, shall be completed and submitted to the Architect to obtain a response to any needed information and/or clarifications.

C. Should there be any discrepancy within information on the drawings and information within the specifications, and/or between information on the drawings and information in the specifications, the Architect, whose decision is final, will decide which information and requirement shall govern, and such could be the more stringent and more expensive requirement. Contractor to provide at no additional cost to the Owner

1.7 CONTRACTORS REPRESENTATIONS

A. The Contractor represents that he has visited the site and determined for himself all existing conditions, laws and regulations that will affect the construction of the work and be responsible for same.

B. The contractor must be fully qualified under any "Licensing Law for Contractors" in effect at the time and place of the work before submitting his proposal. In the State of Louisiana, only the bids of Contractors and Subcontractors duly licensed under Chapter 24 of the Louisiana State Legislature, La. R.S. 37:2151, et seq., will be considered if licensing is required. The law requires the Contractor to ascertain that his Subcontractors are fully licensed in accordance with the law.

C. The Contractor represents that the Contract will include all permits, other than the building permit

D. The Contractor represents that he has ascertained prior to submission of his bid that he has received all addenda issued, and that his contract will contain the costs associated with these addenda.

E. The Contractor represents that the contract will include the full cost of the building permit, and all other permits and licenses, required as a result of the work of this Contract such as State Fire Marshal Plan Review Fee, as well as fees for inspection and testing as required by the City, Parish, or State authority having jurisdiction over this project. The Contractor acknowledges that if the Owner has prepaid any portion of the building permit or other permit fees, the Owner will deduct from the bid an amount equal to that prepaid by the Owner for the permits in arriving at the Contract Sum to be used on the Contract to be entered into by the Owner and Contractor, or the permit fee shall be deducted by Change Order.

F. The Contractor represents that the Contract will include all applicable taxes; local, state, and federal.

G. The Contractor represents that he has ascertained prior to submission of his bid that he has received all addenda issued. and that his contract will contain the costs associated with these addenda.

1.8 SUPERINTENDENT

A. Contractor shall, prior to the commencement of construction operations, submit to the Architect for approval the name of the Superintendent and assistants he proposes to assign to the job and shall further submit a resume of the experience of the Superintendent and assistants and such other data as will attest to their competence and qualifications. This information shall be submitted in duplicate for the guidance of the Architect and Owner, and assignment of a Superintendent to the job shall not be made until the Owner and the Architect have approved this selection.

B. The Superintendent shall be full time and be in attendance at the site whenever Work is being performed.

1.9 WORKING CONDITIONS AND SCHEDULING

A. In general, the work may be performed during normal working hours, provided it is performed in a manner which does not interfere with the normal use and functions of the adjacent areas and buildings by the public.

B. The Contractor shall furnish sufficient forces, construction plant and equipment, and shall work such hours of overtime or perform a continuous operation if necessary to insure the prosecution of the work in accordance with the approved progress schedule. It is imperative that the Work be completed on or before the date scheduled, and necessary allowances shall be made in estimating the project to allow for the construction schedule. The Contractor shall "accelerate" his subcontractors to the fullest extent and he shall impress upon his subcontractors the expedience required to overcome delays on their part or in the delivery of materials. He shall be alert to any and all happenings that affect the progress of the project. If the Contractor should fall behind in the progress schedule, it is mandatory that he take immediate steps, whatever required, to put the project back on schedule. Neither the Contractor nor any of his subcontractors nor anyone working on the Project shall be entitled to any compensation whatsoever for acceleration of the work for any reason for which the Contractor or any of his subcontractors or anyone else working on the Project is responsible, even if that responsibility is only a partial cause of the need to accelerate.

1.10 PROTECTION OF PROPERTY AND PUBLIC

A. Contractor shall protect the public and the existing property that is adjacent to the Work being performed under this contract. Contractor shall also obtain approval from the Architect prior to removal of protection. Prior to commencing work, the Contractor shall provide adequate protection such as covers, dust partitions, platforms, scaffolding, etc., all as may be necessary to protect the Owner's property from dust and possible falling debris and/or materials. Removal of such protection shall likewise be performed with extreme care to prevent possible damage to the Owner's property.

B. Furthermore, the Contractor shall repair at his own cost and make good all damage to the Owner's property and to adjacent and adjoining properties not belonging to the Owner for which he is or has been adjudged to be legally responsible. He shall further, reimburse the Owner and/or Architect in full for any damages resulting from suits that may be decided against the Owner and/or Architect rising out of claims for property damage due to the Contractor's improper performance or negligence on the part of any of the Contractor's employees, agents, or subcontractors, or due to any other acts for which the Contractor is legally responsible, together with all attorneys' fees, cost of court, and any other expense that may be entailed by the Owner and/or Architect in defending themselves against such suits and/or claims.

C. The Contractor shall make all necessary provisions for the protection of the public. He shall provide barriers and shelters or any other safeguards as required to protect the public in accordance with the local laws. The safeguards and protections shall be fully maintained in first-class condition during the entire construction period, and at no time shall required protection be removed without the approval of the Architect. It is of utmost importance that

all construction work be done without interfering with the normal operations of the adjacent areas and buildings.

D. Restore all areas and items disturbed by the new construction to original condition.

1.11 CLEANLINESS AND CLEANUP

A. All existing areas adjacent to the area of work must be kept clean from Contractor's debris. Any area not adequately cleaned by the Contractor shall be cleaned by the Owner (to his satisfaction) and the cost of such cleaning operations shall be deducted from any monies still due the Contractor.

1.12 DEFINITIONS AND EXPLANATIONS

A. Scope: This article defines certain terms used in the specifications (Project Manual), and explains the language, abbreviations thereof, format and certain conventions used in the Specifications and associated Contract Documents.

B. Limitations: The definitions and explanations of this article are not necessarily either complete or exclusive, but are general for the work to the extent such definitions or explanations are not stated more explicitly in another provision of the Contract Documents.

C. General Explanation: A substantial amount of the Contract Document Specification language constitutes specific definitions for terms found in the other contract documents, including the drawings which must be recognized as diagrammatic in nature and not completely descriptive of the requirements indicated thereon. Certain terms used repetitiously in the Contract Documents are defined generally in this article.

D. General Requirements: The provisions and requirements of the performance of the work, either exclusively or in conjunction with others performing other work as part of the project.

E. Definitions:

1. Project Site: The space available to the Contractor for the performance of the work, either exclusively or in conjunction with others performing other work as part of the project.

2. Provide: Except as otherwise defined in greater detail, the term "provide" means furnish and install, complete and ready for the intended use, as applicable in each instance.

3. Project Manual: Includes the bidding requirements, Conditions of the Contract, and the Specifications (Division 1 through 16).

4. Related Work Specified Elsewhere: List of items under this heading in the Specifications is for convenience only and is not intended to be all-inclusive or all-exclusive, nor to the direct specific trades to perform specific work.

F. Format Explanation: The format of principal portions of these specifications can be described as follows; although other portions may not fully comply and no particular significance will be attached to such compliance or non-compliance:

1. Sections and Divisions: For convenience, the basic unit of specification text is a "section", each unit of which is named and numbered. These are organized into related families of sections, and the various families of sections are organized into "divisions", which are recognized as the present industry-consensus on uniform organization and sequencing of specifications. The section title is not intended to limit the meaning or content of the section, nor to be fully descriptive of the requirements specified therein, nor to be an integral part of the next.
2. Parts: Each section of specification has been subdivided into 3 (or less) "parts" for uniformity and convenience (Part 1 - General, Part 2 - Products, and Part 3 - Execution). These do not limit the meaning of, and are not an integral part of, the text which specifies requirements.
3. Underscoring: Used strictly to assist the reader of specification text in scanning the text for key works in the content (for quick recall). No emphasis on or relative importance of text is intended where underscoring is used.
4. Section Numbering: Sections are numbered in CSI 5 Digit System. Contract Documents sections are placed in the Project Manual in numerical sequence; however, the numbering sequence is not complete, and the listing of sections in the Project Manual must be consulted to determine the numbers and names of specification sections in the contract documents.
5. Page Numbering: Numbered independently for each section.

G. Overlapping and Conflicting Requirements: Where compliance with 2 or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes 2 different or conflicting minimums or levels of quality, the most stringent requirement (which is generally recognized to be also the most costly) is intended and will be enforced, unless specifically detailed language written into the Contract Documents (not by way of reference to an industry standard) clearly indicates that the less stringent requirement is to be fulfilled. Refer apparently equal, but different requirements and uncertainties, as to which of 2 levels of quality is the more stringent, to the Consultant for a decision before proceeding.

H. Minimum Quality/Quantity: In every instance, the quality level or quantity shown or specified is intended as the minimum for the work to be performed or provided.

I. Specialists; Assignments: In certain instances the specification text requires (or at least implies) that specific work be assigned to certain specialists or expert entities, who must be engaged for the performance of those units of work.

J. Abbreviations: The language of the specifications and elsewhere in the Contract Documents is of the abbreviated type in certain instances, and implies words and meanings which will be appropriately interpreted.

END OF SECTION

Mathes Brierre + ARCHITECTS BEAZLEY MOLIERE
A JOINT VENTURE

Request For Information

Project: St. Bernard Parish Public Library
St. Bernard Parish, Louisiana

MBA Project No. 11884

RFI No. _____

Date: _____

Contractor:

Brief Description:

Drawing No. _____
Spec. Section _____

Detailed Description:

MBA Response:

Note: Some of the items in this response may result in credits or additions which may become part of a future Request for Change Order.

____ This document is not a RFI and therefore is being returned to you without a response. This document has not been entered into the project's RFI Log.

Initialed: _____

Date: _____

PROJECT MEETINGS SECTION 01200

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:

1. Pre-Construction Conference
2. Pre-Installation Conferences
3. Coordination Meetings
4. Progress Meetings

B. The Contractor shall schedule and conduct meeting. The Architect will record the contents of all meetings and distribute typed minutes to all pertinent parties in a timely manner.

1.03 PRE-CONSTRUCTION CONFERENCE

A. Owner will schedule a pre-construction conference and organizational meeting at the Project site or other convenient location after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.

B. Attendees: The Owner, Architect and their consultants, the Contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.

C. Agenda: Discuss items of significance that could affect progress including such topics as:

1. Tentative construction schedule.
2. Critical Work sequencing.
3. Designation of responsible personnel.
4. Procedures for processing field decisions and Change Orders.
5. Procedures for processing Applications for Payment.
6. Distribution of Contract Documents.
7. Submittal procedure for Shop Drawings, Product Data and Samples.
8. Preparation of record documents.
9. Use of the premises.
10. Office, Work, and storage area.
11. Equipment deliveries and priorities.
12. Safety procedures.
13. First aid.
14. Security.
15. Housekeeping.

16. Working hours.
17. Establish timing of progress meetings to coincide with monthly pay request.

D. Submittals: Contractor will be responsible for submitting the following at the pre-construction conference:

.

1. Insurance certificates
2. Estimated progress schedule for the work
3. Traffic control management plan
4. Payment application forms G702 and G703 filled out with Schedule of Values
6. List of Sub-Contractors
7. Schedule of unit prices
8. Submittal Schedule
9 List of Contractor's staff assignments
10. Storm water pollution prevention plan

1.04 PRE-INSTALLATION CONFERENCES

A. Conduct a pre-installation conference at the site before each construction activity that requires coordination with other construction. The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect of schedule meeting dates.

B. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:

1. Contract Documents
2. Options
3. Related Change Orders
4. Purchases
5. Deliveries
6. Shop Drawings, Product Data and quality control samples
7. Possible conflicts
8. Compatibility problems
9. Time schedules
10. Weather limitations
11. Manufacturer's recommendations
12. Compatibility of materials
13. Acceptability of substrates
14. Temporary facilities
15. Space and access limitations
16. Governing regulations
17. Safety
18. Inspection and testing requirements
19. Required performance results
20. Recording requirements
21. Protection

C. Record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner and Architect.

D. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

1.05 COORDINATION MEETINGS

A. Conduct Project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and shall address similar agenda items as the Progress Meetings.

B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.

C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.06 PROGRESS MEETINGS

A. Conduct progress meetings at the Project site weekly. Notify the Owner and Architect of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.

B. Attendees: In addition to representatives of the Owner and Architect, Contractor and his Superintendent each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.

C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project to include applicable agenda items listed for the Pre-Construction Conference and as further listed below.

D. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

E. Review the present and future needs of each entity present, including such items as:

1. Interface requirements
2. Time
3. Sequences
4. Deliveries
5. Off-site fabrication problems

6. Access
7. Site utilization
8. Temporary facilities and services
9. Hours of work
10. Hazards and risks
11. Housekeeping
12. Quality and Work standards
13. Change Orders
14. Documentation of information for payment requests

F. Reporting: No later than three (3) days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

G. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

END OF SECTION

PAYMENT PROCEDURES SECTION 01290

PART 1 – GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Application for Payment.

1.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including Application for Payment forms with Continuation Sheets, Submittals Schedule and Contractor's Construction Schedule.
2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
3. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the Schedule of Values:

a. Project name and location.
b. Name of Architect.
c. Architect's project number.
d. Contractor's name and address.
e. Date of submittal.

2. Submit draft of AIA Document G703 Continuation Sheets.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.

8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

9. Schedule Updating: Update and resubmit the schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion~ and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Times: Progress payments shall be submitted to Architect by the 30th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

D. Payment Application Forms: Use AlA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.

E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

F. Transmittal: Submit five (5) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.

2. When an application shows completion of an item, submit final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors. Submit at Pre-Construction Conference.
2. Schedule of Values. Submit at Pre-Construction Conference
3. Contractor's Construction Schedule (preliminary if not final). Due 5 days after Award of Bid, but no later than the Pre-Construction Conference.
4. Schedule of unit prices. Submit at Pre-Construction Conference.
5. Submittals Schedule (preliminary if not final). Due 5 days after Award of Bid. but no later than the Pre-Construction Conference
6. List of Contractor's staff assignments. Due 5 days after Award of Bid.
7. Initial progress report. Due with first Application for Payment.
8. Report of preconstruction conference. Due with first Application for Payment.

I. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion on, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final, liquidated damages settlement statement.
9. Prior to final payment (retainage) being released by the Owner, the Contractor must secure and provide the Owner with a unrestricted Use and Occupancy Certificate.

PART 2- PRODUCTS (Not Used)

PART 3- EXECUTION (Not Used)

END OF SECTION 01290

SUBMITTALS SECTION 01300

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Submittal schedule and procedures.

B. Construction progress schedule.

C. Proposed products list.

D. Daily construction reports.

E. List of Subcontractors.

F. Shop drawings.

G. Product data.

H. Samples.

I. Manufacturer's instructions.

J. Manufacturer's certificates.

K. Schedule of values.

1.02 RELATED SECTIONS

A. Section 01700 - Project Closeout

1.03 DEFINITIONS

A. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.

B. Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the work will be judged.

C. Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not samples.

1.04 SUBMITTAL SCHEDULE

A. General: Immediately following the development and acceptance of the fully developed progress schedule, prepare a complete Submitted Schedule of work-related submittals. Submit within ten (10) days of date required for establishment of the progress schedule. Correlate submittal schedule with the requirements of Division 2 through 16.

B. Form: Prepare schedule in chronological sequence of submittals related to dates required for the items on the site. Indicate generic description of work covered including type of submittal, related specification section numbers, name of subcontractor/vendor and required date for item to be delivered on the site. The Schedule shall contain all submittals required including shop drawings (SD), product data (PD) and samples (S). Columns for date of submittal to Architect and Architect to Contractor, resubmittal, and final release by the Architect shall be left blank for use by the Architect.

1. The above Schedule will serve as a summary of work related submittal and will be used by the Architect as a submittal log.

1.05 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

B. Submission Requirements: Electronic submittals are preferred in lieu of hardcopies described within this section. Coordinate with the MBA Project Manager regarding submission electronically or via hardcopy for all submittals. Some hardcopy submittals may be required. Schedule submissions at least 45 days before dates on which reviewed submittals will be needed. Submit samples in number and size specified in each Specification Section. Accompany submittals with transmittal letter, in duplicate, containing the following:

C.

1. Date.
2. Project Title and Number.
3. Contractor's Name and Address.
4. The number of each Shop Drawing, Project Datum and Sample submitted.
5. Notification of deviations from Contract Documents.
6. Other pertinent data.
7. NOTE: Each individual transmittal shall only contain submittals for a single specification division, i.e. do not submit division 3 items together with division 4 items on the same transmittal.

D. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

1. Provide a space approximately 4 by 6 inches on the label or beside the title block on shop drawings to record the Contractor's and Architect's review markings and the action taken.
2. Include the following information on the label for processing and recording action taken.
    a. Project name.
    b. Date.
    c. Name and address of the Architect.
    d. Name and address of the Contractor.
    e. Name and address of the subcontractor.
    f. Name and address of the supplier.
    g. Name of the manufacturer.

h. Number and title of appropriate specification section.
i. Drawing number and detail references, as appropriate.
j. Identification of product or material.
k. Relation to adjacent structure or materials.
l. Field dimensions, clearly identified as such.
m. Application standards, such as ASTM number or Federal Specification.
n. Identification of deviation from Contract Documents (if any).
o. Contractor's stamp, initialed certifying to review of submittal, verification of field measurements and compliance with Contract Documents.

E. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect using a transmittal form. The Architect will not accept submittals received from sources other than the Contractor.

1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.
2. Transmittal Form: Use the "round-robin" form at the end of this Section for transmittal of submittals.

F. Sequentially number the transmittal forms. Resubmittals shall have original number with an alphabetic suffix.

G. Identify Project, Contractor, subcontractor or supplier; pertinent drawing sheet and detail number(s), and specification section number.

H. Contractor shall review all submittals. Apply Contractor's stamp, signed, or initialed certifying that review, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

I. Schedule submittals to expedite the Project, and deliver to Architect at Architect's business address. Coordinate submission of related items.

J. Contractor shall identify deviations from Contract Documents in writing and/or indicate on the submittal and on the submitted transmittal noting "Deviation". Also provide product or system limitations which may be detrimental to successful performance of the completed Work.

1. If items, dimensions or methods submitted deviate from the Contract Documents and action is not taken by the Architect or his Consultants, this action and the deviation shall not alter the Contract sum.

K. It is the Contractor's responsibility to submit revised details and coordinate any necessary changes in related work when the dimensions and configuration of original details (Contract Documents) are altered by substitutions of materials according to provisions for substitutions contained in the Contract Documents and/or any deviations submitted.

L. Revise and resubmit submittals as required, identify all changes made since previous submittal.

M. Begin no work which requires submittals until submittals are received with Architects/ Engineers stamp and initial indicating review and final unrestricted release. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.06 ARCHITECT'S REVIEW

A. The Architect will review submittals only for the limited purpose of checking conformance with the design concept of the project and with the information given in the Contract Documents. Review of a separate item shall not indicate approval of an assembly in which the item functions or any other related assembly.

B. The Architect's review shall not relieve the Contractor from responsibility for errors or omissions in the submittals.

C. 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.

D. The Architect's action on the stamp does not constitute acceptance of any deviations. If deviations are accepted the contract price shall not increase.

E. Action Stamp: The architect will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

1. Final Unrestricted Release: Where submittals are marked "Do Not Resubmit", that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
2. Final-But-Restricted Release: When submittals are marked "Reviewed" and "Noted", that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
3. Returned for Resubmittal: When submittal is marked "Resubmit As Noted" or "Rejected", do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.

F. Should resubmission be required, the resubmission will be checked one additional time. Should three (3) or more submissions be required, the Owner shall reduce the contract amount, by deductive change orders, for the additional services and expenses of the Architect and/or his consultants.

1.07 DAILY CONSTRUCTION REPORTS

A. Prepare a daily construction report recording the following information concerning events at the site, and submit duplicate copies to the Architect at weekly intervals:

1. List of subcontractors at the site.
2. Approximate count of personnel at the site.

3. High and low temperatures, general weather conditions.
4. Accidents and unusual events.
5. Meetings and significant decisions.
6. Stoppages, delays, shortages, and losses.
7. Meter readings and similar recordings.
8. Emergency procedures.
9. Orders and requests of governing authorities.
10. Change Orders received, implemented.
11. Services connected, disconnected.
12. Equipment or system tests and start ups.
13. Partial Completions, occupancies.
14. Substantial Completions authorized.

1.08 CONSTRUCTION PROGRESS SCHEDULES

A. Schedule: Prepare a fully developed CPM (Critical Path Method equal to Primavera, Microsoft Projects, etc.) construction schedule in horizontal bar-chart format, to include submittal schedule, critical path items (critical remaining work) all activities linked by predecessors and successors and milestones, and other items listed below. Submit within 10 days after the date established for "Commencement of the Work" but no later than the preconstruction meeting.

1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the work as indicated in the "Schedule of Values".
2. Within each time bar, indicate estimated completion percentage in 10 percent increments. As work progresses, place a contrasting mark in each bar to indicate actual completion.
3. Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, or sufficient width to show data for the entire construction period.
4. Secure time commitments for performing critical elements of the work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the work. Show each activity in proper sequence. Indicate graphically the sequences necessary for completion of related portions of the work.
5. Coordinate the Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittal Schedule, progress reports, payment requests, and other schedules.
6. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Architect's procedures necessary for certification of Substantial Completion.

B. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner.

C. Phasing: On the schedule, show how requirements for phased completion to permit work by separate Contractors and partial occupancy by the Owner affect the sequence of work.

D. Work Stages: Indicate important stages of construction for each major portion of the work, including submittal review, testing, and installation.

E. Area Separations: Provide a separate time bar to identify each major construction area for each major portion of the work. Indicate where each element in an area must be sequenced or integrated with other activities.

F. Cost Correlation: At the head of the schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of work performed as of the dates used for preparation of payment requests.

G. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the project meeting room and temporary field office.

1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in construction activities.

H. Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.09 PROPOSED PRODUCTS LIST

A. Within ten (10) days after date of Owner-Contractor Agreement, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. In addition, submit the names of the manufacturers of any long lead items that would potentially impact the progress of the Work and is the Contractor's responsibility to identify these manufacturers. Unless the aforementioned information is submitted, no extensions of time will be considered if extenuating circumstances exist affecting timely product delivery. Furthermore, no payments will be made to the Contractor unless all information is furnished.

C. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.10 SUBCONTRACTORS

A. Within ten (10) days of signing the Agreement or at the Pre-Construction Conference (whichever is first) submit to the Owner and Architect, in writing, the names of the persons and/or entities, (including those who furnish materials or equipment), proposed to perform the work of each portion of the Work.

B. No payments will be made to the Contractor until all information is furnished.

1.11 SHOP DRAWINGS

A. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract

Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.

B. Review of shop drawings by the Architect will be for general compliance with Contract Documents. No responsibility will be assumed by the Architect for correctness of dimensions, quantities or details. The Contractor shall check and verify all field measurements. The Contractor and each separate Contractor shall submit with such promptness as to cause no delay in their own work or in that of any other Contractor, shop or setting drawings, and schedules required for the work of the various trades.

C. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:

1. Dimensions.
2. Identification of products and materials included by sheet and detail number.
3. Compliance with specified standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.
6. Indicate deviations from the Contract Documents.

D. Initial Submittal: The first submittal of shop drawings to the Architect for review shall be electronic pdf file.

1. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit shop drawings on sheets at least $8^1/_2$" x 11" but no larger than 36 by 48 inches. If drawings require more than one 24" x 30" size sheet multiple $8^1/_2$" x 11" size drawings are not acceptable and will be returned for incorporating into a larger sheet.

E. Final Submittal: The pdf (with corrections marked thereon and stamped) will be returned to the Contractor. A subsequent pdf and print shall be resubmitted by the Contractor after correcting the original tracing, until the pdf is stamped by the Architect "No Exceptions Taken", the Contractor shall resubmit final pdf

F. Maintain one set of shop drawings at the project site, available for reference by the Architect, Engineer or others.

G. After review, reproduce and distribute in accordance with Article on Procedures above and for Record Documents described in Section 01700 - Contract Closeout.

1.12 PRODUCT DATA

A. Collect and submit all required data into one submittal for each material, product or system; and mark each copy to show which choices and options are applicable to the project. Include manufacturer's standard printed recommendations for specific application and use for this project, compliance with standards, application of labels and seals, notation of field measurements which have been checked, and special coordination requirements. Maintain one set of product data at the project site, available for reference by the architect, Engineer or others.

1. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer' standard data to provide information unique to this Project. Where printed Product Data includes information on several products that

are not required, mark copies to indicate the applicable information only. Include the following information:

a. Manufacturer's printed recommendations.
b. Compliance with trade association standards.
c. Compliance with recognized testing agency standards.
d. Application of testing agency labels and seals.
e. Notation of dimensions verified by field measurement.
f. Notation of coordination requirements.

2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

B. Submit electronic pdf of each required submittal. The Architect will mark with action taken and corrections or modifications required.

1. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

C. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in Section 01700 - Contract Closeout.

1.13 SAMPLES

A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

B. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Architect's selection, or where indicted as "custom", submit in custom color indicated.

C. Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least 3 multiple units that show approximate limits of the variations.

D. All such samples, colors, etc. shall be submitted in one complete package to facilitate Architects review of related materials and colors. Each sample and color grouping shall be properly labeled with project name, Architect's job number, and applicable specification section number.

1.14 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.

B. The Contractor is responsible to furnish and install equipment in accordance with manufacturer's instructions and more stringent requirements when specified. If manufacturer's instructions deviate or conflict with the Contract Documents, the Contractor shall identify conflict to the Architect prior to procuring or installing equipment.

1.15 MANUFACTURER'S CERTIFICATES

A. When specified in individual specification Sections, submit manufacturers' certificate to Architect/Engineer for review, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceed specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on materials or Product, but must be acceptable to Architect/Engineer.

1.16 SCHEDULE OF VALUES

A. In accordance with General Conditions. Correlate line items with other administrative schedules and forms required for the Work, including progress payment request forms (AIA Forms G703 and G702). Provide breakdown of Contract Sum in sufficient detail to facilitate continued evaluation of payment requests and progress reports. Submit three (3) copies of Schedule of Values to Architect and as follows:

1. Submit at Pre-Construction Conference.

2. Use the Index of this Specification as the format for listing costs of work for Sections under Division 1 through 16. Use each Section number under each Division. Each section shall be subdivided into separate line items for the total cost (with overhead and profit) of separate items in Section.

3. Round off cost figures to the nearest ten (10) dollars. The total of all items shall equal the total Contract Sum.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

Mathes Brierre + ABM
ARCHITECTS ARCHITECTS BEAZLEY MOLIERE
A JOINT VENTURE

ROUTING TRANSMITTAL

PROJECT: _____

Architects Contact: _____
General Contr. Contact: _____
Mechanical Contact: _____
Electrical Contact: _____

PROJECT NO.: _____
SUBMITTAL NO: _____

TO	FROM	SENT	RECEIVED
MATHES BRIERRE + ABM			
	MATHES BRIERRE + ABM		

Enclosed please find the following: _____

Drawings Prepared By:	Copies:	Drawing No. or Title:	Resubmit	Do Not Resubmit	Resubmit As Noted	Reviewed	Noted	Rejected

REMARKS:

_____
_____
_____
_____

Architect's review is for conformity to the design concept and for general arrangement only in accordance with the general conditions of the contract:

1. Reviewed: work may proceed.
2. Noted: work may proceed as noted – resubmit corrected drawing.
3. Resubmit: Correct and resubmit drawing before proceeding.
4. Rejected.
5. Do not resubmit.
6. Resubmittals noted.

201 St. Charles Avenue. Suite 4100. New Orleans. Louisiana 70170-4100 504.586.9303 phone. 504.582.1305. fax.
architecture@mathesbrierre.com

Architect's review is for conformity to the design concept and for general arrangement only in accordance with the general conditions of the contract:

1. Reviewed: work may proceed.
2. Noted: work may proceed as noted – resubmit corrected drawing.
3. Resubmit: Correct and resubmit drawing before proceeding.
4. Rejected.
5. Do not resubmit.
6. Resubmittals noted.

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architecture@mathesbrierre.com

PROCEDURES AND QUALITY CONTROL SECTION 01400

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to the work specified in this section.

1.02 ADMINISTRATION

A. Coordination: Coordinate various elements of the work and entities engaged to perform work; and coordinate the work with existing facilities/conditions, and with work by separate contractors (if any) and Owner.

B. Project Meetings: Conduct general progress and coordination meetings at least once each month, attended by a representative of each primary entity engaged for performance of work. Record discussions and decisions, and distribute copies to those attending and others affected including the Architect. Schedule meetings to coordinate with preparation of payment requests.

1. See Section 01200 - Project Meetings.

1.04 SUBMITTAL SCHEDULE

A. General: Immediately following the development and acceptance of the fully developed progress schedule, prepare a complete schedule of work-related submittals. Submit within ten (10) days of date required for establishment of the progress schedule. Correlate submittal schedule with the listing of principal subcontractors. Refer to Section 01300 and Division 2 through 16 for submittal requirements.

B. Form: Prepare schedule in chronological sequence of "first submittals". Show category of submittal, name of subcontractor, generic description of work covered, related Specification section numbers, activity or event number on progress schedule, scheduled date for first submission, and blank columns for actual date of submittal, resubmittal, and final release by the Architect.

1.05 SURVEYING/RECORDING

A. General: Working from established lines and levels at or near project site, establish and maintain dependable markers for lines and levels of the Work, including markers for each story of construction and elsewhere on the site as needed to properly locate construction and elsewhere on the site as needed to properly locate each element of the entire project. Calculate dimensions and measure for layout of work; do not scale the Drawings. Maintain surveyor's log of layout work. Record deviations (if any) from drawings information on existing conditions, and review with Architect at time of discovery.

1. The Contractor shall retain a competent registered professional engineer or registered land surveyor, acceptable to the Owner and Architect, who shall establish the exterior lines building corners, first floor slabs and required elevations of all buildings and

structures to be erected on the site and shall establish sufficient lines and grades for the construction of associated work such as, but not limited to, roads, utilities, and site grading. The engineer or land surveyor shall certify the actual location of the constructed facilities in relation to the property lines, building lines, easements, and other restrictive boundaries.

2. Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes, and invert elevations.
3. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction.
   a. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping.
4. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks, before proceeding to lay out the work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.
5. Final Property Survey: Prepare a final property survey showing significant features (real property) and ground floor elevation for the project. Include on the survey a certification, signed by the surveyor, that principal metes, bounds, lines, elevations and levels of the project are accurately positioned as shown on the survey.
   a Recording: At Substantial Completion, have the final property survey recorded by or with local governing authorities as the official "property survey".
   b. Above survey shall be provided by a registered surveyor as qualified herein

B. Progress Photographs: During construction, photograph the work in progress from vantage points selected by Architect.

1. Quality: digital images.
2. Quantity: Photograph project once each month; and take a minimum of ten (10) shots each time, except take twenty (20) shots at time of substantial completion. Contractor should take digital photos of all existing conditions (streets, curbs, paving, driveways, sidewalks, fence, gates, trees, etc). and submit with first Pay application

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Receive, store and handle products, materials and equipment in manner which will prevent loss, deterioration and damage. Schedule deliveries to minimize long-term storage at project site. See Specification sections for specific requirements.

1.06 WARRANTIES (GUARANTEES)

A. Categories of warranties required for the work include: 1) Special project warranty (guarantee), issued by Contractor and, where required, countersigned by Installer or other recognized entity involved in performance of the work, 2) Specified product warranty, issued by manufacturer or fabricator, for compliance with requirements in Contract Documents, and 3) Coincidental product warranty, available on a product incorporated int the Work, by virtue of manufacturer's publication or warranty without regard for application requirements (non-

specified warranty). Refer to sections of Divisions 2 through 16 for requirements of specified warranties.

B. Warranty Obligations: Restore or remove-and-replace warranted work to its originally specified condition, at such time during warranty as it does not comply with or fulfill terms of warranty. Restore or remove-and-replace other work which has been damaged by failure of warranted work, or which must be removed and replaced to gain access to warranted work. Cost of restoration or removal-and-replacement is Contractor's obligation, without regard to whether Owner has already benefitted from use of failing work.

1. Reinstatement of Warranty: Upon restoration or removal-and-replacement of warranted work which has failed, reinstate the warranty by issuing newly executed form, for at least the remaining period of time of the original warranty, but for not less than half of the original warranty period.

C. Owner's Recourse: Warranties and warranty periods do not diminish implied warranties, and do not deprive Owner of actions, rights and remedies otherwise available for Contractor's failure to fulfill requirements of the contract documents. Owner reserves right to reject coincidental product warranties considered to be conflicting with or detracting from requirements of the contract documents.

1.07 INSPECTIONS AND TESTING

A. General: Neither inspection-and-test results nor failure thereof to disclose deficiencies relieves Contractor of responsibility to comply with requirements of Contract Documents. Provide services to inspection and testing agencies (Owner's and Contractor's), including taking and delivery of samples, patching work and similar assistance. Require engaged agencies to perform indicated testing and submit reports promptly; and to report significant observations having an important bearing on the work, to the Architect by the most expeditious means possible.

1. See Section 01410 - Testing Laboratory Services

B. Installer Inspections: Require Installer of each major unit of work to inspect substrate and conditions for installation, and to report (in writing) unsatisfactory conditions. Correct unsatisfactory conditions before proceeding. Inspect each product immediately before installation, and do not install damaged or defective products, materials or equipment.

1.08 PREPARATIONS FOR INSTALLATION

A. Pre-Installation Conference: Prior to starting installation of each major component of the Work, hold a pre-installation conference, attended by each entity involved or affected by planned installation. Include technical representatives of product manufacturers and other recognized as expert or otherwise capable of influencing success of the installation. Review significant aspects of requirements for the Work. Record discussion and distribute as plan of action.

1.09 INSTALLATION, GENERAL

A. Examination of Substrate and Conditions: Examine the substrate and the conditions under which work is to be performed. If unsatisfactory conditions are found, do not proceed with

the work until these conditions have been corrected and placed in a condition recommended by the manufacturer of the items to be installed.

B. Comply with manufacturer's printed instructions and recommendations to extent printed information is more detailed or stringent than requirements contained directly in Contract Documents.

C. Timing: Install work during time and under conditions which will ensure best possible results, coordinated with required inspection and testing.

D. Anchor work securely in place, properly located by measured line and level, organized for best possible uniformity, visual effect, operational efficiency, durability, and similar benefit to Owner's use. Isolate non-compatible materials from contract, sufficiently to prevent deterioration.

E. Mount individual units of work at industry-recognized mounting heights, if not otherwise indicated; refer uncertainties to Architect before proceeding.

1.10 MANUFACTURER'S INSTRUCTIONS

A. When Contract Documents require that the installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two copies to Architect.

1. Maintain one set of complete instructions at the job site.

B. Handle, prepare substrate, install, connect, clean, and adjust products in strict accordance with such instructions and in conformity with specified requirements.

C. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Architect for further instructions.

D. Do not proceed with work without clear instructions.

1.11 CLEANING AND PROTECTION

A. General: Clean each element of work at time of installation. Provide sufficient maintenance and protection during construction to ensure freedom from damage and deterioration at time of substantial completion.

1. See Section 01700 - Project Closeout

1.12 DEFINITIONS

A. General: In addition to the definitions in the General and Supplementary Conditions and other locations in the Contract Documents, add the following:

1. Provide: Furnishing of all labor and materials, equipment, transportation, installation and services required, directly or indirectly.

2. Project Manual: Includes the bidding requirements, Conditions of the Contract, and the Specifications (Division 1 through 16).
3. Related Work Specified Elsewhere: List of items under this heading in the Specifications is for convenience only and is not intended to be all-inclusive or all-exclusive, nor to the direct specific trades to perform specific work.

1.13 REFERENCE STANDARDS

A. General: Any reference to standards (such as ASTM, Federal Specifications, etc.), where the date is not specified, shall mean the latest edition of such standards published prior to the date of the Contract Documents. Where such a reference is made, the applicable standard is hereby made a part of the specification which refers to it to the same extent as if written out in that specification in full.

1.14 SCHEDULE OF VALUES

A. At the Pre-Construction Conference, the Contractor shall submit to the Architect a Schedule of values prepared as follows:

1. The Schedule of Values Form of submittal shall be AIA Document G702A, Continuation Sheet.
2. Use the Index of this Specification as the format for listing costs of work for Sections under Division 1 through 16. Use each Section number under each Division of r subtitles. Each section shall be subdivided into separate line items for the total cost (with overhead and profit) of separate items in Section.
3. Round off cost figures to the nearest ten (10) dollars. The total of all items shall equal the total Contract Sum.

1.15 COORDINATION

A. The Contractor is responsible to coordinate construction activities included under various sections of these specifications to assure efficient and orderly installation of each part of the work. Coordinate construction operations included under different sections of the specifications that are dependent upon each other for proper installation, connection, and operation.

1. Where installation of one part of the work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notes, reports and attendance at meetings.

1. Prepare similar memoranda for the Owner regarding his separate Contractors where coordination of their work is required.

C. Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project close-out activities.

D. Contractor shall coordinate the arrangements for all chases, openings, trenching, etc., required for the installation of the work under this contract and shall be held solely responsible for proper location of same.

E. Where work will be installed in close proximity to other work of other trades, or where there is evidence that work will interfere with the work of the other, Contractor shall assist in resolving space conditions to make a satisfactory adjustment. If a subcontractor installs his work before coordinating with other trades, or cause interference with work of other trades, the Contractor shall implement necessary changes in the work to correct the condition without additional charge to the Owner.

F. All questions regarding scope, cost, project schedule, or intent of the Documents shall be initiated with the Architect. The Contractor's performance of any Work at the direction of others, without the prior authorization of the Architect or another Owner's designated representative, will be at the Contractor's risk.

END OF SECTION

TESTING LABORATORY SERVICES SECTION 01410

PART 1 - GENERAL

1.01 SELECTION AND PAYMENT:

A. The Owner will select and will pay for the services of an independent testing laboratory to perform inspections and test of materials and constructions as hereinafter specified and/or as specified in other sections of the specifications or as shown on the Drawings.

1.02 RELATED SECTIONS

A. Division 2- Earthwork and paving
B. Division 2 - Piling
C. Division 3 - Concrete
D. Division 5 – Steel

1.03 RESPONSIBILITY OF CONTRACTOR

A. Selection of the laboratory by the Owner in no way relieves the Contractor of his responsibility to furnish materials and construction in full compliance with the project plans and specifications. The Contractor accepts all processes, materials and their use which are approved by the testing laboratory unless the Contractor protests in writing prior to the approval by the testing laboratory.

1.04 COOPERATION OF CONTRACTOR

A. The Contractor shall cooperate with the laboratory and make available, without cost, samples of materials to be tested.

B. Furnish such nominal labor and sheltered working space as is necessary to obtain samples at the project.

C. Advise the laboratory of the identity of material sources and instruct the suppliers to allow tests or inspections by the laboratory.

D. Contractor shall notify the laboratory sufficiently in advance of operations to allow for completion of initial tests and assignment of inspection personnel. Notification shall be not less than 48 hours in advance or as directed by the Architect. When test or inspections cannot be performed after such notice, the total cost including minimum call out rates for time and travel associated with cancellation by the Contractor shall become the responsibility of the Contractor. The Contractor will reimburse the Owner for any cost associated with the cancellations.

E. Contractor to pay for all retesting as a result of test failure

1.05 REJECTION OF MATERIALS

A. The laboratory shall reject any materials which are not in full conformance with specifications, and promptly notify the Architect. The Architect shall notify the Contractor promptly of such rejections. Any materials rejected by the laboratory shall not be incorporated in the work without prior written approval of the Architect.

1.06 TEST METHODS

A. Tests and inspections shall be conducted in accordance with the requirements of these specifications or, if not herein specified, in accordance with latest ASTM, ACI, or other recognized authorities.

1.07 LABORATORY DUTIES

A. The laboratory shall submit written reports of each test and inspection made to the Architect, Engineer and Contractor, suppliers of tested products and to such other parties the Architect may specify.

B. Cooperate with the Architect, Engineer, and Contractor to provide certified personnel after due notice.

C. Perform specified inspections, sampling and testing of materials and methods of construction:
1.Comply with specified standards
2.Ascertain compliance of materials with requirements of the Contract Documents

D. Promptly notify the Architect and Contractor of observed irregularities ro deficiencies of work or product.

E. Promptly submit two (2) copies of written reports of each test and inspection to the Engineer, four (4) copies to the Owner's representative and two (2) copies to the Contractor. Each report shall include:
1.Date issued
2.Project title and number
3.Testing laboratory name, address and telephone number
4. Name and signature of laboratory inspector
5.Date and time of sampling or inspection
6. Record of temperature and weather conditions
7. Date of test
8. Identification of product and applicable specification section
9. Location of sample or test taken in the project. Testing agency shall generate log sheet to identify and track each test by specific location.
10. Type of inspection or test.
11. Results of test and compliance with the Contract Documents.
12. Interpretation of test results, when requested by the Engineer

1.01 ADDITIONAL TESTS

A. The Architect reserves the right to require additional tests to those specified or upon materials not herein specified for testing. If such tests are necessary because of apparently defective materials or workmanship, the cost of these additional tests shall be borne by the Contractor.

1.8 DESCRIPTION OF TESTS AND INSPECTION

A. Piling: Inspect all piling for compliance with the specifications and stamp with seal of laboratory. Log the driving of probe piles, conduct pile load test and prepare report of load test. See Division 2 Section - Piling for additional requirements.

1. All acceptable piles are to be hammer marked in the butt. Piles shall be reinspected immediately prior to driving by the laboratory's job site representative.
2. Log the driving of all piles, recording the date driven, actual tip and butt dimension measured at time of driving, type of hammer, and driving resistance with the blows per foot for the full length of the pile. Submit driving records daily.

B. Vibration Monitoring: During the driving of all piles, including exploratory piles (if any), the laboratory shall monitor and record the vibrations to adjacent building and surrounding areas. The laboratory shall employ the services of a vibration specialist engineer who in conjunction with the laboratory shall render complete reports and interpretations of the data obtained, including the possible effects of the measured vibrations on adjacent and surrounding structures. The vibrations shall be measured by means of a portable Seismograph which directly measures particle velocity (rate of ground movement) in three mutually perpendicular directions (longitudinal, transverse and vertical). Probes shall be located at various locations as required to achieve meaningful readings. An air blast monitor which measures the air pressure phenomena associated with the pile driving shall also be employed. In addition to daily reports, a complete report of the vibration study, including seismograms, shall be furnished after the conclusion of the driving of the exploratory piles (if any) and after driving all remaining piles. **Peak particles velocities exceeding 0.25 in./sec. may induce damage to the existing structures and driving operations terminated**

C. Concrete: The laboratory shall continuously monitor the delivery and placing of ready-mix concrete for compliance with the Drawings and the Specifications. The laboratory representative shall report any substandard concrete operations as soon as practicable. Laboratory shall comply with the requirements of ACI 301, Chapter 16.

1. Mix Design: In advance of concrete operations, materials proposed for use in concrete shall be sampled and tested to determine their compliance with the Specifications. Mix proportions shall be established by the Contractor for each strength and type of concrete and shall submit same to Laboratory. Laboratory shall review mix designs for compliance with the Specifications.
2. Sampling: The laboratory shall test the slump, air content, and temperature of the discharged concrete periodically from trucks selected at random and from all truckloads exhibiting visible inconsistencies. The laboratory representative shall have the authority to reject any truckload of concrete not delivered within the specified time limit, or not in compliance with the slump or air-entrainment requirements, or otherwise judged to be deficient.
3. Test cylinders: The laboratory shall cast a set of three (3) standard cylinders for each one hundred (100) cubic yards of concrete placed, but no less than one set per pour. The cylinders shall be broken in the laboratory to test the compressive strength; test one (1) at seven (7) days and two (2) at twenty-eight (28) days.
4. Testing procedures shall be in accordance with the following:
   a. Slump test, ASTM C143
   b. Sampling, ASTM C172
   c. Cylinder specimens, ASTM C31
   d. Compression tests, ASTM C39
   e. Criteria for acceptance, ACI 301 Chapter 17
   f. Air content, ASTM C173 or C231

g. Obtaining and testing drilled cores and sawed beams of concrete, ASTM C42
h. Unit weight test, ASTM C138
i. Temperature of freshly mixed concrete, ASTM C1064

5. No testing laboratory services will be required for concrete in structurally unsupported sidewalks.

D. Soil Compaction: The Testing Laboratory shall obtain a sample of soil to be used as fill or backfill material and perform a sieve analysis test and a Moisture-Density Relation analysis per ASTM D698 or ASTM D1557 to determine optimum moisture content and maximum density in accordance with Section 02200 - Earthwork. If proposed fill material has more than 20% passing a number 200 sieve a complete soils classifications test shall be run per AASHTO M-145.

1. Fill under building structures and paving shall be analyzed for in place dry density and moisture content per ASTM D2922 and ASTM D3017. Test shall be taken no more than two days before placement of the next lift, slab or pavement. Fill must be retested if soil is heavily rained on after testing and before the next lift, pavement or slab is placed. Density tests shall be taken as follows:
2. Backfill of trench over 18" deep and behind grade walls; one test per 150 linear feet per 24" of depth.
3. Perform field density tests in accordance with ASTM D1556 (sand cone method) or ASTM D2922 (nuclear method).
4. Building Slab Subgrade: Make at least one (1) field density test of subgrade for every 5000 sq. ft. of building slab, but in no case less than four (4) tests.
5. Paved Areas Subgrade: Make at least one (1) field density test of subgrade for every 4500 sq. ft. of paved area but in no case less than four (4) tests. The testing laboratory shall also determine base course thickness at each density test.
6. Footing Subgrade: Visual inspection for type of soil and bearing capacity, and determining presence of loose materials.

E. Reinforcing Steel: The laboratory shall check mill test reports and monitor the placing of all reinforcing steel for compliance with the Specifications.

F. Structural Steel, Metal Deck and Steel Framing: The testing laboratory shall visually inspect all connections to determine quality, size, and compliance with reviewed erection drawings. Where the quality of a weld is in question, the Architect will be advised. The Contractor may then be required to remove and reweld the connection or if the Contractor desires, he may have the weld inspected further by radiography. The cost of this radiography inspection will be borne by the Contractor whether or not the weld is acceptable.

1. All welders shall be approved by the laboratory in accordance with American Welding Society Standards and qualified for the type of welding which they will perform. All field butt welds shall be witnessed by the laboratory while being welded. All field but welds shall be ultrasonic tested.
2. If high-strength bolts are used, the testing laboratory shall inspect the high-strength bolt connections in accordance with the requirements set forth in "Specifications for Structural Joints Using ASTM A325 Bolts", by the American Institute of Steel Construction.

G. Grout: For every 5,000 sq. ft of wall area placed, grout strength shall be tested with a set of cubes in accordance with ASTM C1019.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS SECTION 01500

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone service, water, and sanitary facilities.

B. Temporary Controls: Barriers, fencing required to secure the site, erosion and sedimentation control, protection of the Work, and water control. Contractor is responsible to provide protective measures, i.e. barricades at all utility poles, etc. sufficient to deter and prevent vehicle contact and damage during construction

C. Construction Facilities: Progress cleaning, project signage, and temporary buildings.

D. Contractor shall provide and pay all metered cost of temporary facilities and utilities.

1.02 RELATED SECTIONS

A. Section 01700 - Contract Closeout: Final cleaning.

1.03 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations if authorities having jurisdiction, including but not limited to:

1. Building Code requirements.
2. Health and safety regulations.
3. Utility company regulations.
4. Police, Fire Department ad Rescue Squad Rules.
5. Environmental protection regulations.

B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities".

C. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).

D. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

1.04 TEMPORARY UTILITIES

A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where the company provides only part of the service, provide the remainder with matching, compatible materials and equipment; comply with the company's recommendations.

1. Arrange with the company and existing users for a time when service can be interrupted, where necessary, to make connections for temporary services.
2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
3. Obtain easements to bring temporary utilities to the site, where the Owner's easements cannot be used for that purpose.

B. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.

C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload protected disconnects, automatic ground-fault interrupters and main distribution switch gear.

D. Temporary Lighting: Whenever overhead floor or roof deck has been installed, provide temporary lighting with local switching.

1. Install and operate temporary lighting that will fulfill security and protection requirements, without operating the entire system, and will provide adequate illumination for construction operations and traffic conditions.

E. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully.

1. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers.
2. Connect temporary sewers to the municipal system as directed by the sewer department officials.

F. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.

1.05 TEMPORARY VENTILATION

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors or gases. Special consideration shall be taken for ventilation directly to the exterior of vapors during painting.

1.06 TEMPORARY SANITARY FACILITIES

A. The Contractor shall provide adequate toilet facilities at the site for use of all workmen. These facilities shall conform to all City, County and State regulations and be constructed in a location and manner so that they will not be a nuisance in the neighborhood. These facilities shall be removed upon completion of the work.

B. Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.

C. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.

D. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.

1.07 PROTECTION OF WORK

A. Protect Work and provide special protection where specified in individual specification Sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.

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

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

E. Barricades, Warning Signs and Lights: Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.

1.08 SECURITY AND ENCLOSURES

A. Provide security and facilities to protect Work from unauthorized entry, vandalism, or theft.

B. Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.

C. Enclosure Fence: Provide 6' high security fence equivalent to chain link around entire site limits with appropriate gates for access of construction and Owner's personnel.

1.09 PARKING, STAGING AND ACCESS TO THE SITE

A. The Contractor may use areas for parking, staging and stockpiling of materials within the area of limits for the Work.

B. Ingress and egress to the site shall not interfere with adjacent properties.

C. Prohibit access to the site by unauthorized personnel.

D. Upon completion of the project and prior to the final payment, the Contractor shall restore the areas of the site used for his operations to their original condition prior to start of the work.

1.10 TEMPORARY FIRE PROTECTION

A. Provide and maintain fire extinguishers and other equipment necessary for proper fire protection during construction. In addition, provide one or more qualified personnel with fully charged and operating foam type fire extinguishers during all field welding, roofing and similar operations of adequate capacity which are fire hazardous.

B. Comply with NFPA 10 "Standard for Portable Fire Extinguishers", and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations".

C. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.

D. Store combustible materials in containers in fire-safe locations.

E. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.

F. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.

G. All temporary contractors' offices, storage sheds, workmen's shanties, etc. shall be located outside of or well detached from, the building under construction.

H. The installation of water supplies, sprinklers, standpipes and fire hose shall closely follow completion of floors and areas.

I. Storage of all combustible and flammable materials shall be maintained outside of (and well detached from) the buildings.

J. Only flame-proofed tarpaulins shall be used.

K. The supply of paints, solvents, oils, gas cylinders, etc. inside the building shall be limited to that required for one day's use. The handling of these materials should be carefully supervised.

L. Cutting and welding work shall be performed out-of-doors whenever possible. This type work, when performed inside, shall be closely supervised and done with a fire watch with portable extinguishers in the area.

M. Temporary electric wiring shall be kept to a minimum. Flood lights shall be used unless unavoidable then individual unprotected lamps may be used. All temporary electric circuits

should be properly installed to prevent physical damage, and they should be provided with overload protection as specified in the National Electric Code.

N. All material heaters (or any similar equipment) shall be located outside the building, with as much detachment as possible.

O. Hot applications of mastics or insulating materials shall be avoided inside of the building. Where this type of application is necessary in the building interior, adequate ventilation shall be provided to prevent the build-up of the flammable vapor concentrations, and appropriate fire extinguishing equipment should be maintained in the area during the entire operation.

P. Smoking is prohibited within the building. Definite control shall be maintained in the storage areas and areas involving flammable liquids.

Q. No "on site" incineration is permitted.

R. Ready access for the Public Fire Department shall be maintained to all areas.

1.11 WINDSTORM LOSS PREVENTION

A. All structural framing members shall be properly secured and braced at the end of each working day.

B. All roof decking shall be permanently secured as it is laid in place.

C. All insulation and roofing materials shall be permanently fastened to the roof deck as it is applied.

D. All construction materials shall be adequately protected against wind damage during storage.

E. All tarpaulins, or any other temporary enclosure materials, shall be securely fastened.

F. Remove construction materials from the perimeter of the building and tie them down. This includes smaller items such as tools to larger items such as dumpsters, portable bathrooms and even equipment.

G. Cover electrical equipment from exposure to the weather.

H. Clear all storm drains or inlet filters on or near the construction site.

1.12 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

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

D. Remove waste materials, debris, and rubbish from site weekly and dispose off-site.

1.13 FIELD OFFICES

A. Provide an office space or spaces of sufficient size to accommodate required office-type personnel at the project site and also room for site meeting to accommodate all that would attend the progress meetings, with work stations properly furnished and adequately equipped to accommodate plan layout, and plan and shop drawing filing.

1.14 MISCELLANEOUS PROVISIONS

A. Dewatering: Maintain the site, excavations and construction free of water.

B. Rodent and Pest Control: Before foundation Work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches and other pests. Employ this service to perform extermination and control procedures at regular intervals so the Project will be relatively free of pests and their residues at Substantial Completion. Perform control operations in a lawful manner using environmentally safe materials.

C. Temporary Signs: Prepare project identification and other signs; install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative treated wood or steel. Do not permit installation of unauthorized signs.

D. Project Identification Signs: Engage an experienced sign painter to apply graphics. Sign shall be 8' x 8' exterior grade A-face plywood on 4' x 4' treated wood post.

1. Sign shall contain the information listed below:
   a. Name of Project.
   b. Name of Owner and its officials
   c. Name of Architect.
   d. Name of Consultants.
   e. Name of General Contractor
   f. Rendered picture of the building as provided by the Owner

E. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to a sediment and erosion control plan, specific to the site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

1.15 REMOVAL OF UTILITIES, FACILITIES AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary work.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

MATERIAL AND EQUIPMENT SECTION 01600

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Products.

B. Transportation and handling.

C. Storage and protection.

D. Product options.

E. Substitutions ; governed by R.S. 38:2212 (T)(2).

1.02 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

C. Provide interchangeable components of the same manufacturer, for similar components.

D. The name of certain brand, make, manufacturer, or definite specification is utilized only to demote the quality standard of product desired and the bidder is not restricted to the specific brand, make, manufacturer, or definite specification named. The specific brand, make, manufacturer, or definite specification named is used only to convey to prospective bidders the general style, type, character and quality of product desired. Equivalent products will be acceptable if preapproved by the professionally employed engineer for this project

1.03 TRANSPORTATION AND HANDLING

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

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

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

1.04 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.

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

C. Provide off-site storage and protection when site does not permit on-site storage or protection.

D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

E. Store loose granular materials on solid flat surfaces in a well-drained area. Provide mixing with foreign matter.

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

G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

1.05 PRODUCT OPTIONS

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

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

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

1.06 SUBSTITUTIONS

A. Substitutions maybe considered when a product becomes unavailable through no fault of the Contractor.

B. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents, benefit to the project, including associated credit to the project budget or benefit to the project schedule.

C. A request constitutes a representation that the Contractor:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same warranty for the Substitution as for the specified product.
3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension which may subsequently become apparent.
5. Will reimburse Owner for review and/or redesign services associated with re-approval by authorities.

D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

E. Substitution Submittal Procedure:

1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence.
3. The Architect will notify Contractor, in writing, of decision to accept or reject request.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not used

END OF SECTION

Request For Substitution

(Not for Prior Approvals)

Project: St. Bernard Parish Public Library

St. Bernard Parish, Louisiana

Project No. 11884
Sub. No.
Date: ____

Contractor:

Brief Description:

Drawing No. _____
Spec. Section _____

Detailed description of why substitution is beneficial:

Architect Response:

Note: Some of the items in this response may result in credits or additions which may become part of a future Request for Change Order.

Initialed: _____

Date: _____

Date: _____

Mathes Brierre ARCHITECTS + ABM ARCHITECTS BEAZLEY MOLIERE
A JOINT VENTURE

PROJECT CLOSEOUT SECTION 01700

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish all labor, materials, tools, and equipment, and perform all operations necessary for project closeout work indicated or specified.

1.02 DEFINITIONS

A. Closeout is hereby defined to include general requirements near the end of Contract Time, in preparation for final acceptance, final payment, normal termination of Contract, occupancy by Owner and similar actions evidencing completion of the work. Specific requirements for individual units of work are specified in specification sections.

1.03 PREREQUISITES TO SUBSTANTIAL COMPLETION

A. General: Prior to requesting Architect's inspection for certification of substantial completion, as required by General Conditions, complete the following, and list known exceptions in request. Furthermore, issuance of certificate of substantial completion and Architect's final inspection is contingent on completion of all the following:

1. In the progress payment request that coincides with, or first request following substantial completion date claimed, show either 100% completion for portion of work claimed as "substantially complete" or list incomplete items, dollar value of incomplete items, and reasons for being incomplete.
2. Submit statement showing accounting of changes to the Contract Sum.
3. Deliver to Owner tools, spare parts, extra stocks of material, and similar physical items as specifically mentioned in individual specification sections.
4. Complete start-up testing of systems and instructions of Owner's operating/ maintenance personnel. Discontinue (or change over) and remove from project site temporary facilities and services, along with construction tools and facilities, mock-ups, and similar elements.
5. Complete final cleaning up requirements.
6. Touch-up and otherwise repair and restore marred exposed finishes.
7. Submit all warranties, workmanship/maintenance bonds, maintenance agreements, final inspection certifications, record (as-built) drawings, final property survey maintenance and operating manuals, final project photographs (if any) and similar documents.
    a. Note: <u>All</u> above closeout documents must be submitted at one time and be all inclusive.

B. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of incomplete requirements. The Architect will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected (the Architect's "Punch List") before the certificate will be issued.

1. The Architect will repeat inspection one time when requested and assured that the Work has been substantially completed.

2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.04 PREREQUISITES TO FINAL ACCEPTANCE

A. General: Prior to requesting Architect's final inspection for certification of final acceptance and final payment, as required by General Conditions, complete the following. List known exceptions (if any) in request. Furthermore, issuance of certificate of final acceptance is contingent on completion of all the following:

1. Submit occupancy and use permit.
2. Submit final payment request with final releases and supporting documentation not previously submitted and accepted.
3. Submit updated final statement, accounting for additional (final) changes to the Contract Sum.
4. Submit copy of final punch-list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.
5. Submit statement of any continuing insurance coverage.
6. Submit consent of surety.

B. Reinspection Procedure: Upon receipt of Contractor's notice that work has been completed, including punch list items resulting from earlier inspections, and excepting incomplete items delayed because of unacceptable circumstances Architect will reinspect work. Upon completion of reinspection, Architect will wither prepare certificates of final acceptance or advise Contractor of work not completed or obligations not fulfilled as required for final acceptance for final acceptance. If necessary, procedure will be repeated.

1. Should the Architect be required to make two (2) final inspections and he finds that the Work is still incomplete, then the cost of additional Architect's inspections shall be paid for by the Contractor. The aforementioned Architect's compensation will be withheld from the next payment.

1.05 RECORD DOCUMENT SUBMITTALS

A. General: Specific requirements for record documents are indicated in individual sections of these Specifications. Other requirements are indicated in General Conditions, with additional provisions indicated in Division 15 and Division 16 for mechanical and electrical work, respectively. General submittal requirements are indicated in the Section 01300. Do not use record documents for construction purposes; protect from deterioration and/or loss in a secure, fire-resistive location; provide access to record documents for the Architect's reference during normal working hours.

B. Record (As-Built) Drawings: Submit one set of black lines in clean, undamaged condition and CAD electronic drawing files (version 2005) on CD media of Contract Drawings and shop drawings, modified to show actual installations which vary substantially from the work as originally shown. Modify whichever drawing is most capable of showing "field" conditions fully and accurately; however, where shop drawings are used for mark-up, record a cross-reference at corresponding location on Contract drawing. All electronic files of contract drawings transmitted to the contractor for his use for shop drawings for this project will require execution of AIA document C-106-2007, Digital Data Licensing Agreement

1. Mark-up new information which is recognized to be of importance to Owner, but was for some reason not shown on either concealed work, which would difficult to measure and record at a later date. Note related change order numbers where applicable. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on cover of each set.
2. As-builts shall be updated regularly, at least as frequently as the progress meeting, and not at the end of the project.
3. Contractor shall pay all reproduction, handling and delivery costs.
4. Contractor shall stamp date and sign each record (as-built) drawing indicating his certification of as-built conditions. The stamp shall read "RECORD AS-BUILT DRAWINGS".

C. Keys: Provide all keys to Owner as called for in the Finish Hardware Section, Electrical Panelboard keys and any other keys called for in other sections of the Specifications.

1. All keys shall be tagged with same description used in the Hardware Schedule. Other keys shall be tagged with item name and room name and number. "Master" keys shall be so identified.
2. Keys shall be accompanied by three (3) copies of a typewritten list showing key identification as indicated above and number of keys for each location. One (1) copy shall be initialed by the individual receiving keys and returned to the Contractor as proof of receipt.

D. Maintenance and Operating Manuals:

1. Provide one (1) hard paper copy and one (1) digital copy on disk.
2. Organize Maintenance and Operations Manuals into suitable sets of manageable size, and bind into individual binders properly identified and indexed sections, bind each manual of each set in a heavy-duty 2", 3-ring vinyl-covered binder, and include pocket folders for folded sheet information. Provide a minimum of three (3) sets.

   In addition, the Operating and Maintenance Manuals shall include but shall not be limited to the following:

   a. The project title, date of acceptance, names of Architect, General Contractor, subcontractors (associated with the installation of items included in the manual) should be clearly identified on the front cover along with addresses and telephone numbers.
   b. There shall be an index in front of the manual giving the divisions for major equipment groups and a list of subdivision within the groups.
   c. The major divisions should have indexed tabs at the front of each one.
   d. Originals, and legible copies of manufacturers data sheets.
   e. With the data sheets for each equipment item, attach any parts list, sequence of operations, maintenance requirements, and associated certificates or warranties.
   f. Include copies of shop drawings.

   g. Any equipment data which covers different models, options, system configurations, etc., should be clearly marked and highlighted to identify which was installed.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.01 CONTINUING INSPECTIONS

A. General: Except as otherwise required by specific warranties, agreements to maintain, workmanship/maintenance bonds, and similar continuing commitments, comply with Owner's requests to participate in inspections at end of each time period of such continuing commitments. Participate in general inspection of the work approximately one (1) year beyond date(s) of substantial completion.

3.02 FINAL CLEANING

A. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.

1. Remove labels that are not permanent labels.
2. Clean transparent materials, including mirrors and glass in doors and windows to a polished condition, removing substances which are not noticable as vision-obscuring material. Replace broken glass.
3. Clean exposed hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition.
4. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Replace all HVAC filters
5. Remove debris and surface dust from limited-access spaces including roofs, plenum, shafts, trenches, equipment vaults and similar spaces.
6. Clean concrete floors in occupied and non-occupied spaces; broom clean and remove all elements not an integral part of the surface.
7. Clean plumbing fixtures to a sanitary condition, free of stains including those resulting from water exposure.
8. Clean light fixtures and lamps so as to function with full efficiency.
9. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface

END OF SECTION

SOIL INVESTIGATION DATA SECTION 02005

1.1 INVESTIGATION

A. Soil and subsurface investigations were conducted at the site, the results of which are to be found in the report issued by:

Firm Name: The Beta Group Dated: October 2, 2019

B. Copy of the report is bound herein following this section.

C. Bidders are urged to examine soils investigation data and to make their own investigation of the site before bidding.

1.2 INTERPRETATION

A. Soil investigation data is provided only for information and the convenience of bidders. The Owner and Architect disclaim any responsibility for the accuracy, true location and extent of the soils investigation that has been prepared by others. They further disclaim responsibility for interpretation of that data by bidders, as in projecting soil-bearing values, soil stability and the presence, level and extent of underground water. The report is based upon the assumption that uniform variation exists in soil properties between borings

B. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in the Contract Documents

B. Soil investigation data is not part of the Contract Documents.

END OF SECTION

GEOTECHNICAL INVESTIGATION

PROPOSED ST. BERNARD PARISH

PUBLIC LIBRARY

3121 E. JUDGE PEREZ DR.

MERAUX, LOUISIANA

TBG PROJECT NO. 5310G

Prepared for:

ST. BERNARD PARISH GOVERNMENT

CHALMETTE, LOUISIANA

The Beta Group
engineering and construction services

1428½ Claire Avenue, Gretna, Louisiana 70053

(504) 227-2273 • fax: (504) 227-2274

7250 Stennis Airport Rd. Suite 206, Kiln, Mississippi 39576

(228) 466-2556 • fax: (228) 466-2571

Betagroupgc.com

TheBetaGroup
engineering and construction services

October 2, 2019

St. Bernard Parish Government
1125 E. St. Bernard Highway
Chalmette, LA 70043

Attn: Mr. Donald R. Bourgeois Jr.

Reference: Report of Geotechnical Investigation
Proposed St. Bernard Parish Public Library
3121 E. Judge Perez Dr.
Meraux, Louisiana
TBG Report No. 5310G

Dear Mr. Bourgeois:

The Beta Group, LLC (TBG) has performed a Geotechnical Investigation for the above referenced site as authorized by our geotechnical proposal dated, July 22, 2019. The attached report presents our understanding of the project, reviews our exploration procedures, describes existing site and general subsurface conditions, and presents our evaluations and recommendations.

We have enjoyed working with you on this project and look forward to assisting you during the continuing design and construction activities. Please contact us at any time if you have any questions regarding this report or need further service.

Sincerely,

THE BETA GROUP, LLC

STATE OF LOUISIANA
Alexander Jaramillo
License No 36324
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

Alex Jaramillo, P.E.
Senior Project Engineer

Anjelica Moran, E.I.
Project Engineer

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PURPOSE AND SCOPE OF SERVICES

PURPOSE OF SERVICES

The purpose of the Geotechnical Investigation was to explore the subsurface conditions at the site and to provide geotechnical design recommendations for the proposed St. Bernard Parish Public Library, site preparation, earthwork and quality control measures related to these design aspects.

SCOPE OF SERVICES

To accomplish the stated purpose, we executed the following:

1. Documented existing surface conditions and features at the project site and the marked boring locations.

2. Performed a subsurface exploration consisting of six (6) undisturbed soil test borings, one (1) undisturbed soil boring was completed to the 100 ft. depth, two (2) undisturbed soil borings were completed to the 80 ft. depth, and three (3) undisturbed soil borings were completed to the 6 ft. depth below the existing ground surface in the general area of the proposed St. Bernard Parish Public Library.

3. Performed laboratory testing on selected soil samples to ascertain soil properties for engineering purposes.

4. Evaluated the findings of the subsurface exploration and laboratory data relative to general subsurface characterization, support, and other geotechnical aspects of the project.

Our scope of services did not include a survey of the boring locations and elevations, quantity of estimates, preparation of plans or specifications, or the identification and evaluation of environmental aspects of the project site.

PROPOSED PROJECT DESCRIPTION

We understand the project will consist of constructing a new St. Bernard Parish Public Library Building that will be approximately 43,415 sq. ft. in plan dimension, an associated Employee Parking Area that will be approximately 12,305 sq. ft. in plan dimension and a Main Parking

Area that will be approximately 35,275 sq. ft. in plan dimension. The site is located at 3121 E. Judge Perez Dr. in Meraux, LA. We also understand that imported fill be placed on the Building area and the two (2 Parking area sites prior to construction for an extended period of time. Once construction begins, a maximum of 3 ft. of fill will remain in the area of the proposed Building and associated Parking areas and will be distributed throughout the entire construction site for grading and elevation purposes.

SUBSURFACE EXPLORATION

FIELD EXPLORATION

The subsurface exploration consisted of six (6) undisturbed soil test borings (designated as B-1 thru B-3 and P-1 thru P-3) performed between August 22nd and 27th thru 28th, 2019 at the referenced site and at the approximate locations shown on the attached Boring Location Plan (Figure No. 1).

The soil test boring locations were located in the field by a TBG representative based on a site plan provided by Mr. Peter Priola of Mathes Brierre Architects. The boring locations were plotted and topographical information was estimated. The methods used in the determination of the boring locations shown on the Boring Location Plan should be considered approximate.

The soil test borings were drilled utilizing a truck mounted drill rig at the designated locations shown on the Boring Location Plan. Undisturbed sampling was performed continuously in the upper 10 ft. and on 5 ft. centers thereafter in the soil borings B-1 thru B-3, and continuously to the 6 ft. depth in soil borings P-1 thru P-3 with a 3-inch diameter thin-walled tube sampler. Representative samples were removed from the tubes and placed in moisture-proof containers for laboratory testing.

When cohesionless material was encountered, which could not be sampled by undisturbed methods, the Standard Penetration Test was performed. This test consists of driving a two inch diameter split spoon sampler 1 ft. (after first seating it 6 inches) with a 140 lb. hammer falling 30 inches. The number of blows required to drive the sampler gives an indication of the density of the material.

The soil test borings were advanced through the soil overburden to the assigned termination depths of 100 ft., 80 ft. and 6 ft. below the existing ground surface.

Subsurface water level readings were obtained at the soil test boring immediately upon completion of the drilling process and after a period of 15 minutes. Upon completion of the drilling activities, the borehole was backfilled with auger cuttings (soil) and/or high-strength concrete as per LADOTD requirements.

LABORATORY TESTING

Laboratory tests were conducted on selected samples in general accordance with ASTM standards. The laboratory testing performed for this project consisted of:

- Atterberg Limits
- Unconfined Compression Tests
- Natural Moisture Content
- Unit Weight Determination
- Percent Passing #200 Sieve

The test results are summarized on the Boring Log in the Appendix of this report.

SITE AND SUBSURFACE CONDITIONS

SITE CONDITIONS

TBG performed reconnaissance of the site on August 19, 2019. The site is located at 3121 E. Judge Perez Dr. in Meraux, La. The site is a cleared open grassy lot.

SUBSURFACE CONDITIONS

Boring B-1: Reference to the log of boring B-1 shows that beginning at the ground surface there is 6 ft. of soft to medium stiff gray clay with organics and silt followed by soft dark gray organic clay to the 17 ft. depth. This organic clay is underlain by soft to medium stiff gray clay to the 57 ft. depth. This layer is proceeded by loose to medium dense gray clayey sand to the 72 ft. depth. This clayey sand is followed by medium stiff gray sandy clay to the 77 ft. depth. This sandy clay is underlain by medium dense gray clayey sand to the 83 ft. depth. This layer is then proceeded by medium stiff gray silty clay to at least the boring's termination depth of 100 ft.

Boring B-2: Reference to the log of boring B-2 shows that beginning at the ground surface there is 4 ft. of soft to medium stiff gray clay followed by very soft dark gray organic clay to the 8 ft. depth. This organic clay is underlain by very soft gray clay with organics to the 12 ft. depth. This clay is proceeded by very soft gray silty clay to the 17 ft. depth. This silty clay is followed by very soft to soft gray clay to the 52 ft. depth. This clay is underlain by stiff to very stiff gray sandy clay to the 60 ft. depth. This is proceeded by medium dense gray clayey sand to the 67 ft. depth. This clayey sand is followed by stiff gray sandy clay to at least the boring's termination depth of 80 ft.

Boring B-3: Reference to the log of boring B-3 shows that beginning at the ground surface there is 6 ft. of very soft to soft gray clay followed by very soft to soft dark gray organic clay to the 12 ft. depth. This clay is underlain by soft gray clay to the 17 ft. depth. This layer is proceeded by stiff gray silty clay to the 22 ft. depth. This clay layer is followed by very soft to soft gray clay to the 57 ft. depth. This clay is underlain by loose to medium dense gray clayey sand to the 67 ft. depth. This clayey sand is proceeded by medium stiff to stiff gray sandy clay to at least the boring's termination depth of 80 ft.

Boring P-1: Reference to the log of boring P-1 shows that beginning at the ground surface there is medium stiff gray clay with organics to at least the boring's termination depth of 6 ft.

Boring P-2: Reference to the log of boring P-2 shows that beginning at the ground surface there is soft gray clay with organics to at least the boring's termination depth of 6 ft.

Boring P-3: Reference to the log of boring P-3 shows that beginning at the ground surface there is 4 ft. of medium stiff gray clay with organics followed by very soft clay with organics to at least the boring's termination depth of 6 ft.

GROUNDWATER CONDITIONS

At the time of making the borings, subsurface water was encountered at the 6 ft. depth below the existing ground surface in borings B-1 thru B-3. After a 15 minute wait period, groundwater was measured at the 4 ft. depth in borings B-1 thru B-3. Subsurface water was not encountered in borings P-1 thru P-3 before water was added to the borehole. It should be noted that

groundwater levels tend to fluctuate with seasonal and climatic changes, the proximity to any water bodies, as well as with some types of construction operations. As such, groundwater levels at other times of the year may be different than those described in this report. These observations were made while completing the borings and may not have become fully static at the time of measurement. If groundwater is important to construction, it should be measured at that time.

ENGINEERING EVALUATION & RECOMMENDATIONS

The following evaluations and recommendations are based on our observations at the site, interpretation of the field and soil laboratory data obtained during this exploration, and our experience with similar subsurface conditions and projects. Subsurface conditions in unexplored locations may vary from those encountered. If the project location or information changes, we request that we be advised so that we may re-evaluate our recommendations.

Design recommendations, for the proposed Library, for the given location are dependent on the soil and site conditions. The subsurface exploration aids the geotechnical engineer in determining the necessary geotechnical recommendations needed. In addition, since the method of construction greatly affects the soils intended for the proposed Library, consideration must be given to the implementation of suitable methods of site preparation, pile driving, and other aspects of construction. Based on our analysis, it is our opinion that the proposed site is suitable for the planned construction.

The near surface soils at the site are poor in bearing quality and are compressible even under nominal loading conditions, therefore; piles are recommended for support of all structural loads that cannot tolerate settlements including the ground floor slabs and any sensitive pavements. Analyses were made with regard to piles and the results given in the following section.

DEEP FOUNDATION

Analyses were made based on borings B-1 thru B-3 and laboratory tests data to develop geotechnical related parameters for use in design of the proposed Library Building foundation. These include an evaluation of pile capacities for 7-inch diameter tip timber piles (ASTM D 25) and estimates of settlement. Results of these analyses are given in the following sections. Allowable pile load capacities for driven treated ASTM D 25 quality timber piles are provided in the following table. The allowable pile capacities assume the piles are vertical and do not

include the weight of the pile. In addition, pile tip depths are referenced from the top of the existing ground surface. Piles will achieve their capacities through "skin friction", piles may achieve additional "point support" if they are embedded in the sand stratum encountered at the 60 ft. depth below the existing ground surface.

ALLOWABLE PILE LOAD CAPACITIES

SIZE OF TIMBER PILE (ASTM D25)*	PILE TIP EMBEDMENT BELOW EXISTING GROUND SURFACE IN FEET	ESTIMATED ALLOWABLE SINGLE PILE LOAD CAPACITIES IN TONS COMPRESSION FACTOR OF SAFETY = 2
		COMPRESSION
7 in. Dia. Tip & 12 in. Dia. Butt	40	6
	45	7
	50	8
	55	10
	60**	13
	65	14
	70	15
	75	17
	80	19
	85	20
	90	22

* These are soil-pile related values and consideration should be given to the structural integrity of the pile member.

** Pile tip firmly embedded in sand

The provided compression capacities contain an estimated factor of safety of two (2) against failure of a single pile through the soil. The analysis for pile capacities are based on a soil-pile relationship only. The structural capacities of the piles and their connections to transmit these loads should be determined by a structural engineer.

ESTIMATED SETTLEMENT OF PILE FOUNDATIONS

Settlements of the pile supported structure using the recommended pile load capacities in single widely spaced rows or in clusters of up to 10 piles are estimated to be on the order of ½ to 1 inch. Settlements will increase with the size of the pile cluster and, if larger clusters of closely spaced piles are needed for support, detailed settlement analyses should be made. Our estimates do not include the elastic deformation of the piles, which should be added to the settlement estimates. Elastic deformation of the piles may be estimated at 67% of the static column strain of a pile acting as a column. It is recommended that all of the piles be the same type of pile driven to the same tip penetration depth. This is important to minimize the potential for differential settlements. In any case, consideration should be given to these estimated movements at sensitive locations. In the event any of our assumptions are not valid, TBG should be contacted to evaluate the potential effects on settlement of pile foundations.

PILE DRIVING

Driving of timber piles having a 7-inch diameter tip and a 12-inch diameter butt should be limited to the rate of 25 blows per foot using a maximum of 12,000 to 15,000 ft-lbs. of energy. These recommendations are given in order to minimize possible damage to the piles.

Driving of piles into the underlying sand could be erratic, if piles with tips in the sand are selected for design, it is recommended that probe type piles be driven several throughout the site to establish driving characteristics, to verify good density of the sand stratum throughout the site, and to establish pile lengths. While it is believed the piles could be driven several feet into the sand without damage, the piles should be closely observed and, if "refusal' or little to no penetration under several successive blows occurs, driving should be ceased. The probe piles should be the same type and size as the job piles and should be installed with the same equipment and techniques that would be used to install job piles.

It should be recognized that the density of the clayey sand stratum that begins at the approximate 58 ft. depth is relatively low. In view of this, there is a possibility that the piles may not develop "refusal" or good "point" support in this stratum. If piles with tips driven to firm embedment into the clayey sand are selected for design, the density of this clayey sand stratum should be confirmed by probe piles. If firm embedment of the pile tips does not develop, then it is recommended that a longer "skin friction" pile of a similar capacity be used for support.

If longer piles with higher capacities are selected, predrilling may be required to bypass the clayey sand stratum. Predrilling may also be needed in the area of boring B-2 if the density of the clayey sand is greater than the borings indicate. In this case, our office could provide further guidance relative to pile installation. It is important that inspection and logging of piles be performed by a qualified soil technician so as to detect unexpected conditions indicated by the driving resistance (hammer blows per foot) as well as any potential problems with breakage or driving difficulties.

DRAG LOAD

When fill is placed on the site, the underlying compressible soils consolidate, resulting in surface settlement. As the compressible soils consolidate, "negative skin friction" or down drag may be imparted on piles. This could result in an extraneous load, additive to any structural load, on the piles and could increase settlement of the structure. It is our opinion that drag load is dependent on the fill thickness, compressibility of the soils, time-rate of consolidation, and pile length. While the foregoing pile lengths would not totally eliminate settlements due to drag load, they should limit them to tolerable values. It is also recommended that all fill needed to raise the site grade be placed as soon as practical. In general, limiting the total amount of fill needed to raise the site grade would also minimize drag load effects on piles. In order to minimize the effects of drag load, it is recommended that a minimum pile length of 40 ft. (below the natural ground surface) be used if the fill thickness needed to raise the site grade in the area of the proposed Building is limited to 3 ft. It is also recommended to strengthen the structure foundation above normal design to increase its rigidity. It is recommended that all fill be placed as far in advance of construction as possible.

GROUP EFFECT

The effect of pile grouping on the single pile load capacities is dependent on pile spacing, pile length and soil characteristics throughout the pile length and below the pile tips. All piles should have a minimum center-to-center spacing of at least three (3) pile diameters or center-to-center spacing of 3 ft., whichever is greater. Group effect should be unimportant for pile clusters of up to 10 piles. Group effect could become important for larger clusters and should be evaluated when actual pile layouts are known.

MINIMUM PILE SPACING

$$SPAC = 0.05\ L_1 + 0.025\ L_2 + 0.0125\ L_3$$

SPAC(ft.) = Center to center spacing of piles = (Min. 3.0 ft.)
L_1 = Pile penetration in ft. up to 100 ft.
L_2 = Pile penetration in ft. from 101 to 200 ft.
L_3 = Pile penetration in ft. from 201 to 300 ft.

ALLOWABLE GROUP CAPACITY*

$$Q_a = \frac{P \times L \times c}{FSF} + \frac{2.6 \times q_u \times (1 + 0.2\ {}^{w}/_{b}) \times A}{FSB}$$

P = Perimeter distance of pile group (ft.)
L = Length of pile (ft.)
c = Average (weighted) shear strength (½ q_u) of soil throughout pile length (lbs./sq. ft.)
q_u = Unconfined compressive strength of soils below pile tips (lbs./sq.ft.)
w = Width of base of pile group (ft.)
b = Length of base of pile group (ft.)
A = Base area of pile group (sq. ft.)
FSF = Factor of safety for friction area = 2
FSB = Factor of safety for base area = 3

*In no case should the recommended single pile load capacity be exceeded.

VIBRATION MONITORING

Pile driving operations will cause vibrations that may affect nearby structures, pavement or utilities. Pile driving operations should be monitored at any structure of concern during the driving of the job piles to record the magnitude of vibrations. Sustained peak particle velocities of 0.25 inches per second measured at a structure may induce damage to the structure. Therefore, for sustained peak particle velocities in excess of 0.25 inches per second pile driving operations should be terminated and consideration given to altering the pile installation criteria.

PARKING AREAS

It is recommended that the proposed Parking Areas be constructed with rigid (concrete) pavement to allow for vehicular traffic. It is assumed the Parking Areas will be subjected to 200 vehicles per day. It is understood that the proposed Parking Areas will include automobiles and light trucks. Other areas could also be subjected to light concentrations of heavier truck traffic (garbage trucks, delivery trucks, etc.).

Based on soil borings P-1 thru P-3, it is believed that the surface soils could be assigned a Coefficient of Subgrade Reaction (k value) of 75 to 100 psi per inch for rigid pavement design. This assumes that the existing ground surface is stripped of all vegetation, soft or loose surface soil, deleterious materials, etc. and is well drained prior to construction. Any new fill needed to replace the excavated material or to raise the pavement grade could consist of a good quality compacted granular material. This compacted fill will provide a good base for rigid pavements.

Construction of the pavement improvement should only be attempted when the subgrade is dry and stable and after good drainage has been established in the area. If these surface soils are not well drained prior to and during construction, "pumping" may occur which would inhibit proper compaction of the rigid pavement base material. They would have to be stripped from the site and replaced with pavement base material. A geotextile fabric could be placed beneath the pavement improvement base to separate it from the soil subgrade.

CONCRETE PAVEMENT

In order to achieve a 20 year design life it is recommended that all areas subjected to automobile and light truck traffic, have a minimum concrete thickness of 7 in. For high traffic areas (entrances, driveways, etc.) a concrete thickness of at least 9 in. is recommended for design. Furthermore, for areas subjected to heavy truck traffic and garbage dumpster pick-up a concrete thickness of 11 in. is recommended for design. These concrete thicknesses assume an ultimate flexural strength for the concrete of at least 600 lbs. per sq. inch and that the concrete is at least wire-mesh reinforced.

It is recommended that the concrete pavement be underlain by a base or leveling course of at least 12 in. of good quality granular material. This could consist of locally available "sugar" sand or "pumped" sand having less than 10% fines passing the No. 200 Sieve. This material should be compacted to a minimum dry density of 95% of its maximum dry density as determined by ASTM D 698A. In-place density measurements should be taken to assure that this degree of compaction is achieved. Proper drainage should be provided in order to facilitate fill placement during both dry and wet weather conditions.

Reference is also made to the State of Louisiana, Department of Transportation and Development, Standard Specifications for Roads and Bridges, Latest Edition for additional guidelines and recommendations regarding pavement design and construction. This includes subgrade preparation; drainage and stripping; pavement materials (concrete, base, etc.); placement method and compaction requirements; paving equipment; and conditions; etc.

PAVEMENT CONSTRUCTION

It is our opinion that the methods, means and sequence of construction of the pavement sections are the responsibility of the contractor who should be experienced in this type construction. It should be noted that the geotechnical recommendations given herein with regard to concrete and base thicknesses for the new pavement sections are based on the assumed traffic conditions analyzed. This includes the recommended total improved thicknesses for areas restricted to automobiles and light truck traffic, high traffic areas (entrances/driveways), and for areas subjected to light concentrations of heavier traffic (delivery trucks, garbage trucks, etc.). However, it should be recognized that the fully or partially constructed pavement may be subjected to heavier construction equipment, such as bulldozers, spreaders, rollers, concrete trucks, dump trucks, etc. Therefore, appropriate measures should be taken by the contractor in terms of site preparation, base placement and compaction, selection of paving equipment, etc. to assure the performance of the pavement improvement during and after construction.

AREAL SETTLEMENT

A significant amount of imported fill will be placed on the site prior to construction. The St. Bernard Parish Public Library Building will be approximately 43,415 sq. ft. in plan dimension; an associated Employee Parking Area will be approximately 12,305 sq. ft. in plan dimension and a Main Parking Area will be approximately 35,275 sq. ft. in plan dimension. Analyses were made to estimate long term consolidation settlements that should be expected to occur due to the fill load over the areas of the proposed Library Building and Parking Lots. Long term settlements due to consolidation of the subsoils are estimated to occur and are provided in the following tables.

LIBRARY BUILDING	
Fill Thickness (FT.)	**Estimated Settlement (IN.)**
3	12 to 13
4	16 to 17
5	20 to 21
6	23 to 24
7	27 to 28
8	31 to 32
9	35 to 36
10	38 to 39

EMPLOYEE PARKING AREA	
Fill Thickness (FT.)	**Estimated Settlement (IN.)**
3	10 to 11
4	13 to 14
5	17 to 18
6	20 to 21
7	22 to 23
8	26 to 27
9	29 to 30
10	32 to 33

MAIN PARKING AREA	
Fill Thickness (FT.)	**Estimated Settlement (IN.)**
3	12 to 13
4	16 to 17
5	19 to 20
6	23 to 24
7	27 to 28
8	30 to 31
9	34 to 35
10	38 to 39

Some additional settlement could occur due to shrinkage of the fill material, itself. The estimated settlements would occur over most of the filled area, while settlements at the perimeter or edge of the fill would be approximately one-half (1/2) of the center settlements and would occur only over a limited range near the perimeter. The estimated settlements given above are based on a uniform fill thickness over a large filled area and a unit weight of fill of about 110 lbs. per cubic ft. These estimates are ultimate values due to fill loads. Additional settlements could occur due to lowering of groundwater with improved drainage or shrinkage of cohesive fill. It is recommended that all fill be placed as far in advance of construction as possible. The estimated areal settlements are total consolidation settlements and will take a long time to completely occur. Detailed soil properties to determine time-rate of settlement were not developed. However, it is estimated that about 30 to 40 percent may occur within the first 1 to 2 years after fill placement. The remaining 60 to 70 percent would take a long time to completely occur and on the order of 20 to 30 years.

Consideration could also be given to a preload program with surcharge loading to induce some of the anticipated settlements prior to construction. No detailed analyses were made in this regard. However, in order to be effective in a reasonable period of time, the preload should be at least twice the amount of design fill, but no less than 10 ft.

PRELOAD SURCHARGE

A long time would be required to achieve complete consolidation. In order to accelerate the occurrence of the anticipated settlements under the fill loads, a preload surcharge could be placed over the proposed Building Area and Parking Areas to induce a portion of these settlements in a shorter time period. Consolidation of the upper organic stratum will occur at a more rapid rate than the thick underlying clays. It is believed that best performance of a preload would result by consolidating the upper organic stratum as much as possible. It is believed that long term settlements of the underlying clay stratum would be more uniform and would have less effect on the pavement improvement than the settlements of the near surface organic clay.

There are numerous combinations of preload surcharge height and time of preload. The benefits of preload surcharge in minimizing construction settlements can be determined for various combinations of these parameters. This recommendation assumes the preload surcharge consists of "pumped" sand or "sugar" sand.

SETTLEMENT MONITORING

It is recommended that settlements be monitored to substantiate the estimated magnitude and time rate of settlement. This could be accomplished by monitoring settlement points at various locations throughout the various areas. The settlement reference points could consist of 2 ft. square and ¼ inch thick metal plate placed at about the 1 ft. depth below the existing ground surface. A metal standpipe should be rigidly connected to the settlement plate, projecting above the surcharge fill grade, to allow elevation readings to be taken.

These plates should be placed prior to fill placement and care should be taken so that they are not disturbed during fill operations. At the initial stage, elevation readings could be taken every week for about 2 months. Thereafter, readings could be taken every 2 weeks to 1 month or until the desired amount of settlement has occurred. When the surcharge is removed, care should again be taken so as not to disturb the settlement plates. Several additional elevation readings should be taken for a short time thereafter to monitor residual settlements that may occur.

EARTHWORK CONSIDERATIONS

At a minimum, the site will require earthwork associated with grading and preparation for the new Building and Parking Areas. The following paragraphs provide pertinent recommendations associated with potential earthwork activities.

SITE PREPARATION

Significant site preparation problems will develop unless good drainage is provided throughout the project duration. Proper site drainage should be maintained during and after construction. Providing drainage during the construction process will facilitate construction by reducing the potential for compaction problems.

FILL MATERIALS

Subsequent to the site preparation activities, the entire project area should be brought to grade using a clean, select fill material free from debris or organic matter. The imported fill could consist of locally available "sugar" sand or "pumped" sand having less than 10% fines passing the No. 200 Sieve. This material can be used from the proposed surcharge program as long as it meets these standards. This fill should be compacted to a dry density equal to at least 95% of its maximum dry density as determined by the Standard Proctor compaction test (ASTM D 698A). In-place density measurements should be taken to assure that this degree of compaction is achieved.

GEOTEXTILE

The geotextile should be a non-woven fabric with an apparent opening size (AOS) smaller than the U.S. No. 70 sieve. The geotextile should be able to retain the underlying soil without clogging.

QUALITY CONTROL

The use of the correct fill materials and the proper placement and compaction are critical in any earthwork where subsequent construction is planned. Construction monitoring by a qualified geotechnical engineer or technician is recommended to document that proper fill construction has been accomplished. The responsibilities of the quality control representative generally include observation of excavations, proof rolling operations, documentation of material types, and fill placement and compaction techniques. The geotechnical engineer or technician should

make sure the fill is the proper material type, and is placed in the correct manner. Any deviation from the design should be reported to the design engineer.

CONSTRUCTION QUALITY CONTROL

The Geotechnical Engineer of record should be retained to monitor and test earthwork activities, pile driving activities, subgrade preparations, as well as any additional construction activities. We recommend that TBG be employed to monitor the earthwork construction, and to report that the recommendations contained in this report are completed in a satisfactory manner. Our continued involvement on the project will aid in the proper implementation of the recommendations discussed herein.

The following is a recommended scope of services:

- Review of project plans and construction specifications to verify that the recommendations presented in this report have been properly interpreted and implemented.
- Observe the earthwork process to document that subsurface conditions encountered during construction are consistent with the conditions anticipated in this report.
- Observe the subgrade conditions before placing structural materials.
- Observe the placement and compaction of all structural materials, and perform laboratory and field compaction testing.

CONSULTATION

Often during final design and/or construction, questions can arise or services are needed to complete the project. TBG offers various construction services such as pile logging, vibration monitoring, pile load tests, subgrade preparation testing, etc. At your request, TBG would be pleased to discuss these services with a brief phone call or conference.

LIMITATIONS

This report has been prepared for the exclusive use of St. Bernard Parish Government, and their assigns for specific application to the referenced property in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made. These recommendations do not reflect variations in subsurface conditions that may be intermediate of the boring locations or in unexplored areas of the site. Should such variations become apparent during construction, we reserve the right to re-evaluate our recommendations based upon on-site observations of the conditions. In the event changes are made in the proposed construction plans, the recommendations presented in this report shall not be considered valid unless reviewed by our firm and modified or verified in writing.

Appendix

BORING LOCATION PLAN ● **BORING LOCATION** | **North** ▲

THE BETA GROUP, LLC.
1428½ Claire Ave, Gretna, Louisiana, 70053
504-227-2273 fax: 504-227-2274
Betagroupgc.com

Client:	St. Bernard Parish Government
Project:	Proposed Public Library
Location:	3121 E. Judge Perez Dr.
TBG Project No:	5310G
Date:	9/27/19
	Scale: Not To Scale — Figure 1

Proposed St. Bernard Parish Library
3121 E. Judge Oerez Dr.
Meraux, Louisiana

St. Bernard Parish Government
1125 E. St. Bernard Highway
Chalmette LA 70043

LOG OF SOIL BORING B-1

TheBetaGroup engineering and construction services

Sheet 1 of 1

File: 5310G
Date: 8/22/19
Logged by: E.J. Lazier
Driller: K. Williams
Rig: DAS

Location: Lat. 29° 56' 17.93"
Long. 89° 55' 48.5"
Surface Elevation:

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Wet Unit Weight (pcf)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Percent Passing #200 Sieve	Organic Content	Soil Type	Description
▽	0												Soft to Medium Stiff Gray CLAY (CH) with Organics and Silt
	5		1.5 (P)	0.51	53	99							
			1.25 (P)	0.49	52	104							
			1.0 (P)	0.43	68	104							
			3 b/f		107								Soft Dark Gray ORGANIC CLAY (OH)
	10		1-2-1		118								
			3 b/f										
			1-1-2										
	15		0.5 (P)	0.26	265	76	288	84	204				
	20		WOH		67								Soft to Medium Stiff Gray CLAY (CH)
			4 b/f										
	25		1-2-2		57								
	30		0.25 (P)	0.25	67	97							
	35		0.25 (P)	0.30	76	98							
	40		0.5 (P)		33								
	45		0.5 (P)	0.29	68	100	86	22	64				
	50		0.5 (P)		60								
	55		0.5 (P)	0.28	64	102							
	60		7 b/f		28					21			Loose to Medium Dense Gray CLAYEY SAND (SC)
			2-3-4		32								
			9 b/f		31					41			
	65		3-4-5										
			10 b/f										
			7-5-5										
	70		14 b/f		28								
			6-7-7										
	75		2.5 (P)	0.77	23	126							Medium Stiff Gray SANDY CLAY (CL)
			27 b/f		28					40			Medium Dense Gray CLAYEY SAND (SC)
	80		12-13-14		20								
			11 b/f										
	85		2-5-6	0.95	35	118							Medium Stiff Gray SILTY CLAY (CL)
			2.0 (P)		41								
	90												
	95		1.5 (P)	0.66	33	118							
			1.25 (P)		30								
	100												Boring completed at 100 ft.

Ground Water Level Data

▽ Free water first encountered

▽ Water level after 15 mins.

Boring Advancement Method

4" Nom. Dia. Short Flight Auger:
0 to 10 ft.
4" Dia. Rotary Wash:
10 to 100 ft.

Boring Abandonment Method

Borehole grouted with cement/ bentonite upon completion

Notes

Strata Boundaries May Not Be Exact

ARD LOG01 01R 5310G.GPJ LOG01R.GDT 10/3/19

Proposed St. Bernard Parish Library
3121 E. Judge Oerez Dr.
Meraux, Louisiana

St. Bernard Parish Government
1125 E. St. Bernard Highway
Chalmette LA 70043

LOG OF SOIL BORING B-2

TheBetaGroup
engineering and construction services

Sheet 1 of 1

File: 5310G
Date: 8/27/19
Logged by: E.J. Lazier
Driller: K. Williams
Rig: DAS

Location: Lat. 29° 56' 18.44"
Long. 89° 55' 47.57"
Surface Elevation:

Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Wet Unit Weight (pcf)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Percent Passing #200 Sieve	Organic Content	Soil Type	Description
			1.25 (P)	0.53	48	101							Soft to Medium Stiff Gray CLAY (CH)
			1.0 (P)	0.40	53	104							
	5		0.75 (P)	0.23	116	84	161	38	123				Very Soft Dark Gray ORGANIC CLAY (OH)
			0.25 (P)	0.06	151	79							
	10		0.25 (P)	0.13	110	91							Very Soft Gray CLAY (CH) with Organics
	15		3.0 (P)		29								Very Soft Gray SILTY CLAY (CL)
	20		0.25 (P)	0.11	57	109							Very Soft to Soft Gray CLAY (CH)
	25		0.25 (P)		47								
	30		0.25 (P)	0.22	48	110	55	19	36				
	35		0.5 (P)		75								
	40		0.5 (P)	0.29	62	103							
	45		0.5 (P)		67								
	50		0.5 (P)	0.25	58	100							
	55		21 b/f 8-10-11		46					56			Stiff to Very Stiff Gray SANDY CLAY (CL)
	60		12 b/f 9-7-5		42								
			15 b/f 8-7-8		41 32					24			Medium Dense Gray CLAYEY SAND (SC)
	65		15 b/f 7-7-8										
	70		2.75 (P)	1.23	21	133							Stiff Gray SANDY CLAY (CL)
	75		2.0 (P)		25								
	80		18 b/f 13-13-5		24								Boring completed at 80 ft.
	85												
	90												
	95												
	100												

Ground Water Level Data

Free water first encountered

Water level after 15 mins.

Boring Advancement Method

4" Nom. Dia. Short Flight Auger:
0 to 10 ft.
4" Dia. Rotary Wash:
10 to 80 ft.

Boring Abandonment Method

Borehole grouted with cement/ bentonite upon completion

Notes

Strata Boundaries May Not Be Exact

ARD LOG01 01R 5310G.GPJ LOG01R.GDT 10/3/19

Proposed St. Bernard Parish Library
3121 E. Judge Oerez Dr.
Meraux, Louisiana

St. Bernard Parish Government
1125 E. St. Bernard Highway
Chalmette LA 70043

LOG OF SOIL BORING B-3

TheBetaGroup engineering and construction services

Sheet 1 of 1

File: 5310G
Date: 8/28/19
Logged by: E.J. Lazier
Driller: K. Williams
Rig: DAS

Location: Lat. 29° 56' 18.89"
Long. 89° 55' 45.63"
Surface Elevation:

Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Wet Unit Weight (pcf)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Percent Passing #200 Sieve	Organic Content	Soil Type	Description
▽	5		1.5 (P)	0.29	60	96							Very Soft to Soft Gray CLAY (CH)
			1.25 (P)	0.29	63	96							
			1.0 (P)	0.22	63	97							
	10		0.75 (P)	0.05	156	79	167	53	114				Very Soft Dark Gray ORGANIC CLAY (OH)
			0.25 (P)		151								
	15		0.5 (P)	0.25	74	95							Soft Gray CLAY (CH)
	20		1.75 (P)		30								Stiff Gray SILTY CLAY (CL)
	25		0.25 (P)	0.19	58	106	66	20	46				Very Soft to Soft Gray CLAY (CH)
	30		0.5 (P)		49								
	35		0.5 (P)	0.26	73	100							
	40		0.5 (P)		64								
	45		0.5 (P)	0.35	66	101							
	50		0.5 (P)	0.26	61	104							
	55		16 b/f 6-9-7		47								
	60		6 b/f 3-2-4		40 25					42			Loose to Medium Dense Gray CLAYEY SAND (SC)
	65		13 b/f 4-6-7		27					16			
			13 b/f 5-7-6										
	70		3.0 (P)	1.22	27	123							Medium Stiff to Stiff Gray SANDY CLAY (CL)
	75		1.75 (P)	0.55	24	124							
	80		2.25 (P)		25								
	85												Boring completed at 80 ft.
	90												
	95												
	100												

Ground Water Level Data

▽ Free water first encountered

▽ Water level after 15 mins.

Boring Advancement Method

4" Nom. Dia. Short Flight Auger:
0 to 10 ft.
4" Dia. Rotary Wash:
10 to 80 ft.

Boring Abandonment Method

Borehole grouted with cement/ bentonite upon completion

Notes

Strata Boundaries May Not Be Exact

ARD LOG01 01R 5310G.GPJ LOG01R.GDT 10/3/19

Proposed St. Bernard Parish Library
3121 E. Judge Oerez Dr.
Meraux, Louisiana

St. Bernard Parish Government
1125 E. St. Bernard Highway
Chalmette LA 70043

LOG OF SOIL BORING P-1

TheBetaGroup
engineering and construction services

Sheet 1 of 1

File: 5310G
Date: 8/22/19
Logged by: E.J. Lazier
Driller: K. Williams
Rig: DAS

Location: Lat. 29° 56' 17.9"
Long. 89° 55' 49.69"
Surface Elevation:

FIELD DATA				LABORATORY DATA									
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Wet Unit Weight (pcf)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Percent Passing #200 Sieve	Organic Content	Soil Type	Description
☒	0		1.75 (P) 1.75 (P) 1.25 (P)	0.57	42 47 57	103	94	21	73				Medium Stiff Gray CLAY (CH) with Organics
	5												
	10												Boring completed at 6 ft.
	15												
	20												
	25												
	30												
	35												
	40												
	45												
	50												
	55												
	60												
	65												
	70												
	75												
	80												
	85												
	90												
	95												
	100												

Ground Water Level Data	Boring Advancement Method	Notes
☒ No free water encountered	4" Nom. Dia. Short Flight Auger: 0 to 6 ft.	
	Boring Abandonment Method Borehole grouted with cement/ bentonite upon completion	Strata Boundaries May Not Be Exact

ARD LOG01 01R 5310G.GPJ LOG01R.GDT 10/3/19

Proposed St. Bernard Parish Library
3121 E. Judge Oerez Dr.
Meraux, Louisiana

St. Bernard Parish Government
1125 E. St. Bernard Highway
Chalmette LA 70043

LOG OF SOIL BORING P-2

TheBetaGroup
engineering and construction services

Sheet 1 of 1

File: 5310G
Date: 8/22/19
Logged by: E.J. Lazier
Driller: K. Williams
Rig: DAS

Location: Lat. 29° 56' 17.06"
Long. 89° 55' 46.59"
Surface Elevation:

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Wet Unit Weight (pcf)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Percent Passing #200 Sieve	Organic Content	Soil Type	Description
☒	5		1.25 (P) 1.0 (P) 0.75 (P)	 0.40 0.25	47 52 60	 104 102	 98	 26	 72				Soft Gray CLAY (CH) with Organics
	100												Boring completed at 6 ft.

Ground Water Level Data	Boring Advancement Method	Notes
☒ No free water encountered	4" Nom. Dia. Short Flight Auger: 0 to 6 ft.	
	Boring Abandonment Method Borehole grouted with cement/ bentonite upon completion	Strata Boundaries May Not Be Exact

ARD LOG01 01R 5310G.GPJ LOG01R.GDT 10/3/19

Proposed St. Bernard Parish Library
3121 E. Judge Oerez Dr.
Meraux, Louisiana

St. Bernard Parish Government
1125 E. St. Bernard Highway
Chalmette LA 70043

LOG OF SOIL BORING P-3

TheBetaGroup
engineering and construction services

Sheet 1 of 1

File: 5310G
Date: 8/22/19
Logged by: E.J. Lazier
Driller: K. Williams
Rig: DAS

Location: Lat. 29° 56' 18.89"
Long. 89° 55' 45.63"
Surface Elevation:

Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Wet Unit Weight (pcf)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Percent Passing #200 Sieve	Organic Content	Soil Type	Description
☒			1.5 (P)	0.62	46	104	89	21	68				Medium Stiff Gray CLAY (CH) with Organics
			1.25 (P)		58								
	5		1.0 (P)	0.18	90	93							Very Soft CLAY (CH) with Organics
													Boring completed at 6 ft.
	10												
	15												
	20												
	25												
	30												
	35												
	40												
	45												
	50												
	55												
	60												
	65												
	70												
	75												
	80												
	85												
	90												
	95												
	100												

Ground Water Level Data
☒ No free water encountered

Boring Advancement Method
4" Nom. Dia. Short Flight Auger:
0 to 6 ft.

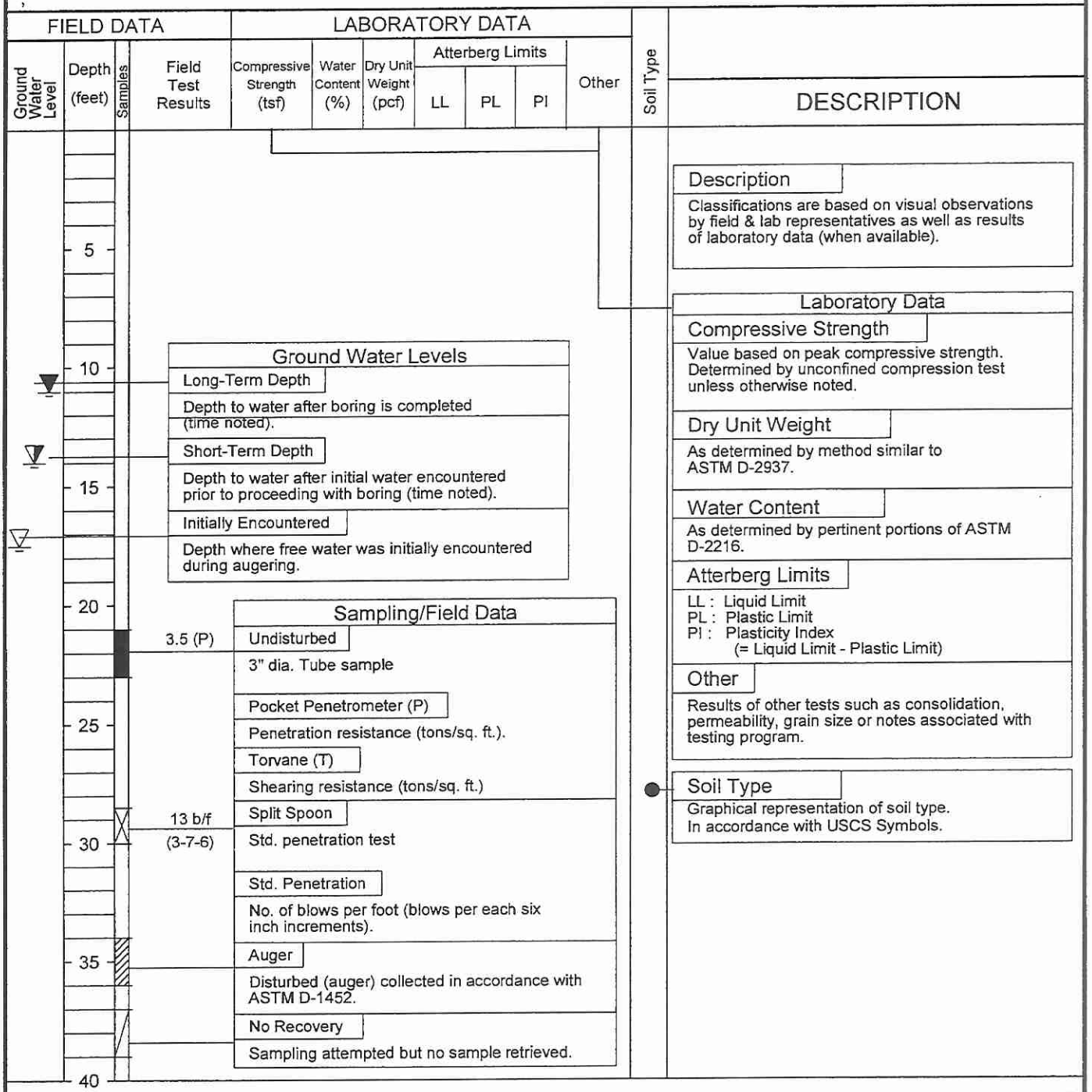
Boring Abandonment Method
Borehole grouted with cement/ bentonite upon completion

Notes

Strata Boundaries May Not Be Exact

ARD LOG01 01R 5310G.GPJ LOG01R.GDT 10/3/19

DESCRIPTION OF TERMS AND SYMBOLS USED ON SOIL BORING LOG



Ground Water Level Data	Boring Advancement Method	Notes
	Boring Abandonment Method	

Form LOGTERMS

Strata Boundaries May Not Be Exact

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

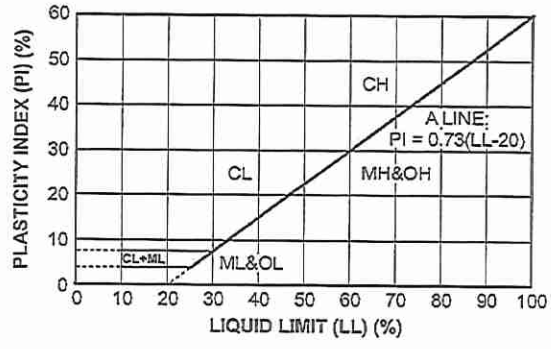
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ..... GW, GP, SW, SP
More than 12 percent ..... GM, GC, SM, SC
5 to 12 percent ..... Borderline cases requiring dual symbols

PLASTICITY CHART



SITE CLEARING SECTION 02110

PART 1: GENERAL

1.1 SUMMARY:

A. Clear and grub trees, stumps, vegetation, debris, rubbish, and designated improvements from site.

B. Protect trees, landscaping, site improvements, and other items not scheduled for clearing, or that might be damaged by construction activities.

C. Strip topsoil and stockpile at designated location on site.

D. Provide temporary erosion and dust control.

1.2 SUBMITTALS: Submit for approval schedule of site clearing.

1.3 QUALITY ASSURANCE: Comply with governing codes and regulations. Use experienced workmen.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION

3.1 CLEARING:

A. Prevent damage to existing improvements indicated to remain, including improvements on and off site. Protect existing trees and vegetation indicated to remain. Do not stockpile materials and restrict traffic within drip line of trees. Provide and maintain temporary guards to encircle trees or groups of trees; obtain approval before beginning work.

B. Water vegetation as required, to maintain health. Cover temporarily exposed roots with wet burlap and backfill as soon as possible. Coat cut plant surfaces with approved emulsified asphalt plant coating.

C. Repair or replace vegetation which has been damaged or pay damages. Remove heavy growths of grass before stripping. Stockpile satisfactory topsoil without stones, foreign matter and weeds in locations directed.

D. Completely remove all improvements including stumps and debris except for those indicated to remain. Remove below grade improvements at least 12" below finish grade and to the extent necessary to not interfere with new construction. Remove abandoned mechanical and electrical work as required.

E. Prevent erosion and siltation of streets, catch basins and piping. Control windblown dust. Remove waste materials and unsatisfactory topsoil from site and dispose of in a legal manner.

END OF SECTION

EXCAVATING, BACKFILLING, AND COMPACTING FOR STRUCTURES AND MINOR UTILITIES AND PAVING SECTION 02220

PART 1: GENERAL

1.1 RELATED DOCUMENTS: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division 0) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 SCOPE OF WORK: Furnish all necessary materials, labor and equipment for the complete earthwork for construction of foundations for structures, paving, utilities and appurtenances, including excavation, backfilling, filling, compacting, disposal of surplus material and restoration of ground surfaces, as shown on the drawings and specified herein. Provide all necessary supplementary items for a complete installation intended by documents.

1.3 PROVISIONS:

A. Existing conditions are generally shown on the Drawings. Contractor shall visit the site, familiarize himself with actual conditions and verify existing conditions in the field. The Contractor is required to accept actual conditions at the site and do the Work specified without additional compensation for possible variation from grades and conditions shown, whether surface or sub-surface.

B. Execute all Work in an orderly and careful manner with due consideration for any and all surroundings areas and planting which are to remain. Periodically water as required to allay dust and dirt. Protect any adjacent property and improvements from damage and replace any portions damaged through this operation.

C. Finish grade all areas affected by Work of this project. Accomplish proper and positive surface drainage with no areas that pond water. Provide a sloping earth berm around all construction of this project and swales as required for positive drainage.

1.4 PROTECTION:

A. Maintain carefully all benchmarks, monuments, and other reference points. If disturbed or destroyed, replace as directed. If found at variance with the Drawings, notify the A/E before proceeding to lie out Work.

B. Protect as may be necessary any existing vegetation, trees, or the like immediately adjacent to the limits of Work which are not stated or directed to be removed. Any such damaged plant shall be replaced at no cost to Owner with like species and size.

B. In the event any excavation must be made immediately adjacent to the existing portion of buildings, covered walks or other Work, which is to remain, thoroughly crib and shore. Any settling or damage to that portion of the existing Work which is to remain, as a direct result of excavation Work, will be the responsibility of Contractor who shall repair the damage at no cost to Owner.

C. Restore all existing curbs and paving damaged in performance of this Work without extra cost to Owner in the manner prescribed by authorities having jurisdiction.

D. Protect all existing fencing and other work to remain, from damage. If damaged, restore or replace at no additional cost to Owner.

F. Where trees are to be left in place in areas to be graded, adequately protect from damage. Natural surface of ground shall be left undisturbed for a distance of eight feet from tree on all sides except as approved or directed by A/E.

1.5 EXISTING UTILITIES:

A. Follow rules and regulations of the authority having jurisdiction in executing all Work under this article. Adequately protect active utilities shown on the drawings from damage and remove or relocate only as indicated or specified. Where active utilities are encountered, but are not shown on the drawings, advise the A/E.

B. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.

C. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities operational. Repair damaged utilities to satisfaction of utility owner.

D. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, except when permitted in writing by A/E and then only after acceptable temporary utility services have been provided.

E. Provide minimum of 48-hour notice to A/E, and receive written notice to proceed before interrupting any utility. Contractor shall be responsible for notifying applicable agency.

F. 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.

G. Remove, plug or cap inactive and abandoned utilities encountered in excavating and grading operations as directed.

1.6 COMPACTION STANDARDS:

A. Densities for Materials:
1. Granular Material, Topsoil and Excavation Materials Densities: Required densities of compaction are expressed hereinafter in terms of percentages. Such terms shall mean percentages of maximum density at optimum moisture content, as determined and controlled in accordance with the American Society For Testing and Materials, "Standard Test Methods for Moisture - Density Relationships of Soils and Soil - Aggregate Mixtures" using 5.5 lb. (2.49kg) Hammer and 12 inch (305mm) Drop. Use relative density test for the bedding material.
2. Bedding Material Densities: Standard Test Methods for Moisture Density Relationships of Soils and Soil-Aggregate Mixtures.

3. Base Course Densities: Standard Test Methods for Laboratory Compaction Characteristics of Soil using Standard Effort (12,400 ft-lb/ft^3).

B. Field density determinations shall be made at locations as directed by the A/E.

C. If tests indicate insufficient density, compact as required and have additional testing performed until required densities are met. The Contractor shall pay for all such additional testing.

1.7 QUALITY ASSURANCE:

A. Testing Agency: In place soil compaction tests to be performed by the designated testing laboratory.

B. Reference Standards:
1. American Society for Testing and Materials (ASTM):
a. ASTM D698-07, Moisture-Density Relations of Soils Using 5.5-lb. (2.49-kg) Rammer and 12-in 305-mm) Drop.
b. ASTM D 2487, Classification of Soils for Engineering Purpose.

C. Contractor is responsible for the payment of all retests.

1.8 JOB CONDITIONS:

A. Time of construction should be kept to a minimum.

B. Sheeting, shoring, and dewatering during construction should be properly designed to keep a stable excavation at all times and to prevent disturbance of the in place soils.

C. As specified in these Specifications, the Contractor shall provide, operate, and maintain all necessary pumps, discharge lines, well points, etc., in sufficient number and capacity to keep all excavation, bases, pits, etc. in conformance with the indicated foundation construction condition at each structure at all times throughout the period of construction.

D. As specified in these Specifications, the Contractor shall assume all responsibility for security of the excavation required, employing bracing, lining, or other accepted means necessary to accomplish same.

D. Excavated areas shall be cleared of all debris, water, slush, muck, and soft or loose earth and shall be conditioned to the entire satisfaction of the A/E.

E. All excavated material unsuitable for use, or which will not be used, shall be disposed of as specified.

G. All excavations encountering stumps, roots, logs, etc. shall be removed of such items by the Contractor and refilled with proper material, as specified.

PART 2: PRODUCTS

2.1 GRANULAR MATERIAL: Fill shall be AASHTO A-2-4 or better or clean sand well graded from fine to coarse, free of debris, organic or other deleterious matter and approved by A/E.

2.2 TOPSOIL: For final grading of areas adjacent to structure, use existing. Provide topsoil from off-site borrows when on-site topsoil:

A. Is not sufficient to complete the work.

B. Does not meet the requirements set forth below, or

C. Is deemed unsuitable by A/E.

Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, trash or other material over 1-1/2 inches diameter. Topsoil shall be free from viable plants and plant parts. Topsoil shall also be free from debris, noxious weeds, toxic substances, or other materials harmful to plant growth. Topsoil shall have a minimum PI of 4, a maximum PI of 12, a pH of 5.5-8.0, a minimum organic content of 2%, and shall be capable of supporting adequate vegetation. Pump sand may not be used for topsoil under any circumstances.

2.3 BEDDING MATERIAL: Material shall be limestone and from a source approved by the Owner. Graded aggregate for 16 inch or less pipes shall be No. 67. Graded aggregate for 18 inch or greater pipes shall be No. 57.

The limestone shall meet the following gradations when tested in accordance with DOTD TR 113:

	#57	#67
U.S. Sieve	Percent	Percent
1 1/2"	100	---
1"	95 - 100	100
3/4"	---	90 - 100
1/2"	25 - 60	---
3/8"	C	20 - 55
#4	0 - 10	0 - 10
#8	0 – 5	0 - 5

The limestone shall have an absorption rate of not more than 1.5 percent and an abrasion loss of not more than 30 percent when tested in accordance with test method AASHTO T96.

2.4 SELECT BACKFILL MATERIAL (FOR UTILITY TRENCHING):

A. Composition: Only approved material shall be used for backfill, free from organic matter. Excavated earth free from debris or organic material may be used for backfilling, as specified.

B. Excavated clay soils free of debris, organic material, or large lumps of clay shall be used only when indicated by geotechnical recommendations, when available.

2.5 Base Course: Unless otherwise noted, material shall be crushed stone in accordance with LA DOTD Standard Specification, Section 1003-03(b), 2016 Edition.

PART 3: EXECUTION

3.1 PREPARATION:

A. Lay out and maintain grade stakes as required. Reference layout work to base lines, property lines, easements, and/or rights-of-way as indicated.

B. Where new grades tie into existing grades, verify existing grades. If existing conditions are at variance with the Drawings, notify A/E before proceeding with the Work and make adjustments only as directed by the A/E.

B. The Contractor shall verify that preceding work affecting work of this section has been satisfactorily completed.

D. Correct conditions adversely affecting work of this section.

3.2 STRIPPING AND STOCKPILING OF TOPSOIL: Carry out this Work when dry weather exists and the topsoil is reasonably loose and dry. Remove topsoil a minimum of four (4) inches to remove all vegetation, roots, foreign matter, from areas to receive fill. Pile topsoil in designated or approved locations where it will not interfere with construction operations. Stockpiles shall be of such size and shape as will keep loss of topsoil by erosion and wind to a minimum.

3.3 DISPOSAL OF MATERIALS:

A. Excavated material shall be stacked without excessive surcharge on the excavation or obstructing free access to street, drives, walks, utility appurtenances, and private property. Excessive inconvenience to traffic and adjacent property owners shall not be allowed. Excavated material shall be segregated for use in topsoil as specified below.

B. All excavated material which is either unsuitable for topsoil or which will not be used for topsoil in the same location shall be removed from the site by the Contractor.

C. Should conditions make it impractical or unsafe to stack material adjacent to the excavation, the material shall be hauled and stored at a location provided by the Contractor. When required, it shall be rehandled and used in backfilling the excavation.

3.4 EXCAVATION:

A. Excavation shall extend to the width and depth shown on the drawings or as specified. Where not specified, Contractor shall confine his excavation to the least width practicable and shall provide suitable room for installing structures and appurtenances.

B. The Contractor shall furnish and place all sheeting, bracing, and supports and shall remove from the excavation all materials which are unsuitable for backfill or which the A/E may deem unsuitable for backfilling. The bottom of the excavation shall be firm, dry, and in all respects, acceptable. The Contractor shall deposit bedding, or refill for excavation below grade, directly on the bottom of the excavation, immediately after excavation has reached the proper depth, and before the bottom has become softened or disturbed by any cause whatever. It shall also include the wasting or disposal of surplus excavated material in a manner and in locations approved by the A/E. If the bottom of the excavation is carried below the level called for by the Drawings, or made mucky or unstable due to the Contractor's operations or carelessness, the excavation shall be deepened to undisturbed soil. Also, the thickness of bedding material or depth of fill material, as determined by the A/E, shall be increased accordingly, without additional compensation to the Contractor.

C. Shore, sheet-pile, and brace excavations as required to maintain them secure and to safeguard life. Remove shoring as the backfilling progresses, but only when banks are safe against caving or collapse and backfill meets required densities.

D. Control the grading so that ground is etched to prevent water from running into the excavated areas or damaging the structures. Maintain all pits and trenches free of water at all times.

E. Pumping: The Contractor shall keep all excavations free from water, at his own expense, while work is in progress. He shall provide for the disposal of the water removed from excavations in such a manner as not to cause injury to the public health, to public or private property, or to any portion of the work completed or in progress, or shall he cause any impediment to the use of the streets by the public.

F. All material excavated shall be placed so as to minimize interference with public travel and to permit proper access for inspection of the work.

F. All excavation shall be made within an area bounded by lines 5 feet outside of, and parallel to, exterior walls of the structure to allow for correct forming, shoring, and inspection of foundation work. Pouring of concrete against earth sidewalls will not be permitted.

G. Where soil conditions permit, footing trenches may be excavated to the exact dimensions of the concrete footing and side form omitted.

H. When bedding material is to rest on an excavated surface, care shall be taken not to disturb the bottom of the excavation. Final removal and replacement of the foundation material and sub base compaction to grade shall not be made until just before the structure is placed.

I. When any excavation is completed, the contractor shall notify the A/E who will make an inspection of the excavation. No concrete or masonry shall be placed until the excavation has been approved by the A/E.

J. The elevation of the bottoms of footings and base slabs, as shown on the drawings, shall be considered as approximate only and the A/E may order, in writing, such changes in dimensions or elevation of footings as may be necessary to secure a satisfactory foundation.

K. Stumps, roots, and logs, which are encountered within the trench area, shall be cut to a depth of one (1) foot below the bottom of the excavation. The Contractor shall fill this excavated space with bedding material.

L. When so required by the A/E, the contractor shall probe one (1) foot below the established bottom on the excavation. If this probing discovers any stump, roots, logs, etc., the Contractor shall cut them out just as if they had been visible in the excavation.

N. Blasting will not be allowed for the removal of stumps.

3.5 FILL UNDER SLABS AND PAVING:

A. Where fill is required to raise the subgrade for concrete placement to the elevations indicated, place and compact as specified.

B. Before depositing fill, remove all loam, vegetation and other unsuitable material from areas to receive fill. In no case shall fill be placed on a subgrade that is muddy, frozen, or that contains frost. Compact subgrade by rolling with spreading equipment uniformly over entire area.

C. Deposit fill material in horizontal layers not exceeding nine (9) inches in depth before compacting. Spread fill evenly and compact each layer by uniformly rolling, pneumatic tamping or other approved equipment over the entire area. If necessary, moisten fill or allow to dry to the correct moisture content before compaction.

D. Bring the finished compacted areas to a reasonably true and even plane at the required elevations.

E. Compact all fill to 95 percent density unless otherwise specified.

3.6 UTILITY TRENCH BACKFILLING:

A. As soon as practicable after the utilities have been laid, jointed, and tested (if required), backfilling shall begin and completed expeditiously. Bedding shall conform to the details on the Drawings. When laying pipe, the groove for the pipe and bell hole must be accurately shaped, and the backfill must be closely packed adjacent to the pipe.

B. Bedding material shall be placed and compacted as shown on the Drawings. All foundation lumber (i.e., planking, sills, and stringers in the trench bottom) shall be suitable for the purpose. Installation of foundation lumber and piling shall be in accordance with the Drawings.

C. Bedding compaction shall consist of the placement in lifts not exceeding 12 inches and compacted by a drum roller or plate vibrating compactor. This mechanical compactor must make a minimum of two passes over every area of the bedding. Compacted bedding shall be enclosed in a filter fabric in areas that require a granular material backfill.

D. Backfill around manholes, catch basins, area drains, and other structures shall be compacted by flooding. All backfill shall be compacted, especially under and over pipes connected to the manholes.

E. All paved surfaces adjacent to backfilling operations shall be broomed and hose-cleaned immediately after backfilling. Dust control measures shall be employed at all times.

F. Compact all bedding material to 75 percent relative density and granular material backfill to 95 percent density. Compact all select backfill material to 90 percent of maximum density.

3.7 RESTORING TRENCH SURFACE:

A. Where the trench occurs adjacent to paved streets, in shoulders or sidewalks, the Contractor shall thoroughly consolidate the backfill and shall maintain the surface as the work progresses. If settlement takes place, he shall immediately deposit additional fill to restore the level of the ground.

B. The surface of any driveway, paving or other area which is disturbed by the trench excavation shall be restored by the Contractor to a condition at least equal to that existing before work began.

C. In sections where the pipeline passes through grassed areas, the Contractor shall regrade and reseed all disturbed areas to a condition at least equal to that existing before work began.

3.8 SITE GRADING:

A. Do all cutting, filling, compaction of fills, and rough grading to bring the entire project area outside of construction to grades indicated on Drawings and as required to provide proper and positive drainage away from construction.

B. Where fill is required to rise the existing grades outside of construction to the new elevation required or indicated, place and compact such fill as specified.

C. Remove all debris subject to termite attack, rot, or corrosion, and all other deleterious materials from areas to be filled. The moisture content of the loosened material shall be such that it will readily bond with the first layer of fill material.

D. Place the material in successive horizontal layers in loose depth for the full width of the cross section. Deposit fill in layers not more than nine (9) inches thick under lawn and planted areas. If necessary, moisten soil, or allow to dry to the correct moisture content, before compaction. Do not deposit any fill on a subgrade that is muddy, frozen, or that contains frost.

E. Compact fills under lawns and planting areas to 95 percent density unless otherwise specified.

3.9 DISTRIBUTION OF TOPSOIL: Spread stockpiled topsoil that is acceptable to A/E to a depth of four (4) inches over open graded areas to be planted with grass. After topsoil is spread, remove all hard lumps of clay, stones over one (1) inch in diameter, roots, limbs, and other deleterious matter which would be harmful, or prevent proper establishment or maintenance of lawn and planting areas.

3.10 FIELD QUALITY CONTROL:

A. Rough grading of all areas within the project, including excavated and filled sections and adjacent transition areas, shall be reasonably smooth, compacted, and free from irregular surface changes.

B. Finish all swales and gutters to drain readily.

3.11 REPAIR: Where any existing lawn areas are damaged, rutted, or otherwise disturbed, repair to original condition.

3.12 DISPOSAL: Burning of materials on the site will not be permitted. Remove rubbish and debris from the site as it accumulates.

3.13 BARRICADES AND FLARES: The Contractor shall provide temporary fencing, barricades, flares, signs, etc., as necessary, to protect vehicles and pedestrians at locations where there exists an open excavation, trench, or any other obstacle. Barricades shall bear the Contractor's name and any other information required by the A/E or public authorities. Where on public roadways all barricade signs and flares shall be of a type and located in a manner that conforms to recommendations of the Louisiana Manual on Uniform Traffic Control Devices, latest edition as revised, or as specified herein, subject to the approval of the A/E.

END OF SECTION

GEOTEXTILE FABRIC (FILTER CLOTH) SECTION 02272

PART 1: GENERAL

1.1 RELATED DOCUMENTS: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division 0) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 SCOPE OF WORK: Furnish all necessary materials, labor and equipment for the complete installation of geotextile fabric. Provide all necessary supplementary items for a complete installation intended by documents.

1.3 SUBMITTALS: The characteristics and properties of the geotextile fabric to be installed shall be submitted to the A/E prior to the installation of the fabric in accordance with Division 1.

PART 2: PRODUCTS

2.1 MATERIALS: Geotextile fabric shall be manufactured and fabricated in strict conformance to ASTM and other industry standards.

A. Underdrains, Bedding, and Around Pipe Joints:

Fabric Property		Minimum Specifications
1.	Weight, ASTM D-3776-79	3.0 oz./sq. yd.
2.	Equivalent Opening Size ASTM D-4751-87	50+
3.	Average Grab Tensile, ASTM D-4632-86	90 lb./in.
4.	Grab Elongation (any direction), ASTM D-4632-86	70%
5.	Permittivity Factor, ASTM D-4491-85	0.8 sec^{-1}

B. Under Base: The fabric shall be installed between the base and subbase layers.

Fabric Property		Minimum Specifications
1.	Equivalent Opening Size	40+
2.	Permittivity Factor, ASTM D-4491-85	0.2 sec^{-1}
3.	UV Radiation Stability, ASTM D-4355	70%
4.	Grab Tensile Strength, ASTM D-4632-86	200 lb/in.
5.	Grab Elongation, ASTM D-4632-86	30%
6.	Puncture Resistance ASTM D-4833-88	85 lbs
7.	Mullen Burst Strength ASTM D-3786-87	400 psi

2.2 APPROVED PRODUCTS:

A. Underdrains, Bedding, and around Pipe Joints: Mirafi 140 NL, Mirafi 140 NS, Trevira 1112, or approved equal.

B. Under Base: Mirafi 500X, Mirafi 600X, Trevira 1135, or approved equal.

2.3 MANUFACTURER: The manufacturer of the geotextile fabric shall have been normally engaged in the manufacture or fabrication of this geotextile fabric for at least five (5) continuous years.

2.4 FABRICATION: The geotextile fabric shall be furnished to the Contractor by the manufacturer as a continuous sheet in the widths required for installation in the trench. The length of each sheet shall be such that the total number of sheets to be joined in the field is minimized.

PART 3: EXECUTION

3.1 HANDLING:

A. The Contractor shall handle and store the sheets in accordance with manufacturer's recommendations to avoid any damage to the sheets. Geotextile fabric shall be stored such that it is not exposed to sunlight.

B. Damaged geotextile fabric will not be acceptable for installation until and unless it has been replaced to the satisfaction of the A/E.

3.2 INSTALLATION:

A. The geotextile fabric shall be installed in a prepared area as specified in the Specifications or as indicated on the Plans.

B. Manufacturer's recommendations shall be followed during the installation of the fabric. Care shall be taken during pipe laying, embedment and backfilling operations to avoid damage to the geotextile fabric. Any portion of the fabric damaged during installation shall be removed and replaced or repaired to the satisfaction of the A/E prior to continuing the installation of the geotextile fabric or pipe laying.
   1. Field Joints: The number of field joints shall be minimized. Lap joints shall be used to join sections in the field.
   2. Lap joints shall be formed by lapping the edges of the fabric sections a minimum of 18 inches.

B. Pipe joints shall be wrapped with geotextile filter cloth for a minimum of 12 inches on each side of the joint. Ends of the cloth shall be lapped at least 10 inches and edges and ends of the cloth shall be suitably secured.

C. Underdrains: Completed trenches for perforated pipe shall be lined with filter cloth. Adjoining sheets of cloth shall be spliced by lapping at least 18 inches and satisfactorily securing, or by use of sewn or heat-bonded splices. A sufficient width of cloth shall be placed in the trench to permit the cloth to lap over the top of the trench for the full width of the trench.

D. Bedding: Completed trenches for bedding material shall be lined with filter cloth, encapsulating the bedding material. Adjoining sheets of cloth shall be spliced by lapping at least 18 inches and satisfactorily securing, or by use of sewn or heat-bonded splices. A sufficient width of cloth shall be placed in the trench to permit the cloth to lap over the bedding material for the full width of the trench.

E. Care shall be taken during placement of the cloth, pipe, bedding material, backfill, and other material to avoid damaging the filter cloth.

G. The Contractor shall satisfactorily repair or replace any damaged filter cloth.

3.3 FIELD QUALITY CONTROL: The Contractor is fully responsible for the installation of the geotextile fabric.

END OF SECTION

SOIL TREATMENT FOR TERMITE CONTROL SECTION 02281

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Soil treatment for subterranean termite control for slabs, foundations and trenching of all areas of the buildings.

1.02 REFERENCES

A. EPA - Environmental Protection Agency - Federal Insecticide, Fungicide and Rodenticide Act.

1.03 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Indicate each toxicant to be used, composition by percentage, dilution schedule, intended application rate. Also include copy of guarantee.

C. Test Reports: Indicate regulatory agency approval reports when required.

D. Manufacturer's Installation Instructions: Indicate caution requirements.

E. Manufacturer's Certificate: Certify that toxicants meet or exceed specified requirements and indicate any deviations required to comply with governing codes and regulations including U.S. Environmental Protection Agency (EPA) regulations for termiticides and State of Louisiana requirements.

1.04 GUARANTEE

A. Written guarantee shall certify that the applied soil poisoning treatment will prevent the infestation of subterranean termites and, that if subterranean termite activity is discovered during the guarantee period, the Contractor shall re-treat the soil and also repair or replace damage including contents caused by termite infestation.

1. Warranty Period: 5 years from date of treatment, signed by the applicable, with two (2) year renewable option.
2. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
3. Contractor shall submit one week after Notice to Proceed the cost for the first annual renewal and shall guarantee that subsequent annual renewals will not exceed a cost calculated on a 5% compounded rate of increase of the first annual renewal fee.
4. Within 12 months after initial treatment of the outside of the foundation, the perimeter wall shall be trenched and treated as required by label and labeling. The licensee shall report the completion of the application to the outside of the foundation to the Louisiana Department of Agriculture and Forestry on the Termite Perimeter

application form. Rodding will be acceptable where trenching may damage flowers and/or shrubs. Maximum distance between rod holes shall be 4 inches.

1.05 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01700.

B. Accurately record moisture content of soil before application, date and rate of application, areas of application, diary of meter readings and corresponding soil coverage.

1.06 QUALITY ASSURANCE

A. Applicator: Company specializing in performing the work of this Section with minimum five (5) years documented experience, and licensed by the State of Louisiana.

B. Use only termiticides that bear a federal registration number of the EPA and are approved by local and State authorities having jurisdiction including application rates.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code and regulations for requirements for application, application licensing, authority to use toxicant chemicals.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of toxicants.

1.08 SEQUENCING

A. Apply toxicant within the 12 hours prior to installation of vapor barrier under slabs-on-grade and finish grading work outside foundations.

B. Restrictions: Do not apply soil treatment solution until excavating, filling, and grading operations are completed, except as otherwise required in construction operations.

C. To ensure penetration, do not apply soil treatment to frozen or excessively wet soils or during inclement weather. Comply with handling and application instructions of the soil toxicant manufacturer.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Use an emulsible, concentrated termiticide that dilutes with water, specially formulated to prevent termites infestation. Fuel oil will not be permitted as a diluent. Provide a solution consisting of one of the following chemical elements.

B. Available Products: Subject to compliance with applicable regulatory agency requirements, products that may be incorporated in the work include, but are not limited to, the following:

1. VERIFY ACCEPTABLE PRODUCTS WITH LOCAL AUTHORITIES PRIOR TO SUBMISSION TO ARCHITECT!

C. Dilute with water to concentration level recommended by manufacturer.

D. Other solutions may be used as recommended by the Applicator and if acceptable to the Architect. Provide only soil-treatment solutions which are not injurious to planting or people in concentrations used.

2.02 MIX

A. Mix toxicant to manufacturer's instructions

PART 3 - EXECUTION

3.01 EXAMINATION/PREPARATION

A. Verify that soil surfaces are sufficiently dry to absorb toxicant, and ready to receive treatment.

B. Verify final grading is complete.

C. Post signs in areas of application warning workers that soil poisoning has been applied. Remove signs when areas are covered by other construction.

3.02 APPLICATION

A. Spray apply toxicant in accordance with manufacturer's instructions.

B. Apply toxicant at locations indicated in Schedule at end of Section.

C. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.

D. Re-treat disturbed treated soil with same toxicant as original treatment.

E. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

3.03 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. Do not permit soil grading over treated work.

3.04 SCHEDULES

A. Surface Preparation: Remove foreign matter that could decrease treatment effectiveness 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 placing compacted fill under slabs if recommended by toxicant manufacturer.

B. Application Rates: Apply soil treatment solution as recommended by the manufacturer and maximum permitted by the applicable governing agencies

END OF SECTION

SECTION 02301 EARTHWORK FOR BUILDING FOUNDATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes:

1. Site Preparation

2. Excavation

3. Backfill

4. Fill

1.03 DESCRIPTION OF WORK

A. Extent of work included in this section pertains to earthwork for building foundations.

1.04 QUALITY ASSURANCE

A. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

B. The Owner will employ an Independent Testing Laboratory to conduct all inspections and testing of fill materials and compaction of fill and backfill.
1. The testing lab shall be in compliance with ASTM E 329 “Standard Specification for Agencies Engaged in Construction Inspection and/or Testing” and ASTM D 3740 “Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction”.

1.05 JOB CONDITIONS

A. Existing Utilities: Locate existing underground utilities, if any, in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

1. 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.

2. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, except when permitted in writing by Architect and then only after acceptable temporary utility services have been provided.

3. Coordinate with utility companies for shut-off of services if lines are active.

B. Use of Explosives: The use of explosives is not permitted.

C. 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.

D. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. Fill Material: Locally available "pumped" river sand shall be used as structural fill. The sand shall have less than ten (10) percent passing the #200 sieve. Prior to transporting this fill to the site, a sample shall be tested by the Owner's Independent Testing Laboratory to verify its conformance to these recommendations.

PART 3 - EXECUTION

3.01 SITE PREPARATION

A. The site has been preloaded in a surcharge program. The surcharge will remain in the area of the scheduled building footprint. Additional fill shall be installed as required to bring the building footprint up to design grade.

B. Establish adequate drainage to prevent ponding of water and ensure immediate runoff of all rainfall. Should areas of ponding water develop, the Contractor shall immediately pump ponding water away from areas of construction.

C. Clearing and Stripping: The existing ground surface shall be stripped of any vegetation, loose topsoil, debris stumps, organic matter, loose fill, and any other deleterious materials. Stripping shall be to the minimum depth necessary to remove any vegetation and roots. Deeper excavations may be required in the vicinity of stumps or demolition debris. The exact depth of stripping shall be determined during construction by a representative of Owner's Independent Testing Laboratory.

D. After stripping and clearing operations, the first layer of structural fill shall be placed in a relatively uniform horizontal lift and shall be adequately keyed into the striped and scarified soils. Placement of structural fill shall extend a minimum of 5 feet past the perimeter of the building pads. The exposed surface shall then be proof rolled with a tandem axle dump truck or similar heavily loaded rubber-tired vehicle. The vibratory system on the compactor, if present, shall not be used during proof rolling. Any depressions, stump holes, or weak areas identified shall be thoroughly cleaned out to the surface of firm, undisturbed soil and backfilled with a

select structural fill material placed and compacted under controlled conditions. All clearing and compaction operations shall only be performed during periods of dry weather. Proof rolling operations shall be witnessed by a representative of the Owner's Independent Testing Laboratory. Motorized wheeled equipment shall not be allowed within the foundation area during periods of inclement weather.

3.02 EXCAVATION

A. Shoring and Bracing:

1. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.

2. Establish requirements for shoring and bracing to comply with local codes and authorities having jurisdiction.

3. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

4. Provide permanent steel sheet piling or pressure treated timber sheet piling wherever subsequent removal of sheet piling might permit lateral movement of soil under adjacent structures, paving, etc. Cut off tops are required and leave permanently in place.

B. Dewatering:

1. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

2. 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 subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

3. 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.

4. Dispose of excess soil material and waste materials as herein specified.

C. Excavation for Structures:

1. Conform to elevations and dimensions shown within a tolerance of 2"±, and extend a sufficient distance from footings and foundations to permit placing and removal of concrete form work, installation of services other construction, and for inspection.

2. In excavating for footings and other subgrade construction, take care not to disturb the bottom of the excavation. Trim bottoms to required lines and grades to leave solid base to receive concrete.

D. Excavation for Trenches:

1. Dig trenches to the uniform width required for the item to be installed, sufficiently wide to provide ample working room.

2. 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.

3. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for the entire body of pipe.

4. Backfill trenches with concrete where trench excavations pass within 18" of soil supported column or wall footings which are carried below the bottom of such footings, or which pass under wall footings. Otherwise, compact as required for adjacent soil. Concrete is specified in Division 3.

5. Do not backfill trenches until tests and inspections have been made. Use care in backfilling to avoid damage or displacement of pipe systems.

E. Cold Weather Protection:

1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.03 COMPACTION

A. Select used for grading of pile-supported building foundations shall be compacted to a dry density of 95% of its maximum dry density as determined by the Standard Proctor compaction test (ASTM D 698A). In-place density measurements shall be taken as specified herein to assure that required compaction is achieved.

B. Moisture Control:

1. 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.

2. Remove and replace soil material that is too wet to permit compaction to specified density.

3.04 BACKFILL AND FILL

A. General: Place fill or satisfactory excavated material in layers to required subgrade elevations.

B. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance by Architect of construction below finish grade.

2. Inspection, testing approval, and recording locations of underground utilities.

3. Removal of concrete formwork.

4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures or remove in manner to prevent settlement of the structure or utilities or leave in place if required.

5. Removal of trash and debris.

6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

3.05 FIELD QUALITY CONTROL

A. Quality Control Testing during Construction: Allow Owner's Independent Testing Laboratory to inspect and approve each subgrade and fill layer before further backfill or construction work is performed. The in-place density and water content shall be determined by the independent testing laboratory by using the ASTM D6938-10 Standard Test Method.
   1. For areas under 5,000 S.F., two compaction tests per 2,500 S.F. for each lift is required. For areas that exceed 5,000 S.F., two compaction tests per 5,000 S.F. for each lift is required.

B. Rejection of Compacted Materials: If in opinion of Owner's Independent Testing Laboratory, based on testing service reports and inspection, subgrade or fills that have been placed are below specified density, perform additional compaction and testing until specified density is obtained.

3.06 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Removal from Owner's Property: Remove trash debris, excess excavated material and waste materials and lawfully dispose of it off the Owner's property. Remove these items from the site, at regular intervals. Do not allow these items to accumulate on-site.

END OF SECTION

JACKED OR BORED PIPE SECTION 02302

PART 1: GENERAL

1.1 RELATED DOCUMENTS: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division 0) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 SCOPE OF WORK: The work done under this section includes the furnishing of all labor, materials, equipment, and services necessary for jacking or boring pipe at those locations indicated on the Drawings.

1.3 PROVISIONS:

A. All work shall comply with applicable provisions of the State of Louisiana Department of Transportation and Development latest edition "Louisiana Standard Specifications for Roads and Bridges" (DOTD), except as modified herein.

B. Where DOTD is modified herein, unaltered provisions of Standard Specifications shall remain in effect.

C. Where general provisions (General, Supplementary Conditions, etc.) of this Specification conflict with DOTD, this Specification shall govern. DOTD provisions not affected shall remain as part of Contract.

D. Whenever "the Department" is referenced in DOTD, change to read "the A/E" and/or "the Owner" as applicable throughout.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION

3.1 JACKED OR BORED PIPE:

A. All work shall comply with applicable provisions of the State of Louisiana Department of Transportation and Development latest edition "Louisiana Standard Specifications for Roads and Bridges" Section 728 (DOTD), except as modified herein.

B. Steel Casing: Smooth wall casing pipe shall be jacked or bored at the locations designated on the Drawings, required by regulating authorities, or as ordered by the A/E. Casing shall be standard steel pipe conforming to ASTM A-139 Grade B of the sizes and lengths required. Pipe shall be pre-coated inside and outside with an approved bitumen compound. Joints shall be welded in accordance with AWS Standards. Welds shall be cleaned and coated with bitumen.

C. Bored casings under roadways shall meet the requirements of Section 728 of the State of Louisiana Department of Transportation and Development latest edition "Louisiana Standard Specifications for Roads and Bridges" with the following exceptions:

1. Bentonite shall be used.
2. Cuttings shall remain in the bore hole so as to help prevent cave-in or sluffing of the drill hole.
3. Cuttings shall not be removed until the casing pipe is installed.

D. Carrier Pipe: Following the installation of the casing the pipe shall be assembled and jacked or pulled through the casing. Carrier pipe shall be permanently secured in position in the steel casing pipe at the proper line and grade. Other methods, besides the use of wood skids, to facilitate the installation of the carrier pipe shall be allowed if approved by the A/E. Carrier pipe shall be secured in such a manner as to prevent flotation or any subsequent change in line and grade.

END OF SECTION

WOOD-CONCRETE COMPOSITE PILES SECTION 02455

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

A. Furnish all labor, materials, tools, and equipment, and perform all operations necessary for piling work indicated or specified.

B. This Section includes the furnishing and driving of the following types of piling:

1. Wood-Concrete Composite Piles.
2. A test pile program is included as part of the Work.

1.03 DAMAGE TO EXISTING PROPERTY

A. Investigate the existing adjacent buildings, sewers, and utilities. Take proper and necessary precautions to protect those things from damage due to the execution of the Piling work. Should damage occur due to the Contractor's negligence, responsibility, and cost for repairing or replacing the work in original condition shall be borne by the Contractor, without additional compensation.

1.04 SUBSURFACE INFORMATION

A. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that the Contractor will be responsible for all interpretations or conclusions which he draws from the subsurface information. Data are made available in the office of the Architect for the convenience of Contractor.

B. Additional soil borings and other exploratory operations may be made by Contractor at no cost to Owner.

1.05 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specifications.

1. Wood-Concrete Composite pile data.
2. Pile installation equipment, including hammer and drill information.

3. Product Data: Submit manufacturer's specifications and instructions for manufactured materials and products/ Include manufacturer's certifications and laboratory test reports.

B. Reports:
   1. Furnish independent testing laboratory reports of tests and inspections as required in this specification.

1.06 QUALITY ASSURANCE

A. The Owner's independent testing laboratory shall perform the following:

   1. Untreated Timber Pile Sections: Inspect at source of supply and hammer mark in the butt to indicate conformance with the requirements of these specifications.

   2. Logging of pile driving: Log the driving of all piling including reaction piles and record the following:
      a. Date driven.
      b. Hammer description.
      c. Dimensions of piles as measured on jobsite.
      d. Location of pile.
      e. Depth and size of predrill
      f. Number of blows per foot for full length of pile. Use painted foot marks for the entire length of each pile.
      g. Submit driving records daily, no later than the morning after each completed day of pile driving.

   3. Concrete Fill for Piles:
      a. Inspect shell of composite piles immediately prior to placing concrete.
      b. Perform all inspections and testing specified in Section 033000.

B. Vibration Study: During the driving of all piles, the laboratory shall monitor and record the vibrations to adjacent and surrounding areas. The laboratory shall employ the services of a vibration specialist engineer who in conjunction with the laboratory shall render complete reports and interpretations of the data obtained, including the possible effects of the measured vibrations on adjacent and surrounding structures. The vibrations shall be measured by means of a portable Seisomograph which directly measures particle velocity (rate of ground movement) in three mutually perpendicular directions (longitudinal, transverse, and vertical). Probes shall be located at various locations as directed. A complete report of the vibration study, including seismograms, shall be furnished after the conclusion of the driving of these piles. Peak particle velocities, measured at the surface, shall not exceed 0.25 inches per second. Should this limit be exceeded, pile driving operations shall be paused, and the Engineer of Record shall be contacted in order to coordinate a method to reduce pile driving vibration.

C. Notification Prior to Start of Pile Driving: The Contractor shall notify the Architect/Engineer and the testing laboratory a minimum of 48 hours prior to start of all pile driving activities.

D. Rejection of Materials: The Laboratory shall notify the Contractor or his authorized representative, of any materials which are not in full conformance with the Specifications, and the Architect shall be informed of such notification.

E. Exploratory Piles: The Contractor shall drive ten (10) exploratory wood-concrete composite piles, having properties and dimensions as specified herein. Locations of nine (9) of the exploratory piles shall be as indicated on the Drawings. One exploratory pile location shall be determined by the Engineer of Record during exploratory pile driving activities.

F. Load Test: The independent testing laboratory shall conduct one (1) static load test on a pile selected by the Engineer of Record. The load test shall have cyclic loads with rebounds and long term loading. The pile shall then be loaded to its ultimate capacity. Laboratory shall furnish an accurately calibrated hydraulic jack and load cell with a capacity of 100 tons. Reaction piles shall be located a minimum distance of 8 feet clear between the outer surfaces of the test pile and reaction piles. Load test shall meet the requirements of the International Building Code. Application of load shall commence no sooner than 14 days after exploratory piles and reaction piles are driven.

Loading Procedure for the 17-ton design load piles shall be as follows:

Begin Load Test no sooner than fourteen (14) days after driving pile to be tested, and reaction piles.

Increment	Load (Tons)	
1	3.4	
2	6.8	
3	10.2	Hold each increment 1 thru 5,
4	13.6	1-hour free of movement.
5	17	
6	13.6	
7	10.2	Hold each decrement 5 thru 8,
8	6.8	15 minutes.
9	3.4	
10	0	Hold 1-hour free of movement.
11	3.4	Hold each increment 11 thru 15,
12	6.8	15 minutes.
13	10.2	
14	13.6	
15	17	
16	20.4	Hold each increment 16 thru
17	23.8	21, 1-hour free of movement.
18	27.2	
19	30.6	If pile begins to fail before reaching
20	34	34 tons, rebound in 4 equal
21	37.4	decrements from failure load.
22	40.8	
23	44.2	

24	46.7	
25	51	3.4 ton increments to failure. Hold each increment 1-hour free of movement. After failure, rebound in 4-equal decrements.

G. Additional Tests: The Architect reserves the right to require additional tests to those specified or upon materials not herein specified for testing. If such tests are necessary because of apparently defective materials or workmanship, the cost of these additional tests shall be borne by the Contractor.

PART 2 - PRODUCTS

2.01 WOOD-CONCRETE COMPOSITE PILES

A. Wood-Concrete Composite Piles:

1. Wood-Concrete composite piles shall consist of an untreated timber lower section and a cast-in-place concrete upper section.
2. Untreated Timber Section: Shall conform to ASTM Designation D25 (latest revision) round timber piles, rough peeled, Southern Yellow Pine, except piles shall have a minimum tip diameter of 7 inches and a minimum 13” diameter 3’-0” from the butt.
3. Shell for Concrete Section: Shall be steel of sufficient strength to prevent distortion during driving of the pile or adjacent piles. The shell shall be a minimum of eleven (11) inches (I.D.) and sufficiently water tight to exclude water and foreign matter during the placing of concrete. The connector shall be manufactured or fabricated of structural grade steel and shall consist in general, of a drive-shoe of twelve (12) gauge or thicker material which is firmly attached to the steel casing. The drive-shoe shall be capable of penetrating a minimum of four (4) inches into the wood section. All other requirements for the connector shall conform to the requirements of the New Orleans Building Code, and the 2021 IBC. The splice shall withstand a minimum moment capacity of four (4) ft. kips, with no applied axial load. The splice shall withstand a minimum tensile force of ten (10) tons.
4. Concrete: Concrete for cast-in-place upper section of composite piles shall be in accordance with Section 03300. Concrete shall have a minimum compressive strength of 3,000 psi at twenty-eight (28) days. Maximum aggregate size shall be ¾”. A pea gravel mix shall not be used.
   a. Concrete for test piles shall have a minimum compressive strength of 3,000 psi at fourteen (14) days.
5. Contract Shell Length: As shown on the Drawings.

B. Total Contract Pile Length: Refer to the Drawings.

1. Exploratory piles shall have a timber section that is 5’-0” longer than Contract timber sections.

PART 3 - EXECUTION

3.01 HANDLING

A. Piles shall be carefully handled to prevent damage to timber piles.

3.02 EQUIPMENT

A. Driving equipment is subject to the Architect's approval. Architect will reject equipment if in his opinion, at any time, the equipment does not perform its intended task adequately.

3.03 PREDRILLING

A. For each pile, predrill a 6-inch diameter hole to a 73 foot depth below the existing ground surface, using a Demon 3-blade wet-rotary bit. Immediately thereafter drive the pile into the drilled hole. Use a minimum amount of water during predrilling activities. The Architect may require the Contractor to change the depth and size of predrill. If this is necessary, it shall be done at no additional cost to the Owner.

3.04 HAMMERS

A. No. 1 Vulcan (15,000 ft. lbs. per blow) for all piles.

3.05 DRIVING PROCEDURE

A. Driving of Contract Piles shall not start until all site preparation, fill placement and proof rolling operations within the building footprint are complete, in accordance with Section 02301.

B. Driving shall be done with fixed leads that shall hold the pile firmly in position and in alignment with the hammer. The top of each pile before driving shall be cut at right angles to the longitudinal axis of the pile. The top of the pile shall be protected with a standard steel hood or similar-type device which will prevent damage to the pile during driving.

C. Drive continuously (except for time required for splicing) until proper penetration as determined by the Architect is obtained.

D. When pile is spliced and lower section of the pile is allowed to remain in ground without competing driving of upper section for a period of time which renders the driving of the completed pile impossible without damage to the pile, furnish and drive additional piles as directed by Architect without additional compensation to Contractor.

E. Make field splice a sufficient distance above the ground surface to insure viewing of splice for complete seating prior to splice being driven below ground surface.

F. The upper portion of wood-concrete composite piles shall be driven with a mandrel.

3.06 LOCATION

A. Piles shall be driven plumb and accurately into positions shown on Drawings: a maximum variation not exceeding 3" for each pile will be accepted as fulfillment of Contract, providing limiting and controlling conditions make it impossible to maintain more accurately the spacing indicated on plans. Maximum tolerance from the vertical shall be 1.5 feet in 100 feet. Should the variations from true center or vertical exceed the above, the piles in each cluster shall be plotted by the Contractor and the center of gravity of said cluster determined. If required, sufficient pile shall then be added at locations determined by the Architect. Contractor shall, at his own cost, drive such additional piling and/or alter pile caps as may be required to compensate for or to rectify the conditions brought about by failure to preserve proper spacing and plumbness, whether this defect is discovered before or after cutting off.

3.07 DEFECTIVE PILES

A. Immediately remove and replace a pile that is damaged, deflected, broken, or which cannot be driven to proper elevation because of interference by underground obstruction. Replace such pile with an acceptable substitute pile at the location determined by the Architect. In the event that such pile's removal should prove to be impossible, abandon the defective pile; replace with an additional pile(s) driven close to the worthless one as directed by the Architect.

3.08 PLACING CONCRETE FOR COMPOSITE PILES

A. Shell of wood-concrete composite pile shall be clean of all earth and debris and must be dry prior to placing concrete.

B. Concrete shall not be placed until the shell has been inspected by the testing laboratory representative immediately prior to filling.

3.09 CUTOFF

A. After driving, pile butts shall be cut-off to the required elevation on a neat horizontal plane and the cut-off portions shall be removed from the job site.

3.10 MISSING PILES

A. Contractor shall be held responsible for any pile omitted; and missing piles at whatever stage of work discovered shall be provided without extra cost to the Owner.

END OF SECTION

CONCRETE WALKS SECTION 02510

PART 1: GENERAL

1.1 RELATED DOCUMENTS: The general provisions of the Contract (General and Supplementary and other Conditions, Division 0) and Division 1 as appropriate, apply to work specified in this section.

1.2 SCOPE OF WORK: Furnish all necessary materials, labor and equipment for the complete installation of concrete walks, as shown on the drawings and specified herein. Provide all necessary supplementary items for a complete installation intended by documents.

1.3 QUALITY ASSURANCE:

A. Codes and Standards: Comply with local governing regulations if more stringent than herein specified.

B. Concrete formwork, reinforcing steel, and related items shall be in accordance with the following:
1. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete"
2. ACI 305 "Recommended Practice for Hot Weather Concreting"
3. ACI 306R "Recommended Practice for Cold Weather Concreting"
4. ACI 315 "Manual of Standard Practice for Concrete Formwork"
5. ACI 318 "Building Code Requirements for Reinforced Concrete".
6. Concrete Reinforcing Steel Institute, "Manual of Standard Practice".
7. ASTM C33 "Concrete Aggregates"
8. ASTM C150 "Portland Cement"
9. ASTM C260 "Air Entraining Admixtures for Concrete"
10. ASTM C94 "Ready-Mixed Concrete"

B. Mixing and Transporting Concrete: In accordance with "Specifications for Ready Mixed Concrete" (ASTM C 94) except complete discharge from the hauling containers within 60 minutes after the cement has been added to the aggregate and water in the mixer.

C. Allowable Tolerances: Flatwork true to plane 1/8 inch in 10 feet. No open paving shall pond water.

E. Testing:
1. Laboratory shall prepare and furnish to the A/E, in triplicate, reports of concrete mix and all inspection and testing complete with summary of results. Laboratory also furnishes copy of all reports to the concrete supplier.
2. Contractor shall furnish samples of the various materials and the concrete mix for laboratory test.
3. The required laboratory testing and control shall be as follows:
a. Prepare and furnish the concrete mixes to be used for all concrete on this job.

b. Test gradation of aggregate used in the concrete mix for compliance with the specifications.

c. Make concrete cylinders to perform compressions tests of cylinders taken from concrete used on the job. Make a minimum of 2 sets of cylinders per day or one set of cylinders per 50 yards, whichever is greater. Each set shall consist of 2 cylinders. Make compression tests at 7 days with both cylinders of each set.

d. Make minimum of 4 slump tests per day or one per 25 yards, whichever is greater.

4. If tests indicate insufficient concrete strength and if additional tests are ordered (cores, etc.), Contractor shall pay for such additional tests.

1.4 SUBMITTALS:

A. Detailed shop drawings, showing layout, sizes, arrangements, bar supports, etc. for all reinforcing steel, joints, curbs, etc.

B. Submit to A/E in writing concrete curing method for A/E approval.

C. Furnish samples, manufacturer's product data and test reports.

D. Submit in accordance with requirements of Division 1.

1.5 STORAGE OF MATERIALS: Store all paving related materials above ground on suitable supports and keeps free of foreign materials, corrosion, damage, etc.

PART 2: PRODUCTS

2.1 MATERIALS:

A. Forms: 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.

1. Use flexible spring steel forms or laminated boards to form radius bends as required.
2. Coat forms with a non-staining form release agent that will not discolor or deface surface of concrete.

B. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A185, (70,000 psi yield point).

1. Furnish in flat sheets, not rolls, unless otherwise acceptable to A/E.

C. Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 60, (60,000 psi yield point).

D. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 40. Cut bars true to length with ends square and free of burrs.

E. Tie Wire: Annealed steel, black, 16 gauge minimum.

2.2 CONCRETE: ASTM C 94. HIGH EARLY STRENGTH.

A. Cement: Type l, ASTM C l50.

B. Admixture:
1. Water reducing Admixture: ASTM C 494, Type A: Eucon WR-75 by Euclid Chemical Co., Pozzolith 300 N by Master Builders, Plastocrete 160 by Silea Chemical Corporation or approved equal.
2. Water Reducing, Retarding Admixture: ASTM C 494 Type D: Eucon Retarder 75 by Euclid Chemical Co., Pozzolith 300-R by Master Builders, Plastiment by Silea Chemical Co. or approved equal.
3. Air Entraining: ASTM C 260, Master Builders MB-VR, Chem-Masters Adz-air, Glifford-Hill Air-Tite, or approved equal, at exterior paving only.

B. Fine Aggregate: Sand, ASTM C 33.

C. Coarse Aggregate: Gravel, ASTM C 33, size number 47 (1 inch to No. 4).

D. Water: Clean and free from oil, alkali, sugar or other deleterious substances.

E. Slump: Maximum 4 inches.

G. Air Content: 6% +/- l% in exterior exposed concrete only. H. Mix Proportioning:
1. 7 day compressive strength of moist cured laboratory samples, 3000 psi minimum.
2. Minimum Cement Content: 540 pounds per cubic yard.
3. Admixture: Use in accordance with manufacturer's recommendations.

2.3 CURING MATERIAL: ASTM C 171, waterproof paper or polyethylene film.

2.4 MIXES: ASTM C 94. Mix concrete only in quantities for immediate use. Do not retemper or use set concrete.

2.5 EXPANSION JOINT MATERIALS: Expansion Joint Filler: Redwood or Treated Wood Strips.

PART 3: EXECUTION

3.1 SURFACE PREPARATION:

A. Remove loose material from compacted subbase surface immediately before placing concrete.

B. Proof-roll prepared subbase surface to check for unstable areas and need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

3.2 FORM CONSTRUCTION:

A. Set forms to required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

B. Check completed formwork for grade and alignment to following tolerances:
1. Top of forms not more than 1/8" in 10'.
2. Vertical face on longitudinal axis, not more than 1/4" in 10'.

C. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

3.3 PLACING REINFORCEMENT:

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean Reinforcement of loose rust and mill scale, earth, ice, and other materials, which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

D. Place Reinforcement as shown on plans or to obtain at least minimum coverage for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, and toward exposed concrete surfaces.

E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least on full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.4 CONCRETE PLACEMENT:

A. General: Comply with specifications herein for mixing and placing concrete.

B. Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase if required to provide a uniform dampened condition at 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, which prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.

D. Deposit and consolidate concrete in a continuous operation between transverse joints, until complete section has been placed. Where complete section cannot be placed or if interrupted for more than 1/2-hour, place a construction joint.

3.5 JOINTS:

A. General: Construct expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to surface of concrete. 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.

B. Weakened-Plane (Contraction) Joints: Provide weakened-plane (contraction) joints, sectioning concrete into areas as shown on drawings. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:
   1. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.
   2. Sawed Joints: Form weakened-plane joints using powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.
   3. Inserts: Use embedded strips of metal or sealed wood to form weakened-plane joints. Set strips into plastic concrete and carefully remove strips after concrete has hardened.

C. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for a period of more than 1/2-hour, except where such placements terminate at expansion joints.
   1. Construct joints as shown or, if not shown, use standard metal keyway-section forms.
   2. Where load transfer-slip dowel devices are used install so that one end of each dowel bar is free to move.

D. Expansion Joints: Provide joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated.
   1. Locate expansion joints as indicated on Drawings.
   2. Extend joint fillers full-width and depth of joint.
   3. Furnish joint fillers in one-piece lengths for full width being placed.
   4. Protect top edge of joint filler during concrete placement.

E. Joint Fillers (Installation):
   1. Clean joint surfaces immediately before installation of joint fillers.
   2. Tool each side of expansion joint filler of abutting edge to concrete to achieve smooth and consistent radius edge.

3.6 CONCRETE FINISHING:

A. After striking-off and consolidating concrete, smooth surface by screening and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

B. After floating, test surface for trueness with a 10' straight edge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

C. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2" radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

D. After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
   1. 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 A/E.
   2. On inclined slab surfaces, provide a coarse, non-slip finish scoring surface with a stiff-bristled broom, perpendicular to line of traffic.
   3. Burlap finish, by dragging a seamless strip of damp burlap across concrete, perpendicular to line of traffic. Repeat operation to provide a gritty texture acceptable to A/E.

E. 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 A/E.

3.7 CURING CONCRETE - GENERAL:

A. Prior to installation of concrete walks contractor shall submit in writing concrete curing method to be used to A/E for approval.

B. Protect freshly placed concrete from premature drying and excessive cold or hot temperature, and maintain without drying at relatively constant temperature for period of time necessary for hydration of the cement and proper hardening of concrete.

C. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting; keep continuously moist for not less than 72 hours.

C. Begin final curing procedures immediately following initial curing and before concrete have dried. Final curing shall continue for at least seven (7) consecutive days maintaining concrete exposure air temperature above 50 degrees.

E. Avoid rapid drying at the end of final curing period.

3.8 CURING METHODS:

A. Moisture Curing: Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water, and keeping continuously wet. Place absorptive cover so as to provide coverage of concrete surfaces and edges with a 4" lap over adjacent absorptive covers.

B. Temperature of Concrete During Curing
1. Maintain concrete temperature as uniformly as possible, and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete, which exceed 5 degrees F. in any one hour and 50 degrees F. in any 24-hour period.
2. Comply with requirements of ACI 305 and 306.

C. Protection from Injury: During curing period, protect from damaging mechanical disturbances including load stresses, heavy shock, excessive vibration, and from damage.

3.9 REPAIRS AND PROTECTION:

A. Contractor shall provide the necessary protection to prevent vandalism or damage to concrete finish. Damage and/or vandalism of concrete finish will be cause for rejection of affected paving. Patching or topping is unacceptable. Removal and replacement of any such rejected paving will be at Contractor's expense, including any charges for retesting.

B. Repair or replace broken or defective concrete, as directed by A/E.

C. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 7 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.

D. Sweep concrete pavement and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

END OF SECTION

PORTLAND CEMENT CONCRETE PAVING SECTION 02514

PART 1: GENERAL

1.1 RELATED DOCUMENTS: The general provisions of the Contract (General and Supplementary and other Conditions, Division 0) and Division 1 as appropriate, apply to work specified in this section.

1.2 SCOPE OF WORK: Work Included: Furnish all necessary materials, labor and equipment for the complete installation of portland cement concrete paving, as shown on the drawings and specified herein. Provide all necessary supplementary items for a complete installation intended by documents. Prepared sub-base as specified elsewhere herein.

1.3 QUALITY ASSURANCE:

A. CODES AND STANDARDS: Comply with local governing regulations if more stringent than herein specified.

B. Concrete formwork, reinforcing steel, and related items shall be in accordance with the following:
1. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete"
2. ACI 305 "Recommended Practice for Hot Weather Concreting"
3. ACI 306R "Recommended Practice for Cold Weather Concreting"
4. ACI 315 "Manual of Standard Practice for Concrete Formwork"
5. ACI 318 "Building Code Requirements for Reinforced Concrete".
6. Concrete Reinforcing Steel Institute, "Manual of Standard Practice".
7. ASTM C33 "Concrete Aggregates"
8. ASTM C150 "Portland Cement"
9. ASTM C260 "Air Entraining Admixtures for Concrete"
10. ASTM C94 "Ready-Mixed Concrete"

B. Mixing and Transporting Concrete: In accordance with "Specifications for Ready Mixed Concrete" (ASTM C 94) except complete discharge from the hauling containers within 60 minutes after the cement has been added to the aggregate and water in the mixer.

C. Allowable Tolerances: Flatwork true to plane 1/8 inch in 10 feet. No open paving shall pond water.

E. Testing:
l. Laboratory shall prepare and furnish to the A/E, in triplicate, reports of concrete mix and all inspection and testing complete with summary of results. Laboratory also furnishes copy of all reports to the concrete supplier.
2. Contractor shall furnish samples of the various materials and the concrete mix for laboratory test.
3. The required laboratory testing and control shall be as follows:
a. Prepare and furnish the concrete mixes to be used for all concrete on this job.

b. Test gradation of aggregate used in the concrete mix for compliance with the specifications.

c. Make concrete cylinders to perform compressions tests of cylinders taken from concrete used on the job. Make a minimum of 2 sets of cylinders per day or one set of cylinders per 50 yards, whichever is greater. Each set shall consist of 2 cylinders. Make compression tests at 7 days with both cylinders of each set.

d. Make a minimum of 4 slump tests per day or one per 25 yards, whichever is greater.

4. If tests indicate insufficient concrete strength and if additional tests are ordered (cores, etc.), Contractor shall pay for such additional tests.

1.4 SUBMITTALS: Detailed shop drawings, showing layout, sizes, arrangements, bar supports, etc. for all reinforcing steel, joints, curbs, etc. Furnish samples, manufacturer's product data, test reports, and materials certifications for joint fillers and sealers. Submit in accordance with requirements of General Conditions for all paving accessories incorporated into the work.

1.5 STORAGE OF MATERIALS: Store all paving related materials above ground on suitable supports and keep free of foreign materials, corrosion, damage, etc.

PART 2: PRODUCTS

2.1 MATERIALS:

A. Forms: 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.

1. Use flexible spring steel forms or laminated boards to form radius bends as required.
2. Coat forms with a non-staining form release agent that will not discolor or deface surface of concrete.

B. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A185, (70,000 psi yield point).

1. Furnish in flat sheets, not rolls, unless otherwise acceptable to A/E.

C. Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 60, (60,000 psi yield point).

D. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 40. Cut bars true to length with ends square and free of burrs.

E. Tie Wire: Annealed steel, black, 16 gauge minimum.

2.2 Concrete Materials:

A. Expansion Joint Filler: Non-extruding, resilient bituminous joint filler conforming to AASHTO M 213, ASTM D1751 or FS-HH-E-341 Type I. Preformed strips from cane or other cellular fiber uniformly saturated with bituminous binder.

B. Joint Sealer: Hot poured asphaltic mineral filler to conform to La. DOTD.

C. Epoxy Resin Grout: FS MMM-G-650.

D. Metal Keys: Heckman No. 95, 16 gage tongue and groove joint, or approved equal, with both stake pin and dowel holes. Provide No. 88, 18 gage tapered channel type stake pins, 15 inches long. Provide approved type metal bar supports as indicated on Drawings.

2.3 PRECAST CONCRETE ITEMS (CURBS, WHEEL STOPS): May be standard manufactured precast concrete of similar sizes; verify with A/E, or concrete (cast-in-place) as dimensioned on Drawings.

2.4 CONCRETE: ASTM C 94. HIGH EARLY STRENGTH.

A. Cement: Type l, ASTM C l50.

B. Admixture:
1. Water reducing Admixture: ASTM C 494, Type A: Eucon WR-75 by Euclid Chemical Co., Pozzolith 300 N by Master Builders, Plastocrete 160 by Silea Chemical Corporation.
2. Water Reducing, Retarding Admixture: ASTM C 494 Type D: Eucon Retarder 75 by Euclid Chemical Co., Pozzolith 300-R by Master Builders, Plastiment by Silea Chemical Co.
3. Air Entraining: ASTM C 260, Master Builders MB-VR, Chem-Masters Adz-air, Glifford-Hill Air-Tite, or approved equal, at exterior paving only.

B. Fine Aggregate: Sand, ASTM C 33.

C. Coarse Aggregate: Gravel, ASTM C 33, size number 47 (1 inch to No.4).

D. Water: Clean and free from oil, alkali, sugar or other deleterious substances.

E. Slump: Maximum 4 inches.

F. Air Content: 6% +/- l% in exterior exposed concrete only.

G. Mix Proportioning:
1. 7 day compressive strength of moist cured laboratory samples, 3000 psi minimum.
2. Minimum Cement Content: 540 pounds per cubic yard.
3. Admixture: Use in accordance with manufacturer's recommendations.

2.5 CURING MATERIAL: Concrete shall be cured using one of the following methods:

A. ASTM C 171, waterproof paper or polyethylene film.

B. Ponding, continuous sprinkling, application of sand kept continuously wet, or application of other moisture-retaining covering.

C. ASTM C 309, clear liquid membrane curing material may be utilized provided it is compatible with all concrete finishes. Verify with all manufacturers concerned. Master seal by Master Builders, Ecocure by Euclid Chemical Co., Clear Seal by W.R. Grace.

2.6 MIXES: ASTM C 94. Mix concrete only in quantities for immediate use. Do not retemper or use set concrete.

PART 3: EXECUTION

3.1 SURFACE PREPARATION:

A. Remove loose material from compacted sub-base surface immediately before placing concrete.

B. Proof-roll prepared sub-base surface to check for unstable areas and need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

3.2 FORM CONSTRUCTION:

A. Set forms to required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

B. Check completed formwork for grade and alignment to following tolerances:
1. Top of forms not more than 1/8" in 10'.
2. Vertical face on longitudinal axis, not more than 1/4" in 10'.

C. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

3.3 PLACING REINFORCEMENT:

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean Reinforcement of loose rust and mill scale, earth, ice, and other materials, which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

D. Place Reinforcement as shown on plans or to obtain at least minimum coverage for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least on full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.4 CONCRETE PLACEMENT:

A. General: Comply with specifications herein for mixing and placing concrete.

B. 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 time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

C. Place concrete using methods, which prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.

D. Deposit and consolidate concrete in a continuous operation between transverse joints, until complete section has been placed. Where complete section cannot be placed or if interrupted for more than 1/2-hour, place a construction joint.

E. Curbs and Gutters: Automatic machine may be used for curb placement at Contractor's option. If machine placement is to be used, submit revised mix design and laboratory test results, which meet or exceed minimums specified. Machine placement must produce curbs and gutters to required cross-section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified.

3.5 JOINTS:

A. General: Construct expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to surface of concrete. 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.

B. Weakened-Plane (Contraction) Joints: Provide weakened-plane (contraction) joints, sectioning concrete into areas as shown on drawings. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:

1. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.

2. Sawed Joints: Form weakened plane joints using powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.

3. Inserts: Use embedded strips of metal or sealed wood to form weakened-plane joints. Set strips into plastic concrete and carefully remove strips after concrete has hardened.

C. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for a period of more than 1/2-hour, except where such placements terminate at expansion joints.
1. Construct joints as shown or, if not shown, use standard metal keyway-section forms.
2. Where load transfer-slip dowel devices are used install so that one end of each dowel bar is free to move.

D. Expansion Joints: Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated.
1. Locate expansion joints as indicated on Drawings.
2. Extend joint fillers full-width and depth of joint, and not less than 1/2" or more than 1" below finished surface where joint sealer is indicated.
3. Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler sections together.
4. Protect top edge of 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.

E. Joint Fillers and Sealers (Installation):
1. Clean joint surfaces immediately before installation of joint fillers and sealant. Remove dirt, insecure coatings, moisture and other substrates, which could interfere with bond of sealant.
2. Prime or seal joint surfaces where indicated, and where recommended by sealant manufacturer. Confine primer/sealer to areas of sealant bond; do not allow spillage or migration onto adjoining sources.

F. Keyways: Provide keyways minimum 1 1/2 inches deep where indicated on paving plan.

3.6 CONCRETE FINISHING:

A. After striking-off and consolidating concrete, smooth surface by screening and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

B. After floating, test surface for trueness with a 10' straight edge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

C. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2" radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

D. After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
   1. 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 A/E.
   2. On inclined slab surfaces, provide a coarse, non-slip finish by scoring surface with a stiff-bristled broom, perpendicular to line of traffic.
   3. Burlap finish, by dragging a seamless strip of damp burlap across concrete, perpendicular to line of traffic. Repeat operation to provide a gritty texture acceptable to A/E.

E. 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 A/E.

3.7 CURING CONCRETE - GENERAL:

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperature, and maintain without drying at relatively constant temperature for period of time necessary for hydration of the cement and proper hardening of concrete.

B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting; keep continuously moist for not less than 72 hours.

C. Begin final curing procedures immediately following initial curing and before concrete has dried. Final curing shall continue for at least seven (7) consecutive days maintaining concrete exposure air temperature above 50 degrees F. Avoid rapid drying at the end of final curing period.

3.8 CURING METHODS:

A. Perform curing of concrete by one or combinations of the following methods. Use only water free of impurities, which could etch or discolor exposed, natural concrete surface. Do not use curing method or compounds, which would prevent or interfere with proper installation of finish materials by causing loss of bond or bleeding through of chemicals. Refer to Finish Schedule and Detail Drawings and coordinate as required.
   1. Moisture Curing - any one of the following:
      a. Keeping surfaces of concrete continuously wet by covering with water.
      b. Continuous water-fog spray.

c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water, and keeping continuously wet. Place absorptive cover so as to provide coverage of concrete surfaces and edges with a 4" lap over adjacent absorptive covers.

2. Moisture Cover Curing - Cover concrete surfaces with specified moisture-retaining cover for curing concrete, placing in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during the curing period using cover material and waterproof tape.

3. Liquid Membrane Curing:

a. Apply approved membrane-forming curing compound to damp concrete surfaces as soon as water film has disappeared. Apply uniformly in two-coat continuous operation by power spray equipment in accordance with manufacturer's directions. Recoat areas, which are subjected to heavy rainfall, within three (3) hours after initial application. Maintain continuity of coating and repair damage during entire curing period.

b. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete or with covering material bonded to concrete.

B. Temperature of Concrete During Curing

1. Maintain concrete temperature as uniformly as possible, and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete, which exceed 5 degrees F. in any one hour and 50 degrees F. in any 24-hour period.

2. Comply with requirements of ACI 305 and 306.

C. Protection from Injury: During curing period, protect from damaging mechanical disturbances including load stresses, heavy shock, excessive vibration, and from damage.

3.9 REPAIRS AND PROTECTION:

A. Contractor shall provide the necessary protection to prevent vandalism or damage to concrete finish. Damage and/or vandalism of concrete finish will be cause for rejection of affected paving. Patching or topping is unacceptable. Removal and replacement of any such rejected paving will be at Contractor's expense, including any charges for retesting.

B. Repair or replace broken or defective concrete, as directed by A/E.

C. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 7 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.

D. Sweep concrete pavement and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

END OF SECTION

PAVEMENT MARKINGS (ROADWAY AND PARKING) SECTION 02584

PART 1: GENERAL

1.1 RELATED DOCUMENTS: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division 0) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 SCOPE OF WORK: Work Included: Furnish all necessary materials, labor and equipment for the complete installation of roadway and parking pavement markings, as shown on the drawings and specified herein. Provide all necessary supplementary items for a complete installation intended by documents.

1.3 QUALITY ASSURANCE:

A. Include, on label of containers, manufacturer's name, type of paint, manufacturer's stock number, color, instructions.

B. Submit, in accordance with requirements of General Conditions, certification or literature from manufacturer that materials furnished meet or exceed specification requirements.

1.4 ENVIRONMENTAL CONDITIONS: Comply with manufacturers recommendations as to environmental conditions under which markings are to be applied. Apply no markings when the ambient air temperature is below 40 degrees Fahrenheit or when there is moisture on the pavement surface.

PART 2: PRODUCTS

2.1 TRAFFIC PAINT: PPG Traffic and Zone Marking Paint. Color for all asphaltic paving shall be white and color for all concrete paving shall be yellow, unless specifically noted otherwise. Striping for handicap stalls and symbols shall be blue.

PART 3: EXECUTION

3.1 INSPECTION: Examine pavements for conditions that will adversely affect execution, permanence, or quality of work and which cannot be put into an acceptable condition through preparatory work as included herein. Do not proceed with surface preparation or coating application until conditions are suitable.

3.2 SURFACE PREPARATION: Strictly follow manufacturer's surface preparation recommendations for all surfaces. Clean pavement surfaces of all dirt, grease, oil, curing compound, loose or unsound layers, and any other material that would reduce the adhesion of the markings to the pavement. Clean by approved methods and maintain surfaces in clean condition until placement of markings.

3.3 APPLICATION:

A. Strictly follow markings manufacturer's application recommendations and information.

B. Application Equipment: Brush, marking machine, or spray as approved by A/E.

B. Locations: Apply markings as indicated on the Drawings.

D. Apply two coats of paint in straight lines for all parking spaces as indicated on Drawings, 4-inch width. Finished lines shall have well defined edges and be free of waviness.

3.4 CLEANING: Touch-up and restore finish where damaged. Remove spilled, splashed or splattered paint from all surfaces.

END OF SECTION

WATER DISTRIBUTION SECTION 02660

PART 1: GENERAL

1.1 RELATED DOCUMENTS: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division 0) and Division 1 as appropriate, apply to the work specified in this section.

1.2 SCOPE OF WORK: This section covers the removal, replacement, relocation and repair of all existing waterlines, known and unknown, and installation of new waterline. Waterlines, generally, are the property of the Owner and shall be installed, removed, replaced, relocated and/or repaired by and at the expense of the Contractor.

1.3 GENERAL: MATERIAL AND EQUIPMENT

A. Conform to applicable specifications and standards.

B. Comply with size, make, type, and quality specified, or as specifically approved in writing by the A/E.

C. Manufactured and Fabricated Products:
1. Design and fabricate, and assemble in accord with the best engineering and shop practices.
2. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
3. Two or more items of the same kind shall be identical, by the same manufacturer.
4. Products shall be suitable for service conditions.

D. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

E. Comply with all local, state and federal laws and regulations.

F. Furnish all necessary labor, material or equipment necessary for compliance with all requirements of this contract.

1.4 GOVERNING STANDARDS: Installation shall conform to the latest standards of the governing authority. In the event of a conflict between these specifications and the latest standards of the Owner and/or governing authority, the latest standards of the Owner and/or governing authority shall govern.

1.5 NOTIFICATION: The Contractor shall be responsible for immediately notifying the Owner and A/E of existing water mains that interfere with his work. The Contractor is responsible for conducting operations in the vicinity of water mains that do not interfere with the work such that main breaks and disruption of water service is avoided.

PART 2: PRODUCTS

See other sections.

PART 3: EXECUTION

3.1 UNKNOWN UTILITIES:

A. The drawings attempt to indicate the location of all known underground facilities within the limits of the work. However, the Contractor shall be responsible to inspect the entire project to verify all underground facilities and determine the existence of any additional facilities conflicting with his work. In addition the Contractor shall be required to prospect ahead of the work to locate and verify all underground facilities.

B. In the event the Contractor encounters an unknown underground facility in his operations and such an item will interfere with his work and will require removal and replacement or relocation, the Contractor shall immediately notify the A/E and Owner and/or appropriate governing authority and arrange for relocation.

3.2 COORDINATION: Removal and replacement of other utility facilities shall be done in close coordination with the Owner and/or governing authority. Removal and replacement or relocation work shall be planned in advance so the inconvenience to the Owner and utility users caused by the disruption of service is minimized. The Contractor shall perform work on utilities in off-peak hours of usage as required by the A/E and Owner.

3.3 HANDLING: Pipe, fittings, and accessories shall be handled in a manner that will insure installation in sound, undamaged condition. Equipment, tools, and methods used in handling and installing pipe and fittings shall not damage the pipe and fittings. Hooks inserted in ends of pipe shall have broad, well-padded contact surfaces. All pipe coating, which has been damaged, shall be repaired by the Contractor before installing the pipe.

3.4 CUTTING PIPE:

A. Pipe to be installed shall be done with sections and fittings such that pipe cutting is not required. Should pipe cutting be required, cutting shall be done in a neat manner, without damage to the pipe or to the lining. Cuts shall be smooth, straight, and at right angles to the pipe axis. After cutting, the end of the pipe shall be dressed with a file to remove all roughness and sharp corners.

B. All cutting of cast iron pipe shall be done with mechanical pipe cutters except where the use of mechanical cutters would be difficult or impracticable. Ends of ductile iron pipe shall be cut with a saw, abrasive wheel, or oxyacetylene torch. Field cut holes for saddles shall be cut with mechanical cutters; oxyacetylene cutting will not be permitted.

3.5 CLEANING:

A. The interior of all pipe and fittings shall be thoroughly cleaned of foreign matter before being installed and shall be kept clean until the work has been accepted. Before jointing, all joint contact surfaces shall be wire brushed if necessary, wiped clean, and kept clean until jointing is completed.

B. Precautions shall be taken to prevent foreign material from entering the pipe during installation. Debris, tools, clothing, or other materials shall not be placed in or allowed to enter the pipe.

3.6 INSPECTION: Pipe and fittings shall be carefully examined for cracks and other defects immediately before installation; spigot ends shall be examined with particular care. All defective pipe and fittings shall be removed from the site of the work.

3.7 LAYING PIPE:

A. Pipe shall be protected from lateral displacement by placing the specified pipe embedment material. Under no circumstances shall pipe be laid in water and no pipe shall be laid under unsuitable weather or trench conditions.

B. Pipe shall be laid with the bell ends facing the direction of laying except when reverse laying is specifically authorized by the A/E.

C. Alignment and grade shall be as existed in removed pipe, unless otherwise indicated on the drawings or directed by the A/E.

3.8 CONNECTIONS WITH EXISTING PIPING: Connections between new work and existing piping shall be made using fittings suitable for the conditions encountered and as indicated on the drawings. Each connection with an existing pipe shall be made at a time and under conditions which will least interfere with service to customers, and as authorized by the A/E. Facilities shall be provided for proper dewatering and for disposal of all water removed from the dewatered lines and excavations without damage to adjacent property.

3.9 FLANGED JOINTS:

A. Pipe shall extend completely through screwed-on flanges. The pipe and flange face shall be finish machined in a single operation. Flange faces shall be flat and perpendicular to the pipe centerline.

B. When bolting flanged joints, care shall be taken to avoid restraint on the opposite end of the pipe or fitting which would prevent uniform gasket compression or which would cause unnecessary stress in the flanges. One flange shall be free to move in any direction while the flange bolts are being tightened. Bolts shall be tightened gradually and at a uniform rate so that gasket compression is uniform.

3.10 VALVES: All valves such as gate valves, check valves, fire hydrants, butterfly valves, air release or combination air-vacuum valves or valve boxes to be relocated or replaced shall be of the same or better quality than the valve being replaced. They shall conform to AWWA standards if not specified in piped utility materials section.

3.11 BULKHEAD OR CLOSURE FOR CONNECTIONS: Connections between new work and existing piping shall be made using fittings suitable for the conditions encountered and as indicated on the drawings. Each connection with an existing pipe shall be made at a time and under conditions which will least interfere with service to customers and as authorized by the A/E. Facilities shall be provided for proper dewatering and for disposal of all water removed from the dewatered lines and excavations without damage to adjacent property. Bulkhead shall be provided at the end of new piping for future connections as indicated on the drawings.

3.12 FIELD JOINTS: Joints in buried locations shall be mechanical joint or push-on type unless otherwise indicated on the drawing or directed by the A/E. Restrained push on joints shall be used to resist thrust forces. All joints shall be watertight and free from leaks.

3.13 MECHANICAL JOINTS:

A. Mechanical joints shall be carefully assembled in accordance with the manufacturer's recommendations. If effective sealing is not obtained, the joint shall be disassembled, thoroughly cleaned and reassembled. Over-tightening bolts to compensate for poor installation practice will not be permitted.

B. The holes in mechanical joints with tie rods shall be carefully aligned to permit installation of the tie rods. In flange and mechanical joint pieces, holes in the mechanical joint bells and the flanges shall straddle the top (or side for vertical piping) centerline. The top (or side) centerline shall be marked on each flange and mechanical joint piece at the foundry.

3.14 PUSH-ON JOINTS: The pipe manufacturer's instructions and recommendations for proper jointing operations shall be followed. All joint surfaces shall be lubricated with heavy vegetable soap solution immediately before the joint is completed. Lubricant shall be suitable for use in potable water, shall be stored in closed containers, and shall be kept clean. Each spigot end shall be suitably beveled to facilitate assembly.

3.15 LEAKAGE: All joints shall be watertight and free from leaks. Each leak which is discovered within the correction period stipulated in the General Conditions shall be repaired by and at the expense of the Contractor.

END OF SECTION

STORM SEWERAGE SYSTEMS SECTION 02720

PART 1: GENERAL

1.1 RELATED REQUIREMENTS: Related Documents: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division 0) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 SCOPE OF WORK: Furnish all labor, equipment, and incidentals required, and install in the locations shown on the Drawings, all piping, fittings, and appurtenances for storm sewerage systems as specified.

1.3 GENERAL: MATERIAL AND EQUIPMENT

A. Conform to applicable specifications and standards.

B. Comply with size, make, type, and quality specified, or as specifically approved in writing by the A/E.

C. Manufactured and Fabricated Products:
1. Design and fabricate, and assemble in accordance with the best engineering and shop practices.
2. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
3. Two or more items of the same kind shall be identical, by the same manufacturer.
4. Products shall be suitable for service conditions.

D. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

E. Comply with all local, state and federal laws and regulations.

F. Furnish all necessary labor, material or equipment necessary for compliance with all requirements of this contract.

1.4 GOVERNING STANDARDS: Installation shall conform to the latest standards of the governing authority. In the event of a conflict between these specifications and the latest standards of the Owner and/or governing authority, the latest standards of the Owner and/or governing authority shall govern.

PART 2: PRODUCTS

Piping and other materials are specified elsewhere.

PART 3: EXECUTION

3.1 UNKNOWN UTILITIES:

A. The drawings attempt to indicate the location of all known underground facilities within the limits of the work. However, the Contractor shall be responsible to inspect the entire project to verify all underground facilities and determine the existence of any additional facilities conflicting with his work. In addition the Contractor shall be required to prospect ahead of the work to locate and verify all under ground facilities.

B. In the event the Contractor encounters an unknown underground facility in his operations and such an item will interfere with his work and will require removal and replacement or relocation, the Contractor shall immediately notify the A/E and Owner and/or appropriate governing authority, and arrange for relocation.

3.2 COORDINATION: Removal and replacement of drainage facilities shall be done in close coordination with the Owner and/or governing authority. Removal and replacement or relocation work shall be planned in advance so the inconvenience to the Owner and utility users caused by the disruption of service is minimized.

3.3 HANDLING:

A. Pipe, fittings, and accessories shall be handled in a manner that will insure installation in sound, undamaged condition. Equipment, tools, and methods used in handling and installing pipe and fittings shall not damage the pipe and fittings. Hooks inserted in ends of pipe shall have broad, well-padded contact surfaces.

B. All pipe coating, which has been damaged, shall be repaired by the Contractor before installing the pipe.

3.4 CLEANING:

A. The interior of all pipe and fittings shall be thoroughly cleaned of foreign matter before being installed and shall be kept clean until the work has been accepted. Before jointing, all joint contact surfaces shall be wire brushed if necessary, wiped clean, and kept clean until jointing is completed.

B. Precautions shall be taken to prevent foreign material from entering the pipe during installation. Debris, tools, clothing, or other materials shall not be placed in or allowed to enter the pipe.

3.5 INSPECTION: Pipe and fittings shall be carefully examined for cracks and other defects immediately before installation; spigot ends shall be examined with particular care. All defective pipe and fittings shall be removed from the site of the work.

3.6 LAYING PIPE:

A. Lay all pipe in straight lines and on uniform grades. Rest pipe on a firm prepared bed with bells laid up grade. Insure position of pipe to proper grade by blocking or other means. Maintain lines laterally so that minimum of 66% of internal area is visible throughout total length of pipe between fittings.

B. Lay pipe with sealed joints in accordance with manufacturer's recommendations; join so that spigot end enters to full depth of socket. No infiltration of soils will be allowed at joints.

C. Install concrete pipe in accordance with applicable provisions of American Concrete Pipe Association "Concrete Pipe Installation Manual", unless otherwise indicated. All joints of pipe greater than 43 inch round and equivalent arch pipe shall be banded with metal straps on three sides in accordance with manufacturers' requirements.

D. Keep pipe lines clean as the laying progresses and keep open ends securely stopped.

E. Make connections into drainage structures with joints thoroughly sealed with mortar, so that no excess mortar remains inside pipe or basin to block flow of water.

F. Pipe shall be protected from lateral displacement by placing the specified pipe embedment material. Under no circumstances shall pipe be laid in water and no pipe shall be laid under unsuitable weather or trench conditions.

G. Pipe shall be laid with the bell ends facing the direction of laying except when reverse laying is specifically authorized by the A/E.

H. Alignment and grade shall be as existed in removed and replaced pipe, unless otherwise indicated on the drawings or directed by the A/E.

3.7 PIPING CONNECTIONS: Where corrugated steel pipe is to be joined with reinforced concrete pipe, corrugated steel pipe shall overlap the concrete pipe using pipe sizes as indicated on the drawings conforming to current local regulatory standards. Required diameters of corrugated steel pipe shall be specially fabricated if not otherwise available. The space between the steel pipe and the concrete pipe where the steel pipe overlaps, shall be filled with grout, except for the upstream 12 inch length of overlap. The upstream 12 inch length of overlay shall be tightened with a corrugated steel band so that there is no space between the corrugated steel pipe and the concrete pipe.

END OF SECTION

DRAINAGE MANHOLES AND DROP INLETS SECTION 02721E

PART 1: SCOPE OF WORK

This work consists in the construction of all manholes and drop inlets in accordance with details, dimensions and grades shown on plans.

PART 2: GENERAL

All work shall be in accordance with the requirements of Section 702 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition and as per requirements of St. Bernard Parish Public Works.

PART 3: MATERIALS

As per Section 702 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition and as per requirements of St. Bernard Parish Public Works.

END OF SECTION

DRAINAGE SYSTEMS - REINFORCED CONCRETE PIPE SECTION 02722E

PART 1: SCOPE OF WORK

This work consists of furnishing and installing reinforced concrete pipe as shown on the plans and to the size shown in accordance with plan details.

PART 2: GENERAL

All work shall be in accordance with the requirements of Section 701 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition.

Payment shall include all necessary excavation, shell bedding and timber foundation as specified on plans, and filter cloth at each joint. Cloth to be 36" wide with 36" overlap.

PART 3: MATERIALS

As per Section 701 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, and shall be Class III pipe, wall B and meet ASTMC-76. Pipe joints shall be Type 2.

END OF SECTION

IRRIGATION SYSTEM SECTION 02813

PART 1. - GENERAL

1.1. RELATED DOCUMENTS

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

1.2. SUMMARY

A. This Section includes piping, valves, sprinklers, lawn sprinkler specialties, controls, and wiring.

B. Contractor is responsible for the design and required products and systems to accomplish the specified performance. The project is a performance specification for sprinkler head layout for all new sodded turf areas and landscape planting installations. 100% coverage is required. Prior to doing shop drawings for the layout of the various areas, the contract shall review the plan to ascertain the species of sod, trees, and plants being utilized.

1.3. DEFINITIONS

A. Circuit Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.

B. Pressure Piping: Downstream from point of connection to water distribution piping to and including control valves. Piping is under water distribution system pressure.

C. The following are industry abbreviations for plastic materials:

1. PVC: Polyvinyl chloride plastic.

1.4. SYSTEM PERFORMANCE REQUIREMENTS

A. Minimum Water Coverage: 100 percent of sodded play area.

B. Location of Sprinklers and Specialties: All sprinkler heads are to be located on the perimeter of the new sodded play yard. No heads shall be located in the center of the play yard. Locate as necessary to avoid plantings and obstructions such as signs, light standards, manholes, utilities, and root systems.

C. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties, unless otherwise indicated:

1. Pressure Piping: 200 psig (1380 kPa).
2. Circuit Piping: 150 psig (1035 kPa).

D. Controls: Provide state-of-the art controls including automatic timer.

1.5. SUBMITTALS

A. Product Data: Include pressure rating, rated capacity, settings, and electrical data of selected models for the following:

1. Water regulators.
2. Water hammer arresters.
3. Valves. Include aboveground and underground; general-duty, manual and automatic control, and quick-coupler types.
4. Valve boxes.
5. Sprinklers.
6. Specialties. Include emitters, drip tubes, and other devices.
7. Controllers. Include wiring diagrams.

B. Shop Drawings: Show lawn sprinkler piping, including plan layout and locations, types, sizes, capacities, and flow characteristics of lawn sprinkler piping components. Include water meters, backflow preventers, valves, piping, sprinklers and devices, accessories, controls, and wiring. Show areas of sprinkler spray and overspray. Contractor shall use all pop-up heads.

C. Coordination Drawings: Show piping and major system components. Indicate interface and spatial relationship between piping, system components, adjacent utilities, and proximate structures.

D. Test Reports: As specified in "Field Quality Control" Article in Part 3.

E. Maintenance Data: To include in maintenance manuals specified in Division 1. Include data for the following:

1. Water regulators.
2. Automatic control valves.
3. Sprinklers.
4. Specialties.
5. Controllers.

1.6. QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of lawn sprinkler piping components and are based on specific types and models indicated. Other manufacturers' products with equal performance characteristics may be considered. Refer to Division 1 Section "Substitutions."

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

C. Comply with requirements of utility supplying water and authorities having jurisdiction for preventing backflow and back siphonage.

D. Comply with ASTM F 645, "Guide for Selection, Design, and Installation of Thermoplastic Water Pressure Piping Systems."

E. Comply with NFPA 70, "National Electrical Code," for electrical connections between wiring and electrically operated devices.

1.7. DELIVERY, STORAGE, AND HANDLING

A Preparation for Transport: Prepare valves according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves according to the following:

1. Do not remove end protectors unless necessary for inspection; then, reinstall for storage.
2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

D. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

E. Protect flanges, fittings, and specialties from moisture and dirt.

F. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.8. PROJECT CONDITIONS

A. Perform site survey, research public utility records, and verify existing utility locations.

B. Investigate and determine available water supply water pressure and flow characteristics. Determine design flow and pressure requirements and install booster pump if necessary.

C. Site Information: Reports on subsurface condition investigations made during design of Project are available for informational purposes only; data in reports are not intended as warranties of accuracy or continuity of conditions (between soil borings). Owner assumes no responsibility for interpretations or conclusions drawn from this information.

1.9. SEQUENCING AND SCHEDULING

A. Maintain uninterrupted water service to building during normal working hours. Arrange for temporary water shutoff with Owner.

B. Coordinate lawn sprinkler piping with work specified in Division 2 Section "Landscaping."

C. Coordinate lawn sprinkler piping with utility work.

1.10. EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to Owner.
   1. Quick Couplers: Furnish quantity of units equal to 10 percent of amount of each size installed.
   2. Sprinklers: Furnish quantity of units equal to 25 percent of amount of each type installed.
   3. Specialties: Furnish quantity of units equal to 20 percent of amount of each type installed.
   4. Valve Keys: Furnish quantity of tee-handle units equal to 25 percent of amount of each type of key-operated, control valve installed.
   5. Quick-Coupler Hose Swivels: Furnish quantity of units equal to 25 percent of amount of each type of quick coupler installed.
   6. Quick-Coupler Operating Keys: Furnish quantity of units equal to 25 percent of amount of each type of quick coupler installed.

PART 2. - PRODUCTS

2.1. MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Bronze Valves for Aboveground and Control-Valve Box Installation:

   a. American Valve, Inc.
   b. Campbell Manufacturing, Inc.
   c. Ceres Products Corp.
   d. Conbraco Industries, Inc.
   e Crane Co.; Valve Div.
   f Grinnell Corp.; Grinnell Supply Sales Co.
   g Hammond Valve Corp.
   h Jomar International, Ltd.
   i Kitz Corp. of America.
   j Milwaukee Valve Co., Inc.
   k Nibco, Inc.
   l Red-White Valve Corp.
   m Stockham Valves & Fittings, Inc.
   n Walworth Co.
   o Watts Industries, Inc.; Water Products Div.
   p Western Brass Works.

2. PVC Valves for Aboveground and Control-Valve Box Installation:

   a American Valve, Inc.
   b Asahi/America, Inc.
   c Campbell Manufacturing, Inc.
   d Colonial Engineering, Inc.
   e Fischer: George Fischer, Inc.
   f Hayward Industrial Products, Inc.
   g Jomar International, Ltd.
   h Nibco, Inc.
   i Orbit Irrigation Products.

j Plast-O-Matic Valves, Inc.
k Sloane: R & G Sloane Manufacturing Co., Inc.

3. Bronze, Automatic Control Valves:

a Rain Bird Sprinkler Mfg. Corp.
b Telsco Industries; Weather-Matic Sprinkler Div.
c Toro Co.; Irrigation Div.

4. Plastic, Automatic Control Valves:

a Rain Bird Sprinkler Mfg. Corp.
b Telsco Industries; Weather-Matic Sprinkler Div.
c Toro Co.; Irrigation Div.

5. Control-Valve Boxes:

a American Drainage Products, Inc.
b AMETEK; Plymouth Products Div.
c Applied Engineering Products.
d Carson-Brooks Plastics, Inc.
e DFW/HPI.
f Morrison Molded Fiber Glass Co.; Quazite Div.
g NDS, Inc.
h Normandy Products Co.
i Orbit Irrigation Products.

6 Quick Couplers:

a Rain Bird Sprinkler Mfg. Corp.
b Toro Co.; Irrigation Div.
c Western Brass Works.

7 Sprinklers:

a Rain Bird Sprinkler Mfg. Corp.
b Telsco Industries; Weather-Matic Sprinkler Div.
c Toro Co.; Irrigation Div.

8 Water Regulators:

a Bermad, Inc.
b Cashco, Inc.
c Cla-Val Co.
d Conbraco Industries, Inc.
e FLOMATIC Corp.
f GA Industries, Inc.
g Honeywell Braukmann.
h IMI Cash Valve, Inc.
i Watts Industries, Inc.; Water Products Div.
j Zurn Industries, Inc.; Wilkins Div.

9 Miscellaneous Specialties:

a Agricultural Products, Inc.
b Buckner, Inc.
c Drip In Irrigation Co.
d Hardie: James Hardie Irrigation, Inc.; Landscape Div.
e Imperial Underground Sprinkler Co.
f Netafim Irrigation, Inc.
g Rain Bird Sprinkler Mfg. Corp.
h Raindrip, Inc.
i Salco Products, Inc.
j Telsco Industries; Weather-Matic Sprinkler Div.
k Toro Co.; Irrigation Div.

10. Controllers:

a Rain Bird Sprinkler Mfg. Corp.
b Telsco Industries; Weather-Matic Sprinkler Div.
c Toro Co.; Irrigation Div.

2.2. PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" and "Valve Applications" articles for application of pipe and tube materials, joining methods, and valve applications.

2.3. PIPES AND TUBES

A Above ground piping: Hard Copper Tubing: ASTM B 88.

B. Sleeving Under Roads and Sidewalks: PVC Pipe: ASTM D 1785, PVC 1120 Compound Schedule 40.

C. Main Line (Pressure Piping), PVC Pressure- Rated Pipe: ASTM D 2241; PVC 1120 Compound; SDR 21

D. Circuit Piping (Downstream of Control Valves)

E. Drip Feeder Tube: PE Controlled ID Pipe: ASTM F 771 and ASTM D 2239; PE 3408 Compound; SIDRs 7, 9, 11.5, and 15.

2.4. PIPE AND TUBE FITTINGS

A PVC Socket Fittings, Schedule 40: ASTM D 2466.

B PVC Socket Fittings, Schedule 80: ASTM D 2467.

C PVC Threaded Fittings: ASTM D 2464.

D Insert Fittings for PE Pipe: ASTM D 2609, NP or PP. Include bands or other fasteners.

E Transition Fittings: Manufactured assembly or fitting, with pressure rating at least equal to that of system and with ends compatible to piping where fitting is to be installed.

2.5. JOINING MATERIALS

A Refer to Division 2 Section "Utility Materials" for commonly used joining materials.

2.6. VALVES AND VALVE SPECIALTIES

A Plastic Valves: PVC with 150-psig (1035-kPa) minimum pressure rating, ends compatible with piping, and tee handle.

B Quick-Couplers: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.

1. Locking Top Option: Include vandal-resistant, locking feature with two matching keys.

C Manual Control-Valve Service Boxes: Cast iron with telescoping top section of length required for depth of bury of valve. Include cover with lettering "WATER," bottom section with base of size to fit over valve, and 3-inch- (75-mm-) diameter barrel. Include valve key, 36 inches (915 mm) long with tee handle and key end to fit valve.

D Control-Valve Boxes: PE, ABS, fiberglass, polymer concrete, or precast concrete box and cover, with open bottom, openings for piping, and designed for installing flush with grade. Include size as required for valves and service.

2.7. SPRINKLERS

A. Description: Manufacturer's standard sprinklers designed for uniform coverage over entire spray area indicated, at available water pressure.

B. Components: Brass or plastic housing and corrosion-resistant interior parts.

C. Shrubbery Sprinklers: Fixed Fixed pattern, with screw-type flow adjustment, 12" pop up, mount on ½" sch 40 Risers in shrubs, mount on ½" Flexible PVC in Ground cover beds.

D. Pop-up, Spray Sprinklers: Fixed pattern, with screw-type flow adjustment and stainless-steel retraction spring. 2" or 4" pop ups in Lawn Areas.

E. Pop-up, Rotary, Spray Sprinklers: Gear drive, full-circle and adjustable part-circle types.

2.8. SPECIALTIES

A. Water Regulators: ASSE 1003, single-seated, direct-operated, water-pressure regulators, rated for 150-psig- (1035-kPa-) minimum, initial-inlet working pressure, with size, flow rate, and inlet and outlet pressures indicated. Include integral factory-installed or separate field-installed Y-pattern strainer that is compatible with unit for size and capacity.

1. 2-Inch NPS (DN50) and Smaller: Bronze body with threaded ends.
2. Interior Components: Corrosion-resistant materials.

B. Water Hammer Arresters: ASME A112.26.1M, ASSE 1010, or PDI WH-201 water hammer arrester. Include bellows or piston-type pressurized cushioning chamber and sizes complying with ASME A112.26.1M and PDI WH-201 Sizes A to F.

C. Pressure Gages: ASME B40.1 pressure gage. Include 4-1/2-inch- (115-mm-) diameter dial, dial range of two times system operating pressure, and bottom outlet.

D. Application Pressure Regulators: Brass housing, 3/4-inch NPS (DN20), with corrosion-resistant internal parts, and capable of controlling outlet pressure to approximately 20 psig (138 kPa).

E. Strainer/Filter Units: Brass or plastic housing, with corrosion-resistant internal parts, of size and capacity required for devices downstream from unit.

F. Contractor to provide booster pump as necessary and in accordance to Industry standards.

2.9. AUTOMATIC CONTROL SYSTEM

A. Exterior Control Enclosures: NEMA 250, Type 4 weatherproof enclosure with locking cover and two matching keys; and include provision for grounding.

1. Material: Stainless-steel, sheet metal.
2. Material: Molded plastic.

B. Transformer: Internal; and suitable for converting 120-V, ac building power to 24-V, ac power.

C. Controller Stations for Automatic Control Valves: Each station is variable from approximately five to 60 minutes. Include switch for manual or automatic operation of each station.

D. Timing Device: Adjustable, 24-hour, 14-day clock with automatic operations to skip operation any day in timer period; to operate every other day; or to operate two or more times daily.

1. Manual or Semiautomatic Operation: Allow this mode without disturbing preset automatic operation.
2. Nickel-Cadmium Battery and Trickle Charger: Automatically power timing device during power outages.

E. Wiring: UL 493, Type UF, solid-Cooper-conductor, insulated cable, suitable for direct burial.

1. Feeder-Circuit Cables: No. 12 AWG minimum, between building and controllers.
2. Low-Voltage, Branch-Circuit Cables: No. 14 AWG minimum, between controllers and automatic control valves and color-coded different than feeder-circuit-cable jacket color and with jackets of different colors for multiple-cable installation in same trench. Run two wires and one spare (red, white and black).
3. Splicing Materials: Pressure-sensitive, thermoplastic tape; waterproof sealing packets; or other waterproof connectors.

2.10. IDENTIFICATION

A. Plastic underground warning-tape materials:

1. Solid blue film with metallic core and continuously printed black-letter caption, "CAUTION--WATER LINE BURIED BELOW."

PART 3. - EXECUTION

3.1. PREPARATION

A. Set stakes to identify proposed lawn sprinkler locations. Obtain Architect's approval before excavation.

3.2. TRENCHING AND BACKFILLING

A. Install warning tape directly above pressure piping, 12 inches (300 mm) below finished grades, except 6 inches (150 mm) below subgrade under pavement and slabs.

B. Install piping and wiring in sleeves under sidewalks, roadways, and parking lots.

1. Install piping sleeves by boring or jacking under existing paving if possible.

C. Provide minimum cover over top of underground piping according to the following:

1. Pressure Piping: Greater depth of minimum of 18 inches (914 mm) below finished grade, or not less than 18 inches (500 mm) below average local frost depth. Depth of pipe that occurs within the drip line of trees will vary to prevent damage to tree roots. All excavation in these areas will be hand dug.
2. Circuit Piping: 12 inches (300 mm).
3. Sleeves: 24 inches.

3.3. PIPING APPLICATIONS

A. Install components having pressure rating equal to or greater than system operating pressure.

B. Piping in control-valve boxes and aboveground may be joined with flanges instead of joints indicated.

C. Aboveground, Pressure Piping: Use the following:

1. 4-Inch NPS (DN 100) and Smaller: Type K (Type C) hard copper tube, wrought or cast-copper fittings, and soldered joints.

D. Underground Pressure Piping: Use the following:

1. 4-Inch NPS (DN100) and Smaller: SDR 21 PVC pressure-rated pipe, Schedule 80 PVC socket fittings and solvent-cemented joints or gasket joints.

E. Underground Branches and Offsets at Sprinklers and Devices: Schedule 80 PVC Nipples PVC threaded fittings, and threaded joints.

1. Option: Plastic piping made for this application may be used instead of pipe and fittings specified.

F. Circuit Piping: Use the following:

1. 2-Inch NPS (DN50) and Smaller: Schedule 40 PVC pipe, Schedule 40 PVC socket fittings, and solvent-cemented joints.

G. Sleeves: Schedule 40 PVC pipe, Schedule 40 PVC socket fittings, and solvent-cemented joints.

3.4. VALVE APPLICATIONS

A. Aboveground, Shutoff-Duty Valves: Use the following:

1. 2-Inch NPS (DN50) and Smaller: Bronze, rising-stem gate valve.

B. Underground, Manual Control Valves: Bronze globe valve with control-valve service box and valve key.

C. Control Valves: Use the following:

1. Rain Bird Feb. Series.

3.5. JOINT CONSTRUCTION

A. Refer to Division 2 Section "Utility Materials" for pipe joint construction requirements.

B. Dissimilar Piping Material Joints: Construct joints using adapters or couplings that are compatible with both piping materials, outside diameters, and system working pressure.

3.6. PIPING INSTALLATION

A. Install piping free of sags and bends.

B. Install groups of pipes parallel to each other, spaced to permit valve servicing.

C. Install fittings for changes in direction and branch connections.

D. Install unions adjacent to valves and final connections to other components with 2-inch NPS (DN50) or smaller pipe connection.

E. Install dielectric fittings to connect piping of dissimilar metals.

F. Lay piping on solid subbase, uniformly sloped without humps or depressions.

G. Install PVC piping in dry weather when temperature is above 40 deg F (4.4 deg C). Allow joints to cure at least 24 hours at temperature above 40 deg F (4.4 deg C) before testing, unless otherwise recommended by manufacturer.

H. Install water regulators with shutoff valve and strainer on inlet and pressure gage on outlet. Install shutoff valve on outlet.

I. Water Hammer Arresters: Install between connection to building main and circuit valves in valve box.

3.7. VALVE INSTALLATION

A. Underground Gate Valves: Install in valve box with top flush with grade.

1. Install valves and PVC pipe with restrained, gasketed joints.

B. Underground, Manual Control Valves: Install in manual, control-valve service box, AMETEK VP10 or equal.

C. Control Valves: Install in control-valve service box, AMETEK VP12 or equal.

3.8. SPRINKLER INSTALLATION

A. Flush circuit piping with full head of water and install sprinklers after hydrostatic test is completed.

B. Install lawn sprinklers at manufacturer's recommended heights.

C. Locate part-circle sprinklers to maintain a minimum distance of 4 inches (100 mm) from walls and 2 inches (50 mm) from other boundaries, unless otherwise indicated.

D. Install in accordance to approved shop drawing.

3.9. AUTOMATIC CONTROL SYSTEM INSTALLATION

A. Install controllers according to manufacturer's written instructions and as indicated. Provide controller with the capability to provide six additional stations.

B. Install freestanding controllers on precast concrete bases not less than 36 by 24 by 4 inches (914 by 610 by 100 mm) thick, and not less than 6 inches (150 mm) greater in each direction than overall dimensions of controller.

C. Install control wiring in same trench with piping. Install wiring with loops at control valves and controllers, at intervals not greater than 100 feet (30 m), and changes in direction to allow for expansion. Bundle wiring in same trench at 10-foot (3-m) intervals.

3.10. CONNECTIONS

A. Connect piping to valves, sprinklers, and specialties.

B. Connect water supplies to lawn sprinkler piping with backflow preventers at connections to potable-water supplies to meet all local code requirements.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

D. Ground electric-powered controllers, valves, and devices.

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

E. Electrical power will be provided by the general contractor at the location of the control clock.

3.11. FIELD QUALITY CONTROL

A Testing: Hydrostatically test piping and valves before backfilling trenches. Piping may be tested in sections.

1. Cap and test piping with static water pressure of 50 psig (345 kPa) above system operating pressure and without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours.
2. Repair leaks and defects with new materials and retest system or portion thereof until satisfactory results are obtained.

3.12. CLEANING AND ADJUSTING

A. Flush dirt and debris from piping before installing sprinklers and other devices.

B. Adjust automatic control valves to provide flow rate of rated operating pressure required for each sprinkler circuit.

C. Carefully adjust lawn sprinklers so they will be flush with, or not more than ½ inch (13 mm) above, finish grade.

D. Adjust settings of controllers and automatic control valves.

3.13. COMMISSIONING

A. Starting Procedures: Follow manufacturer's written procedures. If no procedures are prescribed by manufacturers, proceed as follows:

1. Verify that specialty valves and their accessories are installed and operate correctly in accordance to the psi pressurer.
2. Verify that specified tests of piping are complete.
3. Verify that sprinklers and devices are correct type.
4. Verify that damaged sprinklers and devices are replaced with new materials.
5. Verify that potable-water supply connections have backflow preventers.
6. Energize circuits to electrical equipment and devices.
7. Adjust operating controls.

B. Operational Tests: Measure and record water flow rate and area coverage at each sprinkler. Adjust to achieve indicated values.

3.14. DEMONSTRATION

A. Demonstrate to Owner's maintenance personnel operation of equipment, sprinklers, specialties, and accessories. Review maintenance information.

1. Provide seven days' advance written notice of demonstration.

END OF SECTION

EXTERIOR PLANTING SECTION 02900

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Section includes, but is not limited to, the following:

1. Providing delivery and installation of trees, shrubs, herbaceous plant materials and landscape bed edging in designated planting areas.
2. Protecting existing site features to remain.
3. Clearing and grubbing of existing trees, shrubs and herbaceous plant materials for installation or new plant material.
4. Staking and guying.
5. Mulching.
6. Fertilizing.
7. Warranty.
8. Maintenance.
9. Clean-up

1.2 REFERENCES

A. ASNS: "American Standard for Nursery Stock," ANSI Z60.1 latest edition, published by the American Association of Nurserymen, (AAN).

B. SPN: "Standardized Plant Names," latest edition, by the American Joint Committee on Horticultural Nomenclature.

C. Agricultural chemist: Qualified, experienced public or private soils testing laboratory engaged by the Contractor, capable of providing test results as specified, and approved by the Landscape Architect.

D. American National Standards for Tree Care Operations, ANSI A300. American National Standards Institute, 11 West 42nd Street, New York, N.Y. 10036.

E. Hortus Third, The Staff of the L.H. Bailey Hortorium. 1976. MacMillan Publishing Co., New York.

F. ISA: “International Society of Arboriculture”

G. AAN: “American Association of Nurseryman”

1.3 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

C. Finish Grade: Elevation of finished surface of planting soil.

D. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

E. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

F. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

G. Planting Area: Areas to be planted.

H. Planting Soil: Approved mix containing no less than fifteen (15) percent clay with a PH range from five (5) to seven (7). It should be fertile, friable, natural loam, reasonably free of clay lumps, brush, weeds, and other litter, free of root stumps and stones larger than two (2) inches and any other extraneous or toxic matter harmful to plant growth. It shall be a mixture of the following materials in quantities specified: one part humus, one part coarse building sand, and one part shredded bark mulch.

I. Herbaceous Plant Material: This term refers to but is not limited to perennials and grasses.

J. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.4 MATERIAL OWNERSHIP

A. Except for materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

A. Plant material sources: Submit proposed sources for all plant material within 10 working days of award of a contract. Provide name and location of nursery, contact person, and telephone number.

B. Product Data: For each type of product indicated.
   1. Submit technical descriptive data from each manufactured or packaged product of this Section. Include manufacturer’s product testing and analysis and installation instructions for manufactured or processed items and materials.
   2. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
   3. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.

C. Qualification Data: For qualified landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project

names, addresses, and year completed, and include names and addresses of owners' contact persons. Qualifications must conform as specified herein.

D. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis of standard products.
2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
3. Submit certified analysis for each treatment material specified and as used. Include guaranteed analysis and weight for packaged material.
4. Furnish certification that all plant material is true to name and in conformance with the Specifications. In addition, furnish certificates of inspection as may be required by Federal, State, or other authorities that plant material is free of disease or hazardous insects.
5. Furnish certifications / cultivars by supplying nursery.
6. Prior to the use on-site of any insect or disease control materials, submit a list of control materials and quantities intended for use in controlling insects and diseases prevalent and expected on the site. Submittal shall include data demonstrating the compatibility of the control materials and methods of installation or application with the specified planting types and varieties.

E. Landscape Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required One (1) Year Maintenance and Warranty period prior to Substantial Completion.

F. Notices and Scheduling

1. Within 14 calendar days after Contract Notice to Proceed, submit invoices or certificates of deposit from nurseries guaranteeing timely delivery of all specified and pre-sourced plant materials. If any plant materials are unavailable at the time of submittal, the Contractor shall contact the Owner’s Representative to determine acceptable alternatives. Indicate the following:

   a. Confirm size and grade of materials to be planted.
   b. Indicate source of origin and the health of plant materials, each type.

2. Submit a schedule itemizing landscape work to be performed. This schedule shall be in addition to the Project Contract Schedule(s) required by the General Conditions and shall be submitted within 14 calendar days after the Contract Notice to Proceed.

   a. Include in the schedule, anticipated dates for commencement and sequencing of landscape work, including but not limited to layout and layout approval, placement for each plant type, and commencement of maintenance period. Refer to the specified related requirements, herein.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of plants. Qualifications for Landscape Contractors shall including but not be limited to:

1. Experience: Five (5) years' experience in landscaping, irrigation or arboriculture on similar projects in terms of scope of work and budget to the subject project. The Contractor shall have appropriate experience related to the work specified in the drawings and specifications.
2. Licensure: For projects in which the Contractor will perform landscape, irrigation or arboreal work, the Contractor shall have a current and valid Landscape Horticulturalist License, Arborist License and/or Irrigation Contractor License issued by the Louisiana State Horticultural Commission as is applicable to the scope of work of the project. Contractor shall provide proof of qualifications.
    a. If work is performed by a Subcontractor, the Subcontractor shall have a current and valid Landscape Horticulturalist License, Arborist License and/or Irrigation Contractor License issued by the Louisiana State Horticultural Commission as is applicable to the scope of work of the project. Subcontractor shall provide proof of qualifications.
3. Installer's Field Supervision / Contractor's Foreman: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress. Must have significant and demonstrated experience in the installation of major mixed herbaceous, tree and shrub plantings in the last five (5) years in private and public gardens. This person shall be a Landscape Horticulturalist, Arborist or Irrigation Contractor licensed by the Louisiana Horticultural Commission as is relevant to the scope of work.

B. Plant Material: Meet or exceed applicable AAN standards.

1. Plant List: Investigate sources of supply prior to submitting bid. Confirm that size, variety and quantity of plant material specified on Plant List can be supplied. Failure to take this precaution will not relieve the successful bidder from his responsibility for furnishing and installing all plant material in strict accordance with the Contract requirements and without additional expense to the Owner.

    a. Substitutions will not be permitted unless substantiated written proof is supplied that a specified plant is not obtainable. In this situation a proposal to use the nearest equivalent size or variety with an equitable adjustment of Contract Price will be considered.

2. Plant Material Observation: Landscape Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Landscape Architect retains right to observe plant materials further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected plant materials immediately from Project site.

C. Drawing References and Definitions:

1. Refer to the Drawings for the planting schedule. The planting schedule is a guide only. Quantities, sizes and types of plant material, however, shall be verified by the Contractor's review of the planting plan. Where discrepancies may exist the Contractor shall notify the Landscape Architect immediately.
2. Herbaceous plant materials that are indicated adjacent to the shrub or tree symbol shall not be planted over or in root balls.
3. Botanical names shall take precedence over common names.

D. Pre-installation Conference: Prior to commencement of any work of this Section, arrange a conference at the Site of this Project with the Owner's Representative and Landscape Architect. At least five (5) working days notice shall be given prior to the conference.

1. Conference attendees shall include the Contractor, including the foreman appointed to oversee the Work of this Section, and any other representatives of the Owner, and other persons deemed appropriate for coordination of Work and quality control.
2. At the conference review planting installation and sequence schedule, specification criteria, installation material sources, and such other subjects necessary for coordination of the Work.
3. Establish follow-up meetings as necessary.

E. Material Content and Waste Management: Comply with the following and other specified requirements.

1. All planting materials shall originate from a source within a 500 mile radius of the Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Deliver bulk materials with each individual shipment accompanied by an affidavit from the vendor / supplier, countersigned by the Contractor upon receipt, identifying the material type, composition, analysis, and weight and certifying that the material furnished complies with the Specification requirements of this Project. Affidavits shall be furnished in duplicate with one copy submitted to the Construction Manager. The second copy shall be retained by the Contractor.

C. Plant Material:

1. Notify the Landscape Architect five (5) working days in advance of any delivery of plant materials to the site.
2. Dig and handle plants with care to prevent injury to trunks, branches and roots.
3. Do not prune prior to delivery. Do not bend or bind-tie trees or shrubs in such manner as to damage bark, break branches or destroy natural shape. Pack and ship to insure arrival at site in good condition. Provide protective covering during delivery. No plants will be accepted if ball is cracked or broken.
4. Deliver plants after preparations for planting have been completed, and arrange for Plant Inspection by Landscape Architect immediately. Do not proceed with planting until Plant Inspection has been done.
   a. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade). If planting is delayed more

than 24 hours after delivery, set balled and burlapped plants on the ground well protected with soil or other acceptable material. Set plants and trees in their appropriate aspect (sun, filtered sun, or shade). Protect balls and roots and container grown material from freezing, sun, drying winds, and/or mechanical damage. Water as necessary until planted.

b. Do not remove container-grown stock from containers before time of planting.
c. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.
d. Heeling in of plants shall not be allowed for more than three (3) days without approval of the Landscape Architect.

5. Immediately remove rejected or damaged plant material from the site and replace with material selected and approved by the Landscape Architect. Prepare, maintain and submit a list of such items removed to the Owner's Representative.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:

1. Notify Owner's Representative no fewer than five (5) working days in advance of proposed interruption of each service or utility.
2. Do not proceed with interruption of services or utilities without Owner's Representative written permission.

D. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

E. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

F. Should the Contractor, in the course of the Work, find any discrepancies between the Contract Documents and physical conditions or any omissions in the Drawings, or in layout as

furnished by the Owner, it will be the Contractor's duty to inform the Owner's Representative immediately in writing for clarification. Work done after such discovery, unless authorized by the Owner's Representative and Landscape Architect, shall be done at the Contractor's risk and such Work shall be corrected as directed at the Contractor's expense.

G. Existing Conditions

1. Carefully examine the site before submitting a bid. Be informed as to the nature and location of the Work, general and local conditions including climate, adjacent properties and utilities, conformation of the ground, the nature of subsurface conditions, the character of equipment and facilities needed prior to and during execution of the Work.
2. Should the Contractor, in the course of Work, find any discrepancies between Drawings and physical conditions or any omissions or errors in Drawings, or in layout as furnished by the Landscape Architect, it will be his duty to inform the Landscape Architect immediately in writing for clarification. Work done after such discovery, unless authorized by the Landscape Architect, shall be done at the Contractor's risk.

1.9 SEQUENCING AND SCHEDULING

A. Coordinate Work of this Section with Work of all other Sections of Specification.

1.10 PLANT INSPECTION

A. Inspection of Plant Material at the Project Site:

1. Notify the Landscape Architect ten (10) working days in advance of any delivery of plant material to the Project site.
2. The Landscape Architect and Owner's Representative will inspect all plant material upon delivery to the site which shall be prior to installation. Allow time duration on-site, as approved by Landscape Architect, for inspection and layout adjustments prior to installations.
   a. The Contractor shall arrange for adequate manpower and equipment on-site at the time of plant material inspections and installation to provide a complete staked layout, as otherwise specified in this Section, and to unload, open, and handle plant material during inspection.
   b. Rejected plants shall be removed immediately from the site.
3. Herbaceous plant materials shall be available for inspection at a single location prior to delivery on-site. Perennials will also be inspected upon delivery to the Project site.
4. Install plants immediately after inspection is completed and plants accepted per installation instructions.

B. Inspection for Substantial Completion

1. The Landscape Architect, with the Contractor and the Owner's Representative, will make an inspection for Substantial Completion of the Work of this Section. The Contractor shall furnish full and complete written program for maintenance of the planting for review by the Landscape Architect and the Owner's Representative at the time of the request for Substantial Completion.
2. Maintain all planting areas until Substantial Completion in accordance with the requirements specified herein.

3. Submit a written request for inspection at ten (10) working days prior to the day on which the inspection is requested.

    a. All planting shall be alive, healthy and installed as specified to be accepted.
    b. The Contractor shall prepare a list of items to be completed or corrected for review by the Landscape Architect.
    c. Upon completion of the inspection, the Landscape Architect shall amend the list of items to be completed or corrected, and indicate the time period for their completion or correction.
    d. Landscape Architect will make another inspection after notification from the Contractor that all items have been completed and corrected. If the work is complete and acceptable, the Landscape Architect will recommend, in writing to the Owner the Substantial Completion of the Work.

4. The Contractor's responsibility for construction period maintenance will terminate only when the project is complete and handed over to the Owner, not at Substantial Completion.

1.11 REGULATORY REQUIRMENTS

A. Comply with all rules, regulations, laws and ordinances of local, State, and Federal authorities having jurisdiction. Provide labor, materials, equipment, and services necessary to make Work comply with such requirements without any additional cost to the Owner.

B. Procure and pay for permits and licenses required for Work of this Section.

PART 2 - PRODUCTS

2.01 GENERAL

A. The following list of materials shall be required under this section to complete all work described in these specifications and/or indicated on the project drawing. This includes, but is not limited to the following items and all related items necessary to complete this project:

1. Plants
2. Planting Soil and Amendments
3. Mulch
4. Root Hormone Stimulant
5. Pre-Emergent Herbicide
6. Slow Release Fertilizer
7. Slow Release Watering Bags
8. Stakes
9. Tree Trunk Protectors
10. Edging

B. Approvals for substitution must be requested no later than three working days prior to bid opening.

2.02 PLANTS

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
2. Substitutions of plant materials will not be permitted unless authorized in writing by the Department of Parks and Parkways. If proof is submitted in writing that a plant specified is not obtainable, consideration will be given to the nearest available size or similar variety, with a corresponding adjustment of the contract price.

B. Trees and Shrubs

1. Shall be of specimen quality, exceptionally heavy, symmetrical, and so trained or favored in development and appearance as to be unquestionably and outstandingly superior in form, compactness, and symmetry. They shall be sound, healthy, vigorous, well branched, and densely foliated when in leaf; free of disease and insects, eggs, or larvae; and shall have healthy, well-developed root systems. Typical of their species or variety with normal habits of growth, in accordance with ASNS, they shall be free from physical damage or other conditions that would prevent vigorous growth.

    a. Trees with a natural excurrent growth form will have only one main branch leader. Trees with a damaged or crooked leader, bark abrasions, sunscald, disfiguring knots, insect damage, or cuts of limbs over three-quarter (3/4) inch in diameter that are not completely closed will be rejected.
    b. Trees shall have good branch structure in accordance with the natural form for the species. Branching will be plentiful and uniformly spaced along the trunk and have firm, strong attachments with the trunk.
    c. Sprouts shall be cleanly removed.
    d. Pruning scars will be clean cut leaving little or no protrusion from the trunk or branch.
    e. V-shaped branch unions with included bark will not be accepted.
    f. Nomenclature: Agree with SPN or as accepted in the nursery trade for varieties not listed therein. Clonal types shall be true.
    g. Poor-quality trees with cracked, wet, or loose root balls, poorly developed trunk-to-crown ratios, or undersized root balls shall be rejected.
    h. Trees that settle out of plumb due to inadequate soil compaction either under or adjacent to the root ball shall be excavated and reset. In no case shall trees that have settled out of plumb be pulled upright using guy wires.

2. Conform to measurements specified on Plant List. Dimension plants in their natural position. Plants larger than specified may be used, without increasing Contract Price, if approved by the Landscape Architect, and the root ball shall be increased in proportion to the size of the plant. Large plants cut back to sizes specified will not be accepted.

    a. Measure height or spread and quality in accordance with standards specified in ASNS (unless otherwise specified).

C. Herbaceous Plant Material.

1. Furnish in sizes indicated on the Plant List and conform to ASNS standards for species and sizes.
2. Provide plants of sizes, grades, and ball or container sizes complying with ASNS for types and form of plants required. Plants of a larger size may be used if acceptable to the Landscape Architect.
3. Perennials shall have a minimum of 30% visibility of root stock upon inspection of pot soil media. Actual perennial size shall be commensurate with specified container. Under no circumstances shall undersized material in specified size be accepted.

D. Container Plants

1. Plants grown in containers shall be of appropriate size for the container as specified in the most recent edition of the American Standard for Nursery Stock and be free of circling roots on the exterior and interior of the root ball.
2. No trees will have large roots growing out of the container.
3. Container plants shall have been grown in the container long enough to have established roots throughout the growing medium.
4. The rooting medium shall be weed-free.

E. Balled and Burlapped (B&B) Plant Materials

1. Trees designated B&B shall be properly dug with firm, natural balls of soil retaining as many fibrous roots as possible, in sizes and shapes as specified in the American Standard for Nursery Stock. Balls shall be firmly wrapped with nonsynthetic burlap and secured with nails and heavy, nonsynthetic twine. The root collar shall be apparent at surface of ball. Trees with loose, broken, processed, or manufactured root balls will not be accepted, except with special written approval before planting.

F. Labeling: Label at least one plant of each variety, and size with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

2.03 PLANTING SOIL AND AMENDMENTS

A. Planting Soil Mixture: Garden soil is to be an approved mix containing no less than fifteen (15) percent clay with a PH range from five (5) to seven (7). It should be fertile, friable, natural loam, reasonably free of clay lumps, brush, weeds, and other litter, free of root stumps and stones larger than two (2) inches and any other extraneous or toxic matter harmful to plant growth. It shall be a mixture of the following materials in quantities specified: one part humus, one part coarse building sand, one part sand, and one part shredded bark mulch.

B. Batture sand is prohibited due to associated weed infestation issues.

C. Amendments: Should the Contractor deem a necessity for soil amendment materials, including but not limited to organic material such as compost; or any fertilizers the

Contractor shall submit the recommendation in writing to the Landscape Architect and Owner's Representative prior to use of such materials. Application of such materials is prohibited without written consent from the Owner's Representative.

1. Compost: Shall be double grind #2 screened composted hardwood garden mulch.
2. Peat Humus: Is decomposed peat with no identifiable fibers and with a PH range suitable for intended use.

2.04 MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Aged Ground Pine Bark for mulching
2. Pine Needles for top dressing

2.05 PLANT TREATMENT MATERIALS

A. Herbicides, Fungicides, Pesticides: Approved before use for type and rate of application by Landscape Architect and local, state and/or federal agencies with jurisdiction. Organic treatment methods should be utilized before employing chemical treatments.

1. Pre-Emergent Herbicide: Shall be Pendimethalin, Oryzalin or approved equal applied as per the manufacturer's instructions at the time of planting.
2. Root Hormone Stimulant: Mycor Tree Saver, or approved equal.

B. Anti-desiccant: "Wiltproof" as manufactured by Wiltproof Products, Inc., P.O. Box 4280, Greenwich, Ct. 06830, 203-531-4740.

2.06 COMMERCIAL FERTILIZER

A. All fertilizer shall be a commercial balanced formula with the least 25% organic materials, and shall conform to applicable State fertilizer laws. It shall be a slow release formula, "Osmocote," or equal, and shall be used as specified by manufacturer. Fertilizer, unless otherwise specified, shall be delivered mixed as specified, in standard size, unopened containers, showing weight, analysis, and name of manufacturer. Fertilizer shall be complete and of neutral character, with some elements derived from organic sources and containing following percentages of available plant nutrients:

1. For trees and shrubs, Osomocote 18-6-12 to nine (9) months formulation (Sierra Chemical Corporation), or an approved equal.

2.07 MISCELLANEOUS PRODUCTS

A. Water: Potable, clean fresh and free from harmful materials. Water if not available at the time of planting shall be furnished by the Contractor. Make every effort to coordinate planting with availability of water. All hoses and other equipment shall be furnished by the Contractor as needed.

1. If the Project irrigation system is unavailable in whole or in part the Contractor shall use additional hand watering methods to supplement irrigation as needed.

B. Burlap: Non-synthetic, biodegradable. Synthetic or plasticized material shall not be used.

C. Slow Release Watering Bags: Shall be twenty (20) gallon slow release by Treegator or equivalent manufacturer. The tree watering bag must meet or exceed the following specifications:

1. Made of polyethylene reinforced with nylon webbing and treated with U.V. inhibitors.
2. All sides are watertight with ¼" heat seals.
3. Bag is secured to the tree with heavy duty nylon zippers.
4. Drip holes are cored through both ply of material to allow for adjustable drip times.
5. Treegator is manufactured by:
   Spectrum Products, Inc.
   1-866-873-3428
   www.treegator.com

D. Tree Staking for all new trees:

1. Stakes: Green T bar fence posts, 6' minimum length.
2. Ties shall be ArborTie, or approved equivalent, tree staking and guying material in color green. Approvals for substitution must be requested no later than three working days prior to bid opening.
3. Material for ties shall be: flat woven, polypropylene material, ¾" wide and 900 lb. break strength.
4. Arbor Tie is manufactured by:
   Deep Root Partners, L.P.
   81 Langton Street
   San Francisco, CA 94103
   1 (800) 458-7668
   www.deeproot.com

E. Tree Trunk Protectors for all new trees: Made of expandable polyethylene to form a barrier around the tree to protect against bark damage from gardening equipment, tools and other small pests. Tree shield allows water and light to reach the plant while offering plenty of air circulation to prevent moisture and mildew build-up. This tube color is gray.

F. Edging to be supplied around all planter beds separating sod from planting:

A. Heavy Duty Straight Profile Edging: Permaloc CleanLine or approved equal, 1/8" (3.2mm) x 4" (102mm) high, extruded aluminum, 6063 alloy, T-6 hardness, landscape edging for straight-line and curvilinear applications in corrugated straight profile, as manufactured by Permaloc Corporation, Holland MI 49424, telephone (800) 356-9660. Section shall have loops on side of section to receive stakes spaced approximately 2 to 3 feet (610 mm to 915 mm) apart along its length.

B. Thickness: 1/8 inch (3.2 mm) gage section at 0.072 inch (1.83 mm) minimum thick with 0.135 inch (3.4 mm) exposed top lip and 3/16 inch (4.8 mm) gage section at 0.116 inch (2.95 mm) minimum thick with 0.187 inch (4.75 mm) exposed top lip.

C. Length: 8' (2.44m) sections.

D. Connection Method: Section ends shall splice together with an interlocking stakeless snap-down design.

E. Stake: 12" (305mm) Permaloc extruded aluminum stake. Stakes to interlock into section loops.

F. Finish: Green DuraFlex Painted. Paint finish shall comply with AAMA 2603 for electrostatically baked on paint.

PART 3 - EXECUTION

3.1 GENERAL

A. All locations for plants shall be flagged by the landscape contractor prior to excavation. Flag locations shall be approved by Landscape Architect prior to excavation.

B. Prior to construction of planting areas or excavation for plants verify and ascertain the location of all irrigation lines, electric cables, conduits, drainage systems and other utilities. Take proper precautions so as not to disturb of damage sub-surface elements. If sub-surface elements necessitate the need to relocate planting materials the Contractor shall notify the Landscape Architect promptly to determine the appropriate action plan. Should the Contractor fail to notify the Landscape Architect or take the aforementioned precautions the Contractor shall be responsible for making requisite repairs at the Contractor's expense.

C. Insofar as is practical, plant materials shall be planted on the day of delivery. In the event this is not possible, the Contractor shall protect that stock not planted from sun or drying winds and shall keep the plants well watered and stored in the shade. Plants shall not remain unplanted for longer than three days after delivery. Plants shall not be bound with wire or rope at any time so as to damage the bark or break branches. All plants shall be lifted and handled from the bottom of the ball only. Plants moved with a ball will not be accepted if the ball is cracked or broken before or during planting operations.

D. The Contractor shall be responsible for providing all necessary equipment, materials, and labor to complete the project.

E. Plant list quantities are provided as an aid to bidders only. The Contractor shall verify all quantities on the plan. Improper plant counts made by the Contractor shall be no cause for additional costs to the Owner.

F. Edging to be installed where planting areas abut sodded areas to create a clear separation. Edging is not necessary when planting abuts a concrete walk.

3.2 EXAMINATION

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not work soil in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.3 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

1. Protect existing site improvements to remain from damage during construction.

B. Restore damaged improvements to their original condition, as acceptable to Owner.

C. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.4 LAYOUT

A. Stake out locations for new plants and outlines of planting areas for approval by the Landscape Architect where shown on Drawings except where obstructions exist below ground, overhead, or where changes have been made during construction. Adjustments shall be approved by the Landscape Architect. Completely layout planting beds and pits before seeking approval by the Landscape Architect.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, perennials, ornamental grasses, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner as directed by a Licensed Arborist where such roots and branches obstruct installation of new construction.
3. Use only hand methods or air spade for grubbing within tree protection zone.

B. Re-grade as necessary to smooth and fill depressions caused by clearing and grubbing operations. The Contractor shall preserve existing soils to the greatest extent possible during clearing and grubbing operations.

1. Maintain all “flat” areas and slopes to allow free flow of surface drainage without ponding.

C. Make every effort to protect existing utilities, including but not limited to the irrigation system. Should damage to the irrigation system occur during clearing and grubbing operations the Contractor shall be responsible to sufficiently repair the damage as determined by the Owner.

3.6 PLANTING BED ESTABLISHMENT

A. Rake surface clear of stones, debris, rubbish, and trash before pit excavation. Dispose of such material away from the site.

B. Planting soil shall be installed as plant bed material for all shrubs and groundcovers in accordance with the details and plans.

C. The contractor shall provide positive drainage for all beds and plant areas.

D. Obstructions: If rock, underground construction work, utilities, tree roots, or other obstructions are encountered in the excavation of planting areas, alternate locations for any planting shall be determined by the Landscape Architect.

3.7 PLANT MATERIAL INSTALLATION

A. Excavation: All plant pits or trenches shall be excavated in accordance with the Planting Details after approval of staked locations by the Landscape Architect. Excavation of plant pits shall be done after soil testing, and analysis and approval by the Landscape Architect

1. When compacted soil is encountered, sides and bottoms shall be loosened by scarifying.
2. Pits and Trenches: Excavate circular pits with sides sloped inward. Trim base leaving center area raised slightly to support root ball and assist in drainage. Do not further disturb base. Scarify sides of plant pit smeared or smoothed during excavation.

    a. Tree pits are to be excavated to the depth and widths indicated on the drawings. If the planting area under any tree is initially dug too deep, the soil added to bring it up to the correct level should be thoroughly tamped.
    b. Excavate to the extent possible without disturbing roots of existing adjacent trees.
    c. Excavate using hand methods under drip line of adjacent trees.
    d. In areas of slowly draining soils, the root ball may be set up to three (3) inches or one eighth (1/8) of the depth of the root ball above the adjacent soil level.
    e. Save the existing soil to be used as backfill around the tree.
3. Exercise extreme caution during excavation to avoid damaging or interrupting existing underground utilities. Use appropriate detection equipment to locate utilities during excavation of pits to the required depth.
4. Erect barricades, warning signs, or other protective devices as is required by local, state or federal laws and regulations to protect open excavation.
5. Excavated material shall be removed and disposed off-site, unless approval, in writing, has been obtained from the Landscape Architect.
6. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees are encountered in excavations.

B. Drainage of Plant Beds and Tree Pits

1. Verify by testing that beds and pits are free draining. If beds and pits are not free draining notify Landscape Architect and Owner and submit alternative method of drainage for approval.

    a. Do not put plants in beds and pits until the beds and pits have been approved by the Landscape Architect.

2. Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree pits and plant beds.

C. Obstructions Below Ground

1. In the event that rock, underground construction work, utilities or obstructions are encountered in any plant pit excavation work under this Contract, alternate locations may be selected by the Landscape Architect.
2. Where locations cannot be changed, the obstruction shall be removed, subject to the Landscape Architect's approval, to a depth of not less than three (3) feet below grade and no less than six (6) inches below bottom of ball or roots when plant is properly set at the required grade. Payment shall be made in accordance with the Contract.

D. Placement of Plants

1. Plants shall be set in center of pits plumb and straight, in accordance with the planting details, and faced to give best appearance and relationship to adjacent plants and structures.
2. Do not plant until plant material has been approved by the Landscape Architect at site.
3. Plant to such depth that the finished grade level of the plant, after settlement, will be the same as that at which the plant was grown, and so that the root flair is at finish grade.
4. Do not pull burlap out from under balls. Remove platforms, wire and surplus binding from top and sides of ball. Cleanly cut off all broken or frayed roots.
5. Remove plants from containers by cutting or inverting the container.
6. Set the bare root plants in the pit so that all roots, when fully extended will not touch the walls of the planting pit and the uppermost roots are just below the original grade.
7. Place planting soil mix around tree root balls in layers, tamping to settle mix and eliminate voids and air pockets. When pit is approximately one-half backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.

E. Backfilling

1. Compact planting mixture around bases of balls to fill all voids. Remove all burlap and ropes from the tops of balls. Remove all non-biodegradable materials from the plant pit. Clip and fold down wire baskets.
2. Planting mixture shall be backfilled in layers of not more than six (6) inches and each layer thoroughly compacted and free of voids before next layer is put in place.
3. Spread out the roots of bare root plants properly and work backfill mix among them. Prune off broken roots in a natural position. Water thoroughly while backfilling.
4. Work the backfill soil around and beneath the ball leaving no air pockets. Continue adding and tamping soil until the hole is half full. Add water to partially fill the hole. Let the water soak into the soil and finish backfilling.

F. Installation Inspection

1. The Landscape Architect will inspect trees for injury to trunks, evidence of insect infestation and improper pruning. Treat injuries of infestation by accepted methods. Remove and replace plants determined by the Landscape Architect to have injuries or infestations which cannot be treated or which have caused unacceptable damage to the plant.
2. Trees shall stand plumb.

G. Mulching

1. Mulch backfilled surfaces of planting areas and other areas indicated.
2. Apply three (3) inches average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within six (6) inches of trunks or stems. Mulch within two (2) days of planting.
3. Mulch layer shall include basic organic mulch in (2) inch layer, with top dressing mulch in (1) inch layer.

H. Staking and Guying

1. Staking of trees shall be done immediately after planting. Trees shall stand plumb after staking.
2. Staking methods shall be approved by the Landscape Architect. Stakes shall be of sufficient strength to maintain the tree in an upright position that overcomes the particular circumstances that initiated the need for staking.
3. Where ArborTie, or approved equivalent, is used, it shall be installed as per the manufacturer's instructions.
4. Stakes shall be removed by the contractor at the end of the first growing season. Any tree that is not stable at the end of this time shall be rejected.
5. Three stakes shall be used for each tree
6. Stakes shall not penetrate the ball of earth moved with the tree. Stakes shall penetrate existing soil below tree pit.
7. It shall be the landscape contractor's responsibility to prevent plants from falling or being blown over and to straighten or replant all plants which are damaged due to a lack of staking. If unstaked, plants blown over by high winds shall not be a cause of additional expense to the owner, but shall be the financial responsibility of the landscape contractor.

I. Pruning and Repair

1. Plants shall not be heavily pruned at the time of planting. Healthy lower branches and interior small twigs should not be removed except as necessary to clear walks and roads. In no case should more than one-quarter of the branching structure be removed.
2. Pruning is required at planting time to correct defects in the tree structure, including removal of injured branches, double leaders, waterspouts, suckers, and interfering branches.
3. Each tree shall be pruned to preserve natural character of plant.
4. All injured tree and shrub roots shall be pruned to make clean cut ends before planting.
5. Main leaders of trees shall not be cut back.
6. If required, cut branches and roots with clean, sharp pruning instruments; do not break or chop. All cuts shall be clean and smooth, with the bark intact with no rough edges or tears.
7. No heavily pruned material will be accepted at any time. If the natural form is destroyed, the plant will be rejected.
8. Trees that have had roots pruned must be treated with a root stimulating hormone.
9. The trees or roots shall be pruned in accordance with generally accepted arboricultural practices.
10. The Contractor shall notify the Department of Parks and Parkways Urban Forester's office whenever trees or roots need to be pruned prior to beginning construction. All pruning is to be done under the supervision of the Department of Parks and Parkways Urban Forester.

11. Excavation of roots that need to be pruned must be done by hand or air spade within the drip line of the tree.

J. Edging

1. All edging locations shall be laid out in the field with spray paint by the Contractor and approved by the Landscape Architect prior to installation of any edging. Field mark locations for steel landscape edging as indicated on Contract Drawings.
   a. Horizontal Alignment: Install straight sections true to the alignments as indicated, free of waves or bends, using strings as guides.
2. Anchor with steel stakes spaced approximately 30 inches on-center, driven below top elevation of edging, or at every stake pocket location in landscape edging sections designed and manufactured to receive stakes. Stakes shall be located in solid undisturbed soil.
   a. Vertical Alignment: Install parallel with the finished grade.
   b. Damaged Edging: Replace edging sections damaged by construction operations.
3. In the event that a tree root of one inch diameter or greater conflicts with the installation of the edging, contact the Landscape Architect for further instruction.

K. Watering

1. Upon completion of planting operation, water plant material thoroughly or over the entire planting bed. Continue to water for the duration of the project until handed over to the Owner.
2. Outfit each tree with a twenty (20) gallon slow release watering bag.
3. Apply water slowly so as to penetrate the entire root system and at a rate which will prevent saturation of the soil.

3.8 MAINTENANCE PRIOR TO FINAL ACCEPTANCE

A. Maintenance shall begin immediately after each plant is planted. Plants shall be watered, mulched, weeded, pruned, sprayed, fertilized, cultivated, and otherwise maintained and protected until the project is handed over to the Owner at Final Acceptance, not at Substantial Completion.

B. Defective work shall be corrected as soon as possible after it becomes apparent and weather and season permit.

C. Settled plants shall be reset to proper grade and position, planting saucer restored and dead material removed.

D. Upon completion of planting, and prior to Substantial Completion, remove from site excess soil and debris and repair all damage resulting from planting operations.

E. As part of maintenance, provide protection and extermination measures against gophers, rabbits, or other rodents, and repair damage caused by their activities. The Contractor shall

notify the Owner's Representative of any insect or disease promptly in writing prior to any applications of control materials such as fungicides, insecticides or the like.

F. Replace mulch materials damaged or lost in areas of subsidence.

G. Irrigate as required.

H. Do no pruning without approval of the Landscape Architect.

3.9 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

C. After installation and before Substantial Completion remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

D. Leave site in a neat, orderly, "broom clean" condition at the end of each work day.

3.10 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

3.11 FINAL ACCEPTANCE OF WORK

A. Final Acceptance shall be the final review and completion of all punch list items. The Guarantee Period shall be one full year after the date of Final Acceptance.

B. Inspection of the work to determine its completion (Final Acceptance) will be made by the Landscape Architect upon written notice requesting such inspection submitted by the Contractor at least ten (10) days prior to anticipated date. After the inspection, the Contractor will be notified of the date that the work has been approved or of any deficiencies of the requirements for work to remedy deficiencies.

3.12 WARRANTY PERIOD AFTER FINAL ACCEPTANCE OF WORK

A. Warranty Periods from Date of Substantial Completion:
1. Trees: Twelve (12) months.
2. Shrubs: Twelve (12) months.
3. Ground Covers, Biennials, Perennials, and Other Plants: Twelve (12) months.

END OF SECTION

SODDING SECTION 02938

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Preparation of subsoil.

B. Placing river sand.

C. Fertilizing.

D. Sod installation. All areas disturbed during construction shall be sodded in accordance to these specifications.

E. Maintenance.

1.02 RELATED SECTIONS

A. Section 02900 - Landscaping

1.03 REFERENCES

A. ASPA (American Sod Producers Association) - Guideline Specifications to Sodding.

B. TFS O-F-241 - Fertilizers, Mixed, Commercial.

1.04 DEFINITIONS

A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.05 MAINTENANCE DATA

A. Submit under provisions of Section 01700.

B. Operation Data: Submit for continuing Owner maintenance.

C. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

1.06 QUALITY ASSURANCE

A. Sod: Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.

B. Submit sod certification for grass species and location of sod source.

1.07 QUALIFICATIONS

A. Sod Producer: Company specializing in sod production and harvesting with minimum five years experience, and certified by the State of Louisiana.

B. Installer: Company approved by the sod producer.

1.08 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Deliver sod on pallets in rolls. Protect exposed roots from dehydration.

C. Do not deliver more sod than can be laid within 24 hours.

1.10 COORDINATION

A. Coordinate work under this section and other related work.

1.11 MAINTENANCE SERVICE

A. Maintain sodded areas immediately after placement until grass is well established and fully rooted into the subsoil and exhibits a vigorous growing condition for two cuttings.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Sod: ASPA Approved Field grown grade; cultivated grass sod; type indicated below with strong fibrous root system, free of stones, burned or bare spots; containing no more than 5 weeds per 1000 sq ft.

1. Cynodon dactylon ‘Tifway 419’- Tifway 419 Bermuda Grass

B. Soil fill for fine grading: Pumped river sand free of sticks, roots, stones, lumps of clay, debris and other objectionable materials.

C. Fertilizer: FS O-F-241, Type I, Grade A; recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil to the following proportions: nitrogen 15 percent, phosphoric acid 5 percent, soluble potash 10 percent.

D. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass.

2.02 HARVESTING SOD

A. Machine cut sod and load on pallets in accordance with ASPA Guidelines.

2.03 TESTS

A. Testing is not required if recent tests are available for imported river sand. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this section.

3.02 PREPARATION OF SUBSOIL

A. Prepare sub-soil and eliminate uneven areas and low spots.

B. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

C. Remove foreign materials and undesirable plants and their roots. Do not bury foreign material beneath areas to be sodded.

D. Remove contaminated subsoil.

E. Scarify sub-soil to a depth of 4 inches across all areas to be sodded.

F. Repeat cultivation in areas where equipment, used for hauling and spreading river sand, has compacted subsoil.

3.03 PLACING RIVER SAND

A. Spread river sand to a minimum depth of 2 inches over area to be sodded, ensuring that no areas will be higher than adjacent paved surfaces. Notify Architect if there are grading issues created by the sand application.

B. Place river sand during dry weather and on dry unfrozen subgrade.

C. Remove vegetable matter and foreign non-organic material from river sand while spreading.

D. Grade river sand to eliminate rough, low or soft areas, and to ensure positive drainage to the drainage features on the site.

3.04 FERTILIZING

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

B. Apply after smooth raking of river sand and prior to installation of sod.

C. Apply fertilizer no more than 48 hours before laying sod.

D. Mix thoroughly into upper 2 inches of river sand.

E. Lightly water to aid the dissipation of fertilizer.

3.05 LAYING SOD

A. Moisten prepared surface immediately prior to laying sod.

B. Lay sod immediately after delivery to site to prevent deterioration.

C. Lay sod tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.

D. Lay smooth. Align with adjoining grass areas.

E. Place top elevation of sod flush with adjoining paving.

F. Water sodded areas immediately after installation. Saturate sod to 6 inches of soil.

G. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities. Roll sodded areas with roller not exceeding 200 lbs.

3.06 MAINTENANCE

A. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.

B. Neatly trim edges and hand clip where necessary.

C. Immediately remove clippings after mowing and trimming.

D. Water to prevent grass and soil from drying out, up until end of project completion when handed over to the owner.

E. Roll surface to remove minor depressions or irregularities.

F. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

G. Immediately replace sod to areas which show deterioration or bare spots.

H. Protect sodded areas with warning signs during maintenance period.

END OF SECTION

CAST-IN-PLACE CONCRETE SECTION 03300

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Scope: The work to be done under this section of the specifications includes all labor, materials, equipment, and services necessary for cast-in-place concrete including formwork, reinforcing, mix design, placement procedures, finishes, as indicated on drawings and herein specified.

1.03 CAST-IN-PLACE CONCRETE: Includes the following:

A. Foundations and footings.

B. Slabs-on-grade.

C. Columns, Girders, Beams and Elevated Slabs.

D. Foundation walls.

E. Equipment pads and bases.

1. Include all concrete pads and supports for mechanical and electrical equipment where indicated. Unless otherwise shown, these pads shall include concrete of the size required to support the equipment purchased and 500 lbs. of reinforcing steel per cubic yard of concrete.

1.04 SUBMITTALS

A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.

B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect.

C. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures. Reproductions made from contract documents will not be allowed. Submit one (1) electronic print for review and comment. The Engineer will have up to ten (10) working days from the time of receipt of the submittal to complete his review and return the submittal to the Architect. Review of shop drawings by the Architect/Engineer will be for

general compliance with contract documents. No responsibility will be assumed for correctness of dimensions, and quantities.

D. Samples of materials as requested by Architect, including names, sources, and descriptions.

E. Laboratory test reports for concrete materials and mix design test.

F. Material certificates in lieu of material laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

1.05 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1. American Concrete Institute (ACI) 301-10, "Specifications for Structural Concrete."

2. ACI 318, "Building Code Requirements for Structural Concrete," current edition.

3. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice," current edition.

B. Concrete Testing Service: The Owner will employ a testing agency to perform material evaluation tests and to review concrete mix designs for compliance with the Contract Documents.

1. The testing lab shall be in compliance with ASTM E 329 “Standard Specification for Agencies Engaged in Construction Inspection and/or Testing” and ASTM C 1077 “Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation”.

2. The testing laboratory shall submit a certificate of accreditation and the scope of accreditation that indicates compliance with the above standards.

C. Materials and installed work may require testing and retesting at any time during progress of Work. Retesting of rejected materials for installed Work shall be done at Contractor's expense.

PART 2 -PRODUCTS

2.01 FORM MATERIALS

A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces.

Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 g/l volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to the plane of the exposed concrete surface.

2.02 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615, Grade 60.

B. Steel Wire: ASTM A1064, plain, cold-drawn steel.

C. Welded Wire Fabric: ASTM A 1064, welded steel wire fabric. Flat sheets only. Rolls are not permitted.

D. Deformed-Steel Welded Wire Fabric: ASTM A1064.

E. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1).

2.03 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or II.

1. Use one brand of cement throughout Project unless otherwise acceptable to Architect.

B. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.

1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.
2. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect.

C. Lightweight Aggregates: ASTM C 330.

D. Water: ASTM C1602. Potable.

E. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

F. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

G. Water-Reducing Admixture: ASTM C 494, Type A.

H. High-Range Water-Reducing Admixture: ASTM C 494, Type approved by Architect.

I. Water-Reducing, Accelerating Admixture: ASTM C 494, Type C or E.

J. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

2.04 RELATED MATERIALS

A. Vapor Vapor Barrier: Vapor barrier shall have all of the following qualities:
   1. Maintain permeance of less than 0.01 Perms [grains/(ft2 · hr · inHg)] as tested in accordance with mandatory conditioning tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).
   2. Other performance criteria:
      a. Strength: ASTM E1745 Class A.
      b. Thickness: 15 mils minimum
   3. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745 Section 8.1
   4. Warranty: (a) compliance with the designated ASTM E1745 classification, and (b) no manufacturing defects in the product for, at least, the Life of the Building.
   5. Basis of design product shall be “Stego Wrap Vapor Barrier (15-mil)” by Stego Industries LLC. Other approved products include “Vaporguard” by Reef Industries, “PMPC” by WR Meadows.
   6. The following accessory products shall be by the approved vapor barrier product manufacturer and as required per manufacturer instructions to achieve the vapor barrier system warranty. Accessory products by manufacturers other than the approved vapor barrier manufacturer are not allowed:
      a. Seam tape

b. Penetration mastic and tape
c. Perimeter/terminated edge seal tape and bar
d. Penetration prevention products
e. Vapor barrier-safe screed system

B. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

C. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Waterproof paper.
2. Polyethylene film.
3. Polyethylene-coated burlap.

D. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.

1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g per liter.

E. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.

F. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

G. Underlayment Compound: Free-flowing, self-leveling, pumpable, cement-based compound for applications from 1 inch thick to feathered edges.

H. Bonding Agent: Polyvinyl acetate or acrylic base.

I. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.

J. Waterstops: Bentonite type, Volclay RX-101RH by CETCO, or approved equal.

2.05 PROPORTIONING AND DESIGNING MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Architect for preparing and reporting proposed mix designs. The independent testing agency shall review and approve the proposed mix design.

B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been submitted to Architect.

C. Design mixes to provide normal weight concrete or light weight concrete with the 28-day compressive strength as indicated on drawings.

D. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

1. Not more than 4 inches.

E. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.

2.06 ADMIXTURES

A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.

B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 40 deg F (10 deg C) and falling.

C. Waterproofing Admixture: Xypex Admix C-500 or Xypex Admix C-1000 as determined by curing conditions on the day of concrete placement, or an approved equal from an alternate product manufacturer. Refer to manufacturer's written instructions and specifications for admixing and placement procedures. Waterproofing admixture shall be added to concrete batches scheduled for placement at the elevator pit. Refer to drawings for locations.

2.07 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.

1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes. Ice can be added to concrete so that delivery time can remain at 1-1/2 hours.

PART 3 - EXECUTION

3.01 GENERAL

A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.02 FORMS

A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 117 and ACI 347 limits:

1. Provide Class A tolerances for concrete surfaces exposed to view.
2. Provide Class C tolerances for other concrete surfaces.

B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.

D. Formwork for Grade Beams and Pile Caps: Provide vertical formwork at the perimeter of grade beams and pile caps. Contractor shall install formwork as described here-in to ensure plumbness of cast vertical surfaces.

E. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.

F. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

G. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

H. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.03 VAPOR RETARDER/BARRIER INSTALLATION

A. Install vapor barrier in accordance ASTM E1643.

1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
2. Vapor barrier shall be neatly placed. Follow the profile of the bottom of the slab and beams, and be in intimate contact with the fill. Stop at impediments such as piles, dowels, and waterstops.
3. If arranging placement of vapor barrier perimeter/edge seals prior to placement of concrete, seal vapor barrier to scheduled wet-cast slab perimeter/edge using Manufacturer’s recommended adhesive product designed for this use, and remove dirt, debris, and mud from this adhesive product prior to concrete placement.
4. Seal vapor barrier to footing/grade beam with double sided tape, termination bar, or both.
5. Overlap joints 6 inches and seal with manufacturer’s tape.
6. Apply tape to a clean and dry vapor barrier.
7. Seal all penetrations (including pipes) per manufacturer’s instructions.
8. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
9. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all sides with tape.
10. Extend vapor barrier to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise (a) at a point acceptable to the structural engineer or (b) where obstructed by impediments, such as dowels, waterstops, or any other site condition requiring early termination of the vapor barrier. At the point of termination, seal vapor barrier to the slab itself using Stego Crete Claw Tape, per manufacturer's instructions.
11. Use reinforcing bar supports with base sections that eliminate or minimize the potential for puncture of the vapor barrier.

3.04 PLACING REINFORCEMENT

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.

1. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect.

D. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

1. Install only flat sheets. Rolls are not permitted.

F. Where not specifically detailed on the drawings, support slab top reinforcing bars with continuous #4 reinforcing bars. Slab top reinforcing bars less than 6 feet in length shall have two support bars and slab top reinforcing bars greater than 6 feet in length shall have support bars spaced at no more than 3’-0” o.c. These bars shall be equally spaced along the length of the slab top reinforcing bars.

3.05 JOINTS

A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect.

B. Provide keyways as indicated on drawings or at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.

C. Provide waterstops at all construction joints in areas indicated on the drawings.

D. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.

E. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

3.06 INSTALLING EMBEDDED ITEMS

A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.

B. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.07 PREPARING FORM SURFACES

A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.

1. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.
2. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.08 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. General: Comply with ACI 304R, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.

1. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

C. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.

D. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.

1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.

2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
3. Maintain reinforcing in proper position on chairs during concrete placement.
4. Floor Slab Tolerance: Floor finish tolerances of floor slabs shall conform to the requirements of the specified finish floor manufacturers, and in accordance with ACI 117 and ASTM E 1155 Standard Method for Determining Floor Flatness and Levelness using the F-Number System. Specified Overall Finish floor tolerances shall meet the requirements of "flat" as described in ACI 117, unless a more stringent tolerance is required by a finish floor installation. Specified overall and minimum (SO_{FL} and ML_{FL}) levelness tolerances shall apply only to level slabs-on-ground, or to level suspended slabs that are shored when tested. Refer to flooring specifications for additional concrete substrate flatness and levelness requirements.

E. Cold-Weather Placement: Comply with provisions of ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

F. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305.1 and as specified.

1. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.

3.09 FINISHING FORMED SURFACES

A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.

B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces to be exposed to view, covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections. These projections shall be completely removed and smoothed. Repair all other surface defects in accordance with Concrete Surface Repairs, as specified herein.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces.

3.10 MONOLITHIC SLAB FINISHES

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, Portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.

1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.

1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance.

D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.

E. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.12 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive old or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

B. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.

1. Provide moisture curing by the following methods:
   a. Keep concrete surface continuously wet by covering with water.

   b. Use continuous water-fog spray.

   c. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.

2. Provide moisture-retaining cover curing as follows:
   a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and Curb as follows:
   a. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

   b. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

C. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

D. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.

1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.13 REMOVING FORMS

A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

C. Comply with ACI 301-10, Chapter 2, Article 2.3.3 – Reshoring and Backshoring.

3.14 REUSING FORMS

A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable. Apply new form-coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable.

3.15 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.

B. Mix dry-pack mortar, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.

1. Cut out honeycombs, rock pockets, voids, and holes left by tie rods and bolts down to Solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
2. For surfaces exposed to view, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.

1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. General: The Owner will employ a testing agency to perform tests and to submit test reports.

B. Sampling and testing for quality control during concrete placement shall include the following, as directed by Architect.

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
2. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
3. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
5. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
6. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
7. Field testing the concrete density by ASTM C138.

C. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.

D. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, slump, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

F. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION

CONCRETE FLOORS - SEALED SECTION 03350

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Where indicated "Sealed", provide clear epoxy sealer on exposed concrete floors.

B. Prepare concrete floors, including shotblasting as required to receive new sealer.

1.02 SUBMITTALS

A. Product Data: Comply with Section 01300.

B. Manufacturers Application Instructions: Submit descriptive data and specific recommendations for mixing, application and curing including any precautions of special handling instructions required.

1.03 QUALITY ASSURANCE

A. Materials used in the floor surfacing shall be the products of a single manufacturer.

B. Installation shall be performed by an applicator with minimum 3 years experience in work of similar nature and scope. Installer must be approved by the manufacturer of the floor surfacing materials.

C. Mock-up: Prior to starting application of sealer, provide full scale mock-up to establish acceptable quality, durability, slip resistance and appearance. Mock-up area must not be less than 100 square feet.
   1. Acceptable mock-up to be standard of quality for remaining work.
   2. Accepted work may remain in place. Unacceptable work to be removed and replaced until acceptable

PART 2 - PRODUCTS

2.01 CONCRETE

A. For concrete materials see Division 3 Section - Concrete Work.

2.02 SEALER

A. Sealer: Two component epoxy sealer, 100% solids by volume, self-leveling, to provide a high strength, dustproofing, water resistant sealed surface recommended for high traffic use. Primer shall be low-viscosity high build 100% solid epoxy primer to penetrate the concrete substrate.

   1. Armoseal by SW or equal by Master Builders and Neogard.
   2. Color: Clear amber, semi-gloss finish
   3. Reduction of water absorption into concrete: 91%.

PART 3 - EXECUTION

3.01 APPLICATION OF SEALER

A. Remove surface elements including curing compound, oil, grease, etc by scrubbing with an industrial grade detergent or a degreasing compound to neutralize substrate and mechanical blast to etch the surface in strict accordance with sealer manufacturers printed instructions. Remove any weak, contaminated or deteriorated concrete by shotblasting or other suitable mechanical means. Follow mechanical cleaning with vacuum cleaning. Check for removal of acid with moist pH paper. Reading shall be greater than 10

B. Apply primer and finish coats of millage recommended by the manufacturer, but not less than total 18 dry mils.

1. One Coat ArmorSeal 33 Epoxy Sealer/Primer – 8 dry mil thickness
2. One coat ArmorSeal 650 SL/RC (low VOC) Finish – 10 dry mil thickness
3. Dynamic Coefficient of Friction >.42 DCOF Rating or Greater (Wet) Per ANSI A137.1- add grit if required to achieve this coefficient of friction

END OF SECTION

MORTAR SECTION 04100

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Mortar for masonry. Colored mortar at all exterior exposed brick masonry.

B. Grout for reinforced masonry, bond beams, lintels, etc.

1.02 RELATED SECTIONS

A. Section 04200 - Unit Masonry: Installation of mortar and grout.

B. Section 08112 - Steel Frames: Grouting steel door frames.

1.03 REFERENCES

A. ASTM C5 - Quicklime for Structural Purposes.

B. ASTM C144 - Aggregate for Masonry Mortar.

C. ASTM C150 - Portland Cement.

D. ASTM C207 - Hydrated Lime for Masonry Purposes.

E. ASTM C270 - Mortar for Unit Masonry.

F. ASTM C404 - Aggregates for Masonry Grout.

G. ASTM C476 - Grout for Masonry.

H. ASTM C780 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.

I. ASTM C1019 - Method of Sampling and Testing Grout.

J. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Include design mix, indicate method used, required environmental conditions, and admixture limitations.

C. Mix Design: Independent testing laboratory, hired by the Contractor shall provide mix design. Mix design shall include certified test results that portland cement will be “low alkali” as specified herein.

D. Certificates: Submit certificates attesting to compliance with appilicable specifications for grades, types, classes, etc. reports on mortar indicating conformance to ASTM C270.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store protect and handle products to site under provisions of Section 01600.

B. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Portland Cement: ASTM C150, Type I, except Type III may be used in cold weather.

1. Provide white cement if required to produce required mortar color.

B. Mortar Aggregate: ASTM C144, standard masonry type.

C. Hydrated Lime: ASTM C207, Type S.

D. Quicklime: ASTM C5, non-hydraulic type.

E. Water: Clean and potable.

F. Grout Aggregate: ASTM C404.

2.02. MORTAR MIXES

A. Colored Mortar: Produce mortar, ASTM C270 Type S utilizing the Proportion Method to achieve 1800 psi strength of color required by use of colored aggregates in combination with selected cementitious materials at al exterior brick.

1. Mix to color selected by the Architect and approved in the job mock-up.

2. Approved: Rainbow Series colors by Holcim, Inc. or Blue Circle Magnolia Colors.

2.02 MORTAR MIXING

A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270 and written instructions of the manufacturer of prepackaged cement/lime mix.

B. Do not use anti-freeze compounds to lower the freezing point of mortar.

C. If water is lost by evaporation, re-temper only within two hours of mixing.

D. Use mortar within two hours after mixing at temperatures of 80 degrees F, or two-and-one-half hours at temperatures under 50 degrees F.

2.03 MORTAR MIX TESTS

A. Test mortar in accordance with Sections 01410 and 04200.

B. Testing of Mortar Mix: In accordance with ASTM C780 for compressive strength, consistency, mortar aggregate ratio, and water content and slump.

2.04 GROUT MIXES

A. Bond Beams and Lintels: 4000 psi strength at 28 days; 7-8 inches slump; mixed in accordance with ASTM C476 Course grout.

2.05 GROUT MIXING

A. Thoroughly mix ingredients in quantities needed for immediate use in accordance with ASTM C476 and of consistency (fine or coarse) at time of placement which will completely fill all spaces to receive grout.

1. Use fine grout in grout spaces less than 2" in horizontal direction, unless otherwise indicated.

2. Use coarse grout in grout spaces 2" or more in least horizontal dimension, unless otherwise indicated.

B. Add admixtures in accordance with manufacturer's instructions. Provide uniformity of mix.

C. Do not use anti-freeze compounds to lower the freezing point of grout.

2.06 GROUT MIX TESTS

A. Test grout in accordance with Section 01410.

B. Testing of Grout Mix: In accordance with ASTM C1019.

C. Test mortar mix for compressive strength and slump.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install mortar in accordance with ASTM C780 and to the requirements of the specific masonry section.

B. Brace masonry for wet grout pressure.

C. Work grout into masonry cores and cavities to eliminate voids.

D. Do not displace reinforcement while placing grout.

E. Remove grout spaces of excess mortar.

END OF SECTION

UNIT MASONRY SECTION 04200

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Face Brick.

B. Reinforcement, anchorage, and accessories. Cavity drainage mesh in cavity at weep hole levels

C. See drawings for bonding/coursing

1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Section 05500 - Metal Fabrications: Placement of loose steel lintels.

B. Section 08410 - Aluminum glazed Systems: Placement of window anchors.

1.03 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Division 3 - Concrete Formwork: Dove-tail anchors and sheetmetal reglets (for membrane flashing) to be cast in concrete.

1.04 RELATED SECTIONS

A. Section 04100 - Mortar: Mortar and grouts.

B. Section 05400 - Cold Formed Metal Framing: Exterior wall studs.

C. Section 05500 - Metal Fabrication: Loose steel lintels.

D. Section 07900 - Joint Sealers: Rod and sealant at control and expansion joints.

E. Section 09260 - Gypsum Board Systems: Sheathing at exterior walls.

1.05 REFERENCES

A. ANSI/ASTM C55 - Concrete Building Brick.

B. ANSI/ASTM A82 - Cold-Drawn Steel Wire for Concrete Reinforcement.

C. ANSI/ASTM C216 - Facing Brick (Solid Masonry Units Made From Clay or Shale).

D. ASTM C90 - Hollow - Load Bearing Concrete Masonry Units.

E. ASTM C145 - Solid Load Bearing Concrete Masonry Units.

F. ASTM C129 - Non-Load Bearing Concrete Masonry Units.

G. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

H. UL - Underwriters' Laboratories.

1.06 SUBMITTALS

A. Submit product data provisions of Section 01300.

B. Submit product data for each type of masonry unit and fabricated wire reinforcement, and ties.

C. Submit drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades.

1. Provide setting drawings, templates and directions for the installation of dove tail slots and other anchorages installed as a unit of work under other sections.
2. Shop drawings for stone trim in form of cutting and setting drawings showing sizes, profiles, and locations of each stone trim unit required.
3. Shop drawings for reinforcing detailing fabrication, bending, and placement of unit masonry reinforcing bars. Comply with ACI 315 "Details and Detailing of Concrete Reinforcing" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of masonry reinforcement.

D. Submit samples under provisions of Section 01300.

E. Submit four (4) samples of face brick units to illustrate color, texture and extremes of color range.

1. Include size variation data verifying that actual range of sizes for brick falls within ASTM C 216 dimension tolerances for brick where modular dimensioning is indicated.

1.07 QUALIFICATIONS

A. Installer: Company specializing in performing the work of this Section with minimum 5 years documented experience.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products to site under provisions of Section 01600.

B. Deliver masonry materials to project in undamaged condition.

C. Store and handle masonry units off the ground, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not place until units are in an air-dried condition.

D. Store cementitious materials off the ground, under cover and in a dry location.

E. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

F. Store masonry accessories including metal items to prevent corrosion and accumulation of dirt and oil.

1.09 PROJECT CONDITIONS

A. Protection of Masonry: During erection, cover top of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that come in contact with such masonry

1. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes from mortar droppings.

D. Cold-Weather Construction: Comply with referenced unit masonry standard for cold-weather construction and the following:

1. Do not lay masonry units that are wet or frozen.
2. Remove masonry damaged by freezing conditions.

E. Hot-Weather Construction: Comply with referenced unit masonry standard.

1.10 SEQUENCING AND SCHEDULING

A. Coordinate the masonry work with installation of window anchors and other embedded items.

1.11 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. Single Source Responsibility: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces. Also obtain all mortar materials from a single source.

C. Job Mock-Up: Prior to installation of masonry work, erect sample wall panel mock-up using 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 indicating the proposed range of color, texture and workmanship to be expected in the completed work. Obtain 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 wntil work is completed. Provide mock-up panel for face brick construction.

1. Size: 4' x 4' of wall area selected by the Architect to include brick and decorative concrete block incorporating stone elements.
2. 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 face brick construction.

D. Construct masonry in strict accordance with ACI 531.1, "Specification for Concrete Masonry Construction" unless otherwise indicated.

PART 2 - PRODUCTS

2.01 BRICK UNITS

A. Face Brick: ANSI/ASTM C216, Type FBX, Grade SW,

1. Size: Modular (3-5/8" thick by 2-1/4" high by 7-5/8" long.)
2. Approved : “Velour”, Color: “Village” by Acme Brick Co. or equal

B. Special Bricks: For sills, caps, and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncored or unfrogged units with similar texture on all exposed sides.

C. Provide special molded shapes where indicated and for application requiring brick of form, size and finish on exposed surfaces which cannot be produced from standard brick sizes by sawing.

2.02 REINFORCEMENT AND ANCHORAGE

A. Adjustable Masonry Veneer Anchors (General): Provide two-piece assemblies allowing vertical or horizontal differential movement between wall and framework parallel to plane of wall, but resisting tension and compression forces perpendicular to it.

1. Structural Performance Characteristics at Metal Studs: Capable of withstanding a 100 lbf load in either tension or compression without deforming over, or developing play in excess of 0.05 inch.

B. Screw-Attached Masonry Veneer Anchors (Studs): Units consisting of 3/16" diameter triangular wire tie section and metal anchor section, hot dip galvanized after fabrication, complying with the following requirements:

1. Anchor Section: Sheet metal plate, with screw holes top and bottom and with raised, rib-stiffened strap stamped into center to provide slot between strap and plate for connection of wire tie; of overall size indicated below equal to DW-10 HS by Holman and Bernard, and AA401S by AA Wire Co.
2. Size: 6 inches by 1-1/4 inches wide plate, 3-5/8 inch by 5/8 inch strap, both sides of plate stiffened in ribs, slot clearance formed between face of plate and back of strap at maximum rib protection of 1/32 inch plus diameter of wire tie.
3. Fasteners shall be hot dip galvanized, minimum two (2) per anchor.

C. Flexible Metal Anchors: Where masonry is shown or specified to be anchored to structural framework, provide 2-piece anchors which will permit horizontal and vertical movement of masonry but will provide lateral restraint.

1. For anchorage to steel framework, provide 2-piece anchor with 16 gauge galvanized channel slot or 3/8" bar stock flanges for welding to steel and vee-shaped 3/16" wire tie section sized to extend 2" into bed joints of masonry veneer.
2. For anchorage to concrete or precast concrete framework, provide manufacturer's standard anchors with dovetail anchor section and triangular-shaped wire tie section sized to extend within 1" of masonry face.

J. Finish: Hot-dip galvanized after fabrication to comply with ASTM A153, Class B2 (minimum 1.50 oz. of zinc per square foot).

1. Provide above for all reinforcement, ties and anchors at exterior wall construction except mill galvanized at interior partitions not in conjunction with exterior walls.

K. Manufacturers: Subject to compliance with requirements, provide products of one of the following:

1. AA Wire Products Co.
2. Dur-O-Wall, Inc.
3. Heckman Building Products, Inc.
4. Hohmann & Barnard, Inc.
5. National Wire Products Corp.

2.04 THROUGH-WALL FLASHING

A. Stainless steel/ Fabric Flashing: .003 inch thick Type 304 stainless steel sheet factory bonded to a layer of high tensile strength, puncture resistant polymeric fabric for self-adhering membrane with release liner, equal to "Mighty-Flash–SA” by Hohmann & Barnard, Inc.

B. Primer For Flashing: Type recommended by flashing manufacturer for application and substrates

indicated

2.05 ACCESSORIES

A. Non-Metallic Expansion Joint Strips: Premolded, flexible cellular neoprene rubber filler strips complying with ASTM D 1056, Grade RE41E1, capable of compression up to 50%, of width and thickness indicated.

D. Weep Holes: Full head joints.

E. Cleaning Solutions: Non-acidic, not harmful to masonry work or adjacent materials. Special care shall be taken to keep white concrete masonry units from turning a color as a result of washing solutions applied to adjacent brick surfaces; products shall be equal to products manufactured by ProSoCo, Inc.

F. Cavity Drainage Material: reticulated, non-absorbant mesh, made from polyethylene strands and shaped (dovetail shape) to maintain drainage at cavity and weep holes without being clogged with mortar droppings equal to "Mortar Net' by Hohman & Barnard/Mortar Net USA. Provide thickness to fill the cavity

PART 3 - EXECUTION

3.01 EXAMINATION

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

B. Verify items provided by other Sections of work are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

D. Beginning of installation means installer accepts existing conditions.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied to other Sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Lay brick units in bond indicated on the drawings. Course three brick units and three mortar joints to equal 8 inches. Form concave mortar joints.

3.04 PLACING AND BONDING

A. Blending of Face Brick: After bricks are delivered to designated areas, the band on each of four cubes should be broken and the brick from all four cubes shall be used at the same time.

B. Wetting Clay Brick: Wet brick made from clay or shale which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting methods which insure each clay masonry unit being nearly saturated but surface dry when laid.

C. Do not wet concrete masonry units.

D. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

E. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

F. Remove excess mortar as Work progresses.

G. Interlock intersections and external corners except on stack bond.

H. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

I. Perform jobsite cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

J. Isolate top joint of masonry partitions from horizontal structural shelf angles compressible joint filler, backing rod and caulking.

K. Stopping and Resuming Work: Rack back 1/2-unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.

N. Built-In Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.

1. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.

3.05 WEEPS AND VENTS

A. Install weep holes in veneer at maximum 24 inches on center horizontally above through-wall flashing and at bottom of walls.

3.06 CAVITY WALL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep holes.

1. Note: Mortar spread as a bed joint shall be beveled or sloped away from the cavity space to eliminate mortar droppings in the cavity. Weep holes and cavity must be kept free of debris and mortar to allow moisture to exit the wall system.

B. Place drainage mesh in the bottom of the cavity and all locations that have through wal flashing. Also, place mesh in weep holes.

3.07 REINFORCEMENT AND ANCHORAGES - GENERAL

A. General: Provide anchor devices of type indicated.

B. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

1. Provide an open space approximately 1/2 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and caulk with approved butyl sealant and backer rod per Section 07900.
2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure or embedded in structure.
3. Space anchors as indicated, but not more than 16" o.c. vertically and 16" o.c. horizontally.

C. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, pipe enclosures and other special conditions.

3.08 MASONRY FLASHINGS

A. Prepare masonry surfaces so that they are smooth and free from projections that could puncture flashing. Place through-wall flashing on sloping bed of mortar and cover with mortar. Install flashing manufacturer's recommended primer. Seal penetrations in flashing with adhesive/sealant/tape as recommended by flashing manufacturer before covering with mortar.

B. Provide concealed flashing in masonry work at, or above, shelf angles, lintels, ledges and other obstructions to the downward flow of water in the wall so as to divert such water to the exterior. Prepare masonry surfaces smooth and free from projections which could puncture flashing. Place through-wall flashing in a bed of mastic and cover with mortar. Seal penetrations in flashing with mastic before covering with mortar. Extend flashings through exterior face of masonry and cut off flush with face of brick after completion of work.

C. Extend flashing the full length of lintels and shelf angles and minimum of 4" into masonry each end. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4", at inner wythe and seal termination. At heads and sills turn up ends not less than 4" to form a continuous pan. Where inner wythe is interrupted by structural column, attach flashing to column face with mastic, cap with stainless steel termination bar and seal with sealant.

D. Lap end joints minimum 6 inches and roll fro good seal and no fishmouths.

E. Install flashing manufacturer's recommended primer

3.09 EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control and expansion joints.

B. Install preformed control joint filler in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

C. Size control joint in accordance with Section 07900 for sealant performance.

D. Form expansion joints as detailed.

E. Joint Spacing: If location of joints is not shown, place vertical joints spaced not to exceed 30'-0" o.c. Locate joints at point of natural weakness in the masonry work.

3.10 BUILT-IN WORK

A. As work progresses, build in metal door and glazed frames window frames and other items furnished by other Sections.

B. Build in items plumb and level.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

D. Do not build in organic materials subject to deterioration.

3.11 TOLERANCES

A. Maximum Variation From Unit to Adjacent Unit: 1/32 inch.

B. Maximum Variation From Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.

C. Maximum Variation From Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

D. Maximum Variation From Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet; 1/2 inch in 30 feet.

E. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

F. Maximum Variation From Cross Sectional Thickness of Walls: 1/4 inch.

3.12 CUTTING AND FITTING

A. Obtain Architect approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.13 CLEANING

A. Clean work under provisions of Section 01700.

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

C. Remove excess mortar and mortar smears.

D. Replace defective mortar. Match adjacent work.

E. Clean soiled surfaces with cleaning solution.

F. Use non-metallic tools in cleaning operations.

END OF SECTION

STRUCTURAL STEEL SECTION 05120

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Scope: This Section includes fabrication and erection of structural steel work, as shown on drawings including schedules, notes, and details showing size and location of members, typical connections, and types of steel required.

B. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" current edition, and as otherwise shown on drawings.

C. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.

1.03 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.

2. High-strength bolts (each type), including nuts and washers.

3. Structural steel primer paint.

4. Shrinkage-resistant grout.

C. Shop drawings, including complete details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.

1. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols and show size, length, and type of each weld.

2. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.

3. See Section Submittals for shop drawings requirements. Reproductions made from contract drawings will not be accepted. Submit one (1) electronic print for review and comment. The Engineer will have up to ten (10) working days from the time of receipt of the submittal to complete his review and return the submittal to the Architect. Review of shop drawings by the Architect/Engineer will be for general compliance with contract documents. No responsibility will be assumed for correctness of dimensions, quantities or details.

4. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.

5. All shop drawings used in the field must bear the Architect/Engineer shop drawings review stamp with "No Exceptions Taken" indicated.

6. For connections not scheduled or detailed include stamped calculations and shop drawings prepared under supervision of a Louisiana-licensed Structural Engineer.

D. Mill Test Reports: Submit manufacturer's certified test reports to the testing laboratory and architect showing chemical analysis and results of tensile and bending tests. Tests shall meet the requirements of ASTM A6/A6M.

E. Test reports conducted on shop and field-bolted and welded connections. Include data on type(s) of tests conducted and test results.

F. AISC certification documentation for fabricators and erectors.

1.04 QUALITY ASSURANCE

A. Standard Specifications: Except as modified or supplemented by these specifications, materials, design, fabrication, and erection of Structural Steel shall be in accordance with the American Institute of Steel Construction's "Specifications for Structural Steel for Buildings, Allowable Stress Design and Plastic Design", June 22, 2010, and the A.I.S.C. "Code of Standard Practice for Steel Buildings and Bridges", April 14, 2010. A.I.S.C. Steel Construction Manual, Fourteenth Edition.

B. Codes and Standards: Comply with provisions of following, except as otherwise indicated:

1. American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges."

   a. Paragraph 4.2.1 of the above code is hereby modified by deletion of the following sentence:
   "This approval constitutes the Owner's acceptance of all responsibility for the design adequacy of any detail configuration of connections developed by the fabricator as a part of his preparation of these shop drawings."

2. AISC "Specifications for Structural Steel Buildings," including "Commentary."

3. "Specifications for Structural Joints using ASTM F 3125 Bolts" approved by the Research Council on Structural Connections.

4. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel."

5. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."

C. Qualifications for Welding Work: Qualify welding procedures and welding operators in accordance with AWS "Qualification" requirements.

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.

2. If recertification of welders is required, retesting will be Contractor's responsibility.

D. Fabricators and Erectors shall be AISC certified.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site at such intervals to ensure uninterrupted progress of work.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not to delay work.

C. Store materials to permit easy access for inspection and identification. Keep steel members off-ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. If bolts and nuts become dry or rusty, clean and relubricate before use.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Metal Surfaces, General: For fabrication of work that will be exposed to view, use only materials that are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating, and applying surface finishes.

B. Structural Steel.
1. Shapes, except for channels, angles and plate: ASTM A992 Grade 50.
2. Channels, angles and plate: ASTM A 36.

C. Cold-Formed Steel Tubing: ASTM A 500, Grade B, min. fy = 46 ksi.

D. Steel Pipe: ASTM A 53, Type E or S, Grade B; or ASTM A 501, min. fy = 35 ksi.

E. Anchor Bolts: ASTM F 1554, non-headed type unless otherwise indicated.

F. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts.

1. Provide hexagonal heads and nuts for all connections.

G. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows.

1. Quenched and tempered medium-carbon steel bolts, nuts, and washers, complying with ASTM F 3125.

2. Where indicated as galvanized, provide units that are zinc coated, either mechanically deposited complying with ASTM B 695, Class 50, or hot-dip galvanized complying with ASTM A 153.

H. Electrodes for Welding: Comply with AWS Code.

1. Welding electrodes for manual shielded metal-arc welding shall conform to AWS A5.1 or A5.5 E70XXX welding electrodes and flux used in submerged arc process shall conform to AWS A5.17 F7X-EXXX. Use low hydrogen electrodes for A572 steel.

I. Headed Concrete Anchors (H.C.A.): To meet or exceed AWS specification D1.1.

J. Deformed Bar Anchor (D.B.A.): Manufacture red in accordance with ASTM A 496.

K. Structural Steel Primer Paint: Rust-inhibitive conforming to Fed. Spec. SSPC 15 and be compatible with finish paint systems.

L. Cement Grout: Portland cement (ASTM C 150, Type I or Type III) and clean, uniformly graded, natural sand (ASTM C 404, Size No. 2). Mix at a ratio of 1.0 part cement to 2.0 parts sand, by volume, with minimum water required for placement and hydration.

M. Nonmetallic Shrinkage-Resistant Grout: Premixed, nonmetallic, non-corrosive, non-staining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with CE-CRD-C621.

2.02 FABRICATION

A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.

1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.

2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

B. Connections: Weld or bolt shop connections, as indicated.

1. Bolt field connections, except where welded connections or other connections are indicated.

C. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

D. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on final shop drawings.

1. Provide threaded nuts welded to framing and other specialty items as indicated to receive other work.

2. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.03 SHOP PAINTING

A. General: Shop-paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel that is partially exposed on exposed portions and initial 2 inches of embedded areas only.

1. Do not paint surfaces to be welded or high-strength bolted with friction-type connections.
2. Do not paint surfaces scheduled to receive sprayed-on fireproofing.
3. Apply 2 coats of paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

B. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils. Use painting methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.04 GALVANIZING

A. Items shown on the plans to be galvanized and bolts for same shall be hot dip zinc coated after fabrications. Galvanizing shall be done in accordance with A.S.T.M. Serial Designation A123 and A153. Any zinc coating that is damaged shall be touched up with Galvacon as manufactured by Southern Coatings in accordance with the manufacturer’s recommendations.

2.05 SOURCE QUALITY CONTROL

A. General: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

1. Promptly remove and replace materials or fabricated components that do not comply.

B. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.

1. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.

PART 3 - EXECUTION

3.01 ERECTION

A. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary Members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

B. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

C. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

1. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
3. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
4. For proprietary grout materials, comply with manufacturer's instructions.

D. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure within specified AISC tolerances.
2. Splice members only where indicated and accepted on shop drawings.

E. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds, and grind smooth at exposed surfaces.

1. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
2. Do not enlarge unfair holes in members by burning or by using drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

F. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.

G. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.

1. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

3.02 QUALITY CONTROL

A. The Owner will engage an independent testing and inspection agency to inspect high-strength bolted welded connections and to perform tests and prepare test reports.

1. The testing lab shall be in compliance with ASTM A 880 “Practice for Criteria for Use in Evaluation of Testing Laboratories and Organizations for Examination and Inspection of Steel, Stainless Steel, and Related Alloys”.
   a. The testing laboratory shall submit a certificate of accreditation, including the scope of accreditation that indicates compliance with the above standards.
   b. Visual inspection of welds shall be performed by an AWS Certified Welding Inspector (AWS-QC-1).
   c. The inspection of welds shall be overseen by an AWS Certified Welding Inspector.
2. Testing agency shall conduct and interpret tests, state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.
3. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.
4. Testing agency may inspect structural steel at plant before shipment.

B. Correct deficiencies in structural steel work that inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as necessary to reconfirm any noncompliance of original work and to show compliance of corrected work.

C. Shop-Bolted Connections: Inspect or test in accordance with AISC specifications. Verify that gaps of installed Direct Tension Indicators are less than gaps specified in ASTM F 959, Table 2.

D. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
2. Perform visual inspection of all welds.
3. Perform tests on 20% of all full-pen welds as follows: Ultrasonic Inspection: ASTM E 164.

E. Field-Bolted Connections: Inspect in accordance with AISC specifications.

F. Field Welding: Inspect and test during erection of structural steel as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
2. Perform visual inspection of all welds.
3. Perform tests of all (100%) full-pen welds as follows: Ultrasonic Inspection: ASTM E 164.

G. Testing and Inspection of Headed Concrete Anchors (H.C.A.): The testing lab shall conduct tests and inspections in accordance with AWS D1.1, latest edition, Chapter 7 “Stud Welding”.

END OF SECTION

STEEL JOISTS SECTION 05210

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes: All steel joist work as shown on the drawings.

1.03 QUALITY ASSURANCE

A. Standard Specifications: Except as modified or supplemented herein, materials, designs, fabrication, painting and erection of all steel joists and bridging for same shall be in accordance with the latest edition of the following publications of the Steel Joist Institute, as applicable:

1. Standard Specifications for Open Web Steel Joists, K-Series, latest edition.
2. Standard Specifications for Long Span Steel LH-Series and Deep Long Span Steel Joists, DLH-Series, latest edition.
3. Standard Specifications for Joist Girders, latest edition.
4. Code of Standard Practice for Steel Joists and Girders, latest edition.

B. Welders: All welders for field welds shall be approved by an independent Testing Laboratory in accordance with American Welding Society standards and qualified for the type of welding which they will perform.

1.04 SUBMITTALS

A. Manufacturer's Data: For information only, submit 2 copies of manufacturer's specifications and installation instructions for each type of joist, joist girder and its accessories. Include manufacturer's certification that joists comply with "Standard Specifications".

B. Shop Drawings: Submit detailed drawings showing layout and erection of joists, special connections, jointing and accessories. Include the mark, number, size and properties, panel point locations, type, locations and spacing of joists and bridging. See Section - Submittals for shop drawing requirements. Reproductions made from contract drawings will not be acceptable. Submit one (1) electronic print for review and comment. Refer to Division 1 requirements. The Engineer will have up to ten (10) working days from the time of receipt of the submittal to complete his review and return the submittal to the Architect.

C. Design Computations: Furnish design computations bearing the seal and signature of a Civil Engineer with State of Louisiana registration. Refer to Division 1 requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURE

A. See Article "Standard Specifications" preceding. Manufacturer of steel joists must be a member of the Steel Joist Institute or must be approved by the Architect prior to receipt of bids.

2.02 MATERIALS

A. GENERAL

1. Comply with "Standard Specifications".
2. Joist and bridging design must meet the uplift requirements required by the drawings.

PART 3 - EXECUTION

3.01 GENERAL

A. Comply with "Standard Specifications".

3.02 FIELD CONNECTIONS

A. All field connections of steel to steel, including bridging, shall be welded.

B. The Owner’s independent Testing Laboratory shall visually inspect all connections in field to determine quality, size, and compliance with reviewed erection drawings. Where the quality of a weld is in question, the Architect will be advised. Thep Contractor may then be required to remove and reweld the connection or if the Contractor desires he may have the weld inspected further by radiography. The cost of this radiography inspection will be borne by the Contractor whether or not the weld is acceptable.

3.03 FIELD PAINTING

A. After erection, all field connections, welds, and abraded places shall be touched-up with same paints as shop coat. Refer to Section - Painting, for additional field coats of paint.

END OF SECTION

STEEL DECKING SECTION 05300

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

A. All steel decking as shown on the drawings.

B. Standing Seam Metal Roofing, if required by the drawings, is specified in Division 7.

1.03 QUALITY ASSURANCE

A. Standard Specifications: Except as modified or supplemented herein, the decking shall be designed in accordance with the latest edition of AISI "Specifications for the Design of Cold-Formed Steel Structural Members and all applicable requirements contained in "Design Manual for Composite Decks, Form Decks and Roof Decks" of the Steel Deck Institute, Inc.

B. Testing – Owner’s independent testing laboratory will witness all welded connections.

1.04 SUBMITTALS

A. Manufacturer's Data: For information only, submit 2 copies of manufacturer's specifications and installation instructions for each type of decking and accessories. Include manufacturer's certifications as may be required to show compliance with these specifications.

1. For deck fastening systems, submit ICC (International Code Council) evaluation reports.

B. Shop Drawings: Submit detailed drawings showing layout and types of deck panels, anchorage details, and conditions requiring closure panels, supplementary framing, cut openings, special jointing or other accessories. Submit one (1) electronic print for review and comment. Refer to Division 1 requirements.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Deck, Dimensions and Properties: Dimensions and properties of the various types of deck are shown on the drawings. Deck configurations shall be similar to that of the decks called for on the drawings. Allowable stresses shall be equal to that of the deck specified on the drawings.

B. Deck Coating: Galvanized, ASTM A653, G90.

C. Miscellaneous Steel Shapes: ASTM A36.

D. Sheet Metal Accessories: ASTM A 526, commercial quality, galvanized.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Deck sheets shall be erected and welded to supports in accordance with the manufacturer's specifications and erection layouts and as required to resist the uplift loads, if any, noted on the drawings.

B. Side joints must be fastened together in accordance with manufacturer's specifications. Cutting openings through the deck less than 16 square feet in area, and all skew cutting shall be performed in the field. Deck shall be continuous over three (3) or more spans.

C. Except where other permanent type edge closures are shown on the drawings, provide sheet metal edge closures around the perimeter of all steel deck areas, including openings, where concrete is to be applied to the deck. Deck closures shall be of proper gage and configuration to retain the wet concrete.

3.02 TOUCH-UP

A. All damaged coating, including welds, shall be touched up with an approved coating before placing fill.

END OF SECTION

COLD FORMED METAL FRAMING SECTION 05400

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Cold formed metal exterior wind loaded galvanized wall stud framing, framing of openings and framing for soffits.

B. Interior cold formed metal wall stud framing heavier than 20 gauge, prime painted finish, gauge on drawings; loading of 5 psf with L/360 deflection limit.

C. Framing accessories. See drawings for deflection tracks and horizontal bridging. All horizontal bridging shall be mechanical attached to the studs

1.02 RELATED SECTIONS

A. Section 05500 - Metal Fabrications: Metal fabrications attached to stud framing.

B. Section 06100 - Carpentry: Rough wood blocking within and attached to stud framing.

C. Section 09260 – Interior metal framing for drywall

1.03 REFERENCES

A. AISI S100–North American - Specifications for the Design of Cold-Formed Steel Structural Members.

B. ASTM A653 - Steel Sheet, Zinc- Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.

C. ASTM A1003 - Steel Sheet, Carbon, Metallic and Nonmetallic Coated by the Hot-Dip Process.

D. ASTM A90 – Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings

E. ASTM C955 –Standard Specification for Cold-Formed Steel Structural Framing Members

F. ASTM E330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

G. SFIA – Steel Framing Industry Association

H. AWS D1.3 Structural Welding Code-Sheet Steel.

I. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.

J. North American Standard for Cold-Formed Steel Framing – General Provisions.

1.04 SYSTEM DESCRIPTION

A. Metal stud framing system with exterior sheathing specified in Section 09260, waterproof membrane applied to sheathing specified in Section 07130.

1. Studs: C-shape galvanized steel with depth and gauge indicated on the Drawings, unless heavier gauge required for specified performance, but in no case less than 16 gauge at 16 ″ o.c. and heavier as indicated on the drawings

1.05 PERFORMANCE

A. Calculate structural properties of framing members in accordance with AISI S100 "Specification for the Design of Cold-Formed Steel Structural Members".

1. Design structural elements under by a Professional Structural Engineer experienced in design of structural building framing members, currently licensed in State of Louisiana.

B. Design and size components, connections, bracing, etc. to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as required by and calculated in accordance with the International Building Code 2021 and Supplements (Orleans Parish) and ASCE 7-latest edition, based on wind pressures indicated on the S-series drawings,, and corners as required by the codes; also withstand all dead loads of attached/bearing construction.

1. Minimum gauge of 16 gauge or heavier as required by specified loads, maximum stud spacing is 16″ o.c.

C. Maximum Allowable Deflection: L/600 at masonry and L/360 at plaster.

D. System shall provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.

E. System shall accommodate construction tolerances, deflection of building structural members, and clearances of intended openings in accordance with AISI Publication “Specifications for Design of Cold-Formed Steel Structural Members”.

1.06 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Provide shop drawings prepared by cold-formed metal framing manufacturer. Indicate prefabricated work, component details, stud layout, framed openings, anchorage to structure, type and location of fasteners, and accessories or items required of other related work.

C. Describe method for securing studs to tracks, and for blocking and reinforcement to framing connections.

D. Provide calculations for loadings and stresses of walls, specially fabricated framing, under a Professional Structural Engineer's seal.

E. Product Data: Provide data describing standard framing member materials and finish, product criteria, load charts and limitations.

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.07 QUALIFICATIONS

A. Installer: Company specializing in performing the work of this section with minimum three years documented experience.

1. Manufacturer Qualifications: Member in good standing of the Steel Framing Industry Association (SFIA) or be a part of a similar organization that provides verifiable code compliance program.
2. Products to be certified under an independent third party inspection program administered by an agency accredited by IAS to ICC-ES AC98 IAS Accreditation Criteria for Inspection Agencies

1.08 COORDINATION

A. Coordinate with the placement of components within the stud framing system.

1.09 QUALITY ASSURANCE

A. Welding: Use qualified welders and comply with American Welding Society (AWS) D1.3, "Structural Welding Code - Sheet Steel".

B. Pre-Installation Conference: Prior to start of installation of metal framing systems, meet at project site with installers of other work including door and window frames and mechanical and electrical work. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work.

1. Product Tests: Mill certificates or data from a qualified independent testing agency[**,** or in-house testing with calibrated test equipment,] indicating steel sheet complies with requirements, including base-steel thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

2. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Steel Framing Industry Association (SFIA), or be a part of a similar organization that provides verifiable code compliance program.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Protect and store cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling as required in AISI's "Code of Standard Practice".

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. ClarkDietrich Building Systems or equal member in good standing of the Steel Framing Industry Association (SFIA)

2.02 FRAMING MATERIALS

A. Steel: For 18 gage and lighter comply with ASTM A653, Grade 33, 33,000 psi minimum yield point. For 16 gage and heavier comply with ASTM A653, Grade 50, 50,000 psi minimum yield point.

B. Steel Sheet for Vertical Deflection Clips: ASTM A 1003/A 1003M, ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

a. Grade: 50 (340), Class 1, As required by structural performance.
Coating: G90 (Z275)

C. Steel for Track, Bridging and Accessories: ASTM A653, 33,000 psi minimum yield point.

D. Touch-Up Primer for Galvanized Surfaces: SSPC - Paint 20, Type II Organic zinc rich.

E. Studs: Manufacturer's standard C-shaped load bearing steel studs of size, shape and gage indicated and/or required, with a minimum 2” flange and flange return lip. Provide depth of studs as noted.

1. Note that the studs framing all openings shall be non-punched, solid studs.

F Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges.

1. Product: ClarkDietrich Building Systems; U-shaped steel track, or comparable product.

G. Headers and Jambs - Heavy-Duty Stud: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges.

H. Slotted Deflection: Manufacturer's single, deep-leg, U-shaped steel track; punched with vertical slots in both legs. Studs should be positively attached to deep-leg track using vertical slots while allowing free vertical movement. Legs designed to support horizontal and lateral loads and transfer them to the primary structure

2.03 FASTENERS

A. Self-drilling, Self-tapping Screws, Bolts, Nuts and Washers: ASTM A90, hot dip galvanized.

B. Anchorage Devices: Power driven, power actuated, drilled expansion bolts, or screws with sleeves.

C. Welding: In conformance with AWS D1.3.

2.04 ACCESSORIES

A. Bracing, Furring, Bridging: Formed galvanized sheet steel thickness determined for conditions encountered, manufacturer's standard shapes, same finish as framing members.

2.05 FABRICATION

A. General: Framing components may be prefabricated into assemblies before erection. Fabricate panels plumb, square, true to line, and braced against racking with joints welded. Perform lifting of prefabricated units to prevent damage or distortion.

1. Fabricate units in jig templates to hold members in proper alignment and position and to assure consistent component placement.

B. Fastenings: Attach similar components by welding. Attach dissimilar components by welding, bolting, or screw fasteners, as standard with manufacturer.

1. Wire tying of framing components is not permitted.

C. Fabrication Tolerances: Fabricate units to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet. All members shall be fabricated to within + or - 1/8" of the required length

D. Fabricate assemblies of framed sections to sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.

E. Fit and assemble in largest practical sections for delivery to site, ready for installation.

F. Welding shall be performed in accordance with AWS D1.1

2.06 FINISHES

A. All exterior studs, tracks, bridging and accessories shall be galvanized to G90 coating class meeting ASTM A653 and ASTM C955.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that conditions are ready to receive work.

B. Verify that rough-in utilities are in proper location.

3.02 ERECTION

A. Install cold-formed steel framing in accordance with ASTM C 1007 and AISI S240 “North American Standard for Cold-Formed Steel Framing – General Provisions,” and manufacturer's written instructions unless more stringent requirements are indicated. Align and secure top and bottom runners to resist the indicated design pressures, with a minimum of one #8 screw in each flange of every stud. The maximum gap between either end of any stud and the top or bottom track shall be 1/16".

B. At track butt joints, abutting pieces of track shall be securely anchored to a common structural element, or they shall be butt-welded or spliced together.

C. 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.

D. Studs shall be installed in a manner in which will assure that ends of the studs are positioned against the inside track web, prior to stud and track attachment.

E. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.

F. Unless otherwise noted, install studs vertically at 16 inches oc.

G. Align stud web openings horizontally.

H. Secure studs to tracks by welding or by other methods when approved by the Architect/Engineer. Studs shall be plumbed, aligned, and welded to both flanges of both the upper and lower tracks.

I. Stud splicing is not permissible.

J. Jack studs or cripples shall be installed below window sills, above window and door heads, and elsewhere to furnish support, and shall be securely attached to supporting members.

K. Bridging for studs shall be attached in a manner to prevent stud rotation. Bridging rows shall be spaced equally as recommended by the manufacturer of the system, but not to exceed 3'-4" o.c.

L. Coordinate erection of studs with requirements of door and window frames; install supports and attachments. Jack studs or cripples shall be installed below window sills, above window and door heads, and elsewhere at the same spacing as wall studs. They shall be securely attached to supporting members

M. Construct corners using three studs.

N. Coordinate installation of wood bucks, anchors, and wood blocking with electrical and mechanical work to be placed within or behind stud framing.

O. Coordinate placement of insulation in stud spaces made inaccessible after stud framing erection.

P. Frame wall openings larger than 2'-0" square with a minimum of double studs at each jamb of frame except where more than two are shown or indicated in manufacturer's instructions to meet performance criteria for size of opening. . Install runner tracks jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of wall. Secure stud system wall opening frame in manner indicated. Where multiple studs are required at window jambs, door jambs, or the sides of other openings they shall be attached to each other sufficiently to work as a unit to resist all loads from the opening

Q. Install supplementary framing, blocking, and bracing in metal framing system wherever walls are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from item supported

R. Touch-up field welds and damaged galvanized surfaces with zinc rich primer.

3.03 ERECTION TOLERANCES

A. Maximum Variation From True Position: 1/8 inch.

B. Maximum Variation of any Member from Plane: 1/8 inch.

C. Maximum Variation From Plumb: 1/8 inch.

END OF SECTION

METAL FABRICATIONS SECTION 05500

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated ferrous metal items, galvanized and prime painted with principal items listed below. Refer to Drawings for items not specifically listed.

1. Rough hardware
2. Ladders.
3. Pipe bollards, schedule 80 galvanized pipe
4. Miscellaneous supports at overhead doors.
5. Cast nosings at steps
6. Galvanized steel raised platform at IT room

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Division 3 - Concrete: Work: Placement of metal fabrications in concrete.

1.03 RELATED SECTIONS

A. Section 05120 - Structural Steel: Structural steel column anchor bolts.

B. Section 09900 - Painting: Paint finish.

1.04 REFERENCES

A. ASTM A36 - Structural Steel.

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

C. ASTM A123 - Zinc (Hot-Galvanized) Coatings on Products Fabricated From Rolled, Pressed and Forged Steel Shapes, Plates, Bars, and Strip.

D. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

E. ASTM A283 - Carbon Steel Plates, Shapes, and Bars.

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

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

H. ASTM A386 - Zinc-Coating (Hot-Dip) on Assembled Steel Products.

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

J. AWS A2.0 - Standard Welding Symbols.

K. AWS D1.1 - Structural Welding Code.

L. SSPC - Steel Structures Painting Council.

M. Fed. Spec. FF-S-325 - Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry).

N. Fed. Spec. FF-P-395 - Pin, Drive, Guided and Pin Drive, Power Actuated (Fasteners For Power Actuated And Hand Actuated Fastening Tools)

O. Fed. Spec. FF-B-588 - Bolt, Toggle; and Expansion Sleeve, Screw.

1.05 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

C. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

1.06 QUALIFICATIONS

A. Fabricator Qualifications: Firm experienced in producing metal fabrications similar to those indicated for this project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the work.

B. Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the project is being constructed.

A. Welders Certificates: Submit under provisions of Section 01300, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.07 FIELD MEASUREMENTS

A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Steel Sections: ASTM A36.

B. Steel Tubing: ASTM A500, Grade B.

C. Plates: ASTM A283.

D. Pipe: ASTM A53, Grade B, Schedule 40.

1. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating per ASTM A53.

E. Fasteners:

1. Power Actuated Drive Pins: Fed. Spec. FF-P-395, style to suit material.
2. Expansion Bolts (Shields): Fed. Spec. FF-S-325, except lead, fiber and plastic shields are not acceptable. Furnish bolts and screws required.
3. Toggle Bolts: Fed. Spec. FF-B-588, except wire wings are not acceptable.

F. Bolts, Nuts, and Washers: ASTM A325 or A307 as appropriate, galvanized to ASTM A153 for attachment to galvanized components.

G. Gray-Iron Castings: ASTM A48, Class 30

H. Malleable-Iron Castings: ASTM A47, Grade 32510 (ASTM A47M, Grade 22010.

I. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E488, conducted by a qualified independent testing agency.

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

K. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications equal to products as follows:

1. B-6 Construction Grout; W. R. Bonsal Co.
2. Euco N-S Grout; Euclid Chemical Co.
3. Five Star Grout; Five Star Products
4. Crystex; L & M Construction Chemicals, Inc.
5. Masterflow 928 and 713; Master Builders Technologies, Inc.
6. Sealtight 588 Grout; W. R. Meadows, Inc.
7. Sonogrout 14; Sonneborn Building Products-ChemRex, Inc.

2.02 PAINT

A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements of FS TT-P-664, selected for good

resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

1. Provide organic zinc rich primer complying with FS SSPC 20, Type II, at exterior work and work built into exterior walls.

B. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.

C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.03 FABRICATION - GENERAL

A. Fit and shop assemble in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

G. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.04 FINISHES

A. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B): SSPC-SP 6 "Commercial Blast Cleaning".
2. Interiors (SSPC Zone 1A): SSPC-SP 3 "Power Tool Cleaning".

B. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes or to be embedded in concrete, unless otherwise indicated. Comply with requirements of SSPC-PA 1 "Paint Application Specification No. 1" for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

C. Galvanize in accordance with ASTM A123 or ASTM A386, as applicable. Provide minimum 1.25 oz/sq ft galvanized coating.

1. Galvanize all items exposed to the exterior or built into exterior wall/roof construction.
2. Do not apply passivating treatment for items which receive paint finish after erection.

2.05 ROUGH HARDWARE

A. Furnish bent or otherwise custom-fabricated, bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.

B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts that bear on wood structural connections, and furnish steel washers elsewhere.

2.06 LADDERS

A. Aluminum Ladders: Fabricate ladders with crossover for the locations shown, with dimensions, spacings, details and anchorages as indicated. Comply with requirements of ANSI A14.3 and OSHA.

1. Equal to Model Number: “560 Fixed Ladder” by Alaco Ladder Co.and
2. Materials: ASTM B221, Alloy 6061, Temper T-6, non-spark extruded aluminum Aluminum Finish: Mill finish
3. Siderails: Continuous 1-3/4 inches (45 mm) wide by 3 inch (76 mm) tubes with 1/8
4. Rungs: 1-1/8" (29 mm) round rungs that are serrated and secured with cast aluminum connectors, 4 solid rivets and capable of 1,000 pound (455 kg) load. Space 12 inches (310 mm) on center. Attach rungs in centerline of side rails
5. Support each ladder at top and bottom and at intermediate points spaced not more

6. Wall Brackets: 2 inch (50 mm) by 3/8" (9.5 mm) thick brackets mounted to the walls

2.10 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports for applications indicated that are not a part of structural steel framework as required to complete the work.

B. Fabricate units to sizes, shapes, and profiles indicated and required to receive other adjacent construction retained by framing and supports. 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, hangers, and similar items.

1. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is places.
2. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch thick by 8 inches long.

2.11 CAST NOSINGS

A. Fabricate units of aluminum, sizes, and a configurations indicated. If not indicated, provide cast-iron units with an integral abrasive finish. Furnish in lengths as required to accurately fit each opening or conditions.

1. Cast units with an integral abrasive grit consisting of aluminum oxide, silicon carbide, or a combination of both.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Safety Tread Co., Inc.
2. Amstep Products.
3. Armstrong Products, Inc.
4. Balco/Metalines, Inc.
5. Safe-T-Metal Co.
6. Wooster Products Inc.

C. Approved: Equal to Type 3511 by American Safety Tread Co. and Type 231BF by Wooster Products, Inc., 3" x 1/4" thick with 1/2" nosing and integral anchor for concrete, aluminum with abrasive filler strips. Anti-slip filler shall contain not less than 65% virgin grain Aluminum Oxide (AL2O3) /Silicone Carbide (Sic) abrasive

D. Apply black asphaltic coating to concealed bottoms, sides, and edges of cast-iron units set into concrete.

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 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

C. Center nosings on tread widths with noses flush with riser faces and tread surfaces.

D. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on Drawings or shop drawings as follows:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.

D. Perform field welding in accordance with AWS D1.1.

E. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

F. Cutting, Fitting, and Placement: Perform cutting, drilling and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

G. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations.

Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.

H. Pipe Bollards: Anchor bollards in concrete with pipe sleeves preset and anchored into concrete. After bollards have been inserted into sleeves, fill annular space between bollard and sleeve solidly with nonshrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's directions.

1. Fill bollards solidly with concrete, mounding top surface.

I. Obtain Architect approval prior to site cutting or making adjustments not scheduled.

3.04 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a 2.0 mil minimum dry film thickness.
2. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal is specified in Section 09900 - Painting.
3. For galvanized surfaces, clean welds, bolted connections, and abraded areas, and apply galvanizing repair paint to comply with ASTM A780.

3.05 ERECTION TOLERANCES

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

END OF SECTION

METAL COLUMN COVERS SECTION 05580

PART 1-GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes factory finished metal column covers for interior and exterior exposure as shown on drawings.

1.3 SUBMITTALS

A. Manufacturer's Literature and Data:

1. Product Data: Submit manufacturer's technical data and brochures for each type of column cover required.

B. Shop Drawings:

1. Shop drawings shall show dimensions, sizes, thickness, alloys, tempers, finishes, joining, attachments, and relationship of adjoining work.

C. Samples:

1. Samples shall include a piece of each type of metal and finish as specified.

D. Certification:

1. Submit certificates from manufacturer of panels attesting that products comply with specified requirements including finish as specified.

E. Qualification Data:

1. Firms specified in "Quality Assurance" Article must demonstrate their capabilities and experience by including lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

A. Manufacturer: Firm with manufacturing and delivery capacity required for the project, shall have successfully completed at least ten projects within the past five years, utilizing systems, materials and techniques as herein specified.

B. Fabricator must own and operate its own manufacturing facilities for all metal components. “Stick Built” or “Kit of Parts Systems” consisting of components from a variety of manufacturers will not be considered or accepted.

C. Manufacturer/Fabricator must own and operate its own Painting and Finishing facility to assure single source responsibility and quality control.

1.5 DELIVERY, STORAGE & HANDLING

All material shall be protected during fabrication, shipment, site storage and erection to prevent damage to the finished work from other trades. Store column covers inside a well-ventilated area, away from uncured concrete and masonry, and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Basis of Design: Decorative Metal Column Covers shall be manufactured by Gordon Interior Specialties Division, Gordon, Inc., 5023 Hazel Jones Road, Bossier City, LA 71111, (800) 747-8954, Fax (800) 877-8746, www.gordoninteriors.com, sales@gordoninteriors.com or equal by Fry Reglet

B. The listed manufacturer shall not be construed as closing specifications to other prospective manufacturers, but rather as establishing a level of quality in a metal system.

2.2 MATERIALS

A. Metal Column Covers / Enclosures shall be a complete Gordon, Inc. system (N-gage™[1] system). All secondary posts, anchors, clips and extrusions are to be provided as complete package of this work. No exposed fasteners for metal closures are allowed.

B. General: Provide metals free from surface blemishes where exposed to view in finished unit. Surfaces exhibiting pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished units are not acceptable. All metal shall be of the highest grade, commercial type.

C. Material: Aluminum, 5052-H34, minimum .090” thickness [ASTM B 209 and ASTM B 209M

2.3 FABRICATION

A. Height of Covers / Enclosures shall be up to 12’-0” without horizontal joints.

B. Column Covers / Enclosures shall have either a closed or reveal horizontal or vertical joint, as shown on the architectural drawings. All other details including base and ceiling details shall be fabricated in accordance with the architectural drawings.

C. Column Covers / Enclosures shall be manufactured true to geometry as shown on plan view of the architectural drawings with manufacturing tolerances.

D. Column Covers / Enclosures shall be manufactured in round (full, three-quarter, half, quarter), Oval, Elliptical, or Square configurations.

E. Diameter should be a minimum of 14" for aluminum.

F. System: As follows

1. Covers / Enclosures shall be fabricated with return flanges at the vertical joints for structural strength. Each column cover shall be reinforced at the top and bottom with gussets.
2. engagement clips shall be provided and factory attached to the column covers at specified intervals to allow for complete accessibility without tools or exposed fasteners. A clearance of ¾" is required at the top for installation.
3. In those cases where access is restricted to authorized personnel, a locking method at the top will be provided.
4. All covers shall be removable, demountable, and re-usable without exposed fasteners.

2.4 FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

B. Factory applied Powder Coat finish equal to the following.

1. All Exterior Column Covers shall receive a micro-etched pretreatment prior to receiving an electrostatically applied ACROGUARD®-*UVX* Exterior Powder Coat finish. super polyester powder coat finish that provides UV, high impact, and chemical resistance and Interior covers to receive a micro-etched pretreatment prior to receiving an electrostatically applied ACROGUARD®-High Performance Powder Coat finish.

2. All exposed surfaces must be coated. Finish shall be cured and oven baked to insure paint adhesion and uniform surface hardness.

2. Paint to be selected from manufacturers standard colors

Technical Data

Impact Resistance (Deformation)	3mm
Smoothness (Ford Scale)	8 - 10 (depending on gloss)
Pencil Hardness	3H
Taber Abrasion	100
Adhesion	5B
So. Florida UV Resistance	10 years, gloss retention: 30%+ color retention: $\Delta E < 5.0$
Humidity Resistance	3000 hours (on-Going)
AAMA Specification	2604

PART 3-EXECUTION

3.1 INSTALLATION

A. Install Column Covers / Enclosures in accordance with manufacturer's written installation instructions and shop drawings.

B. Column Covers / Enclosures shall be erected plumb, level, square, true to line, securely anchored, and in proper alignment and relationship to work of other trades. Exterior joints are to be sealed by installer with backer rods and sealant.

C. Column Covers / Enclosures shall be inspected before installation to be free from dents, scratches, and other defects.

3.2 CLEANING

A. Removal of protective covering shall occur immediately after installation to prevent adhesive transfer.

B. Clean all surfaces following installation.

C. Maintenance per manufacturer's finish maintenance instructions.

3.3 PROTECTION

A. Protection of column covers from damage by other trades after installation to be provided by general contractor.

3.4 GENERAL RESPONSIBILITY

A. Variation from specification: Any variation from this specification resulting in additional cost to any other contractor or subcontractor on this project shall be the sole financial responsibility of the contractor for the work of this section.

END OF SECTION

ORNAMENTAL METALS SECTION 05700

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated custom decorative metal perforated panels, panelized system, stainless steel (angel hair finish by Zahner), with principal items listed below.

1. Custom perforated aluminum wall panels and substructure for stand-off attachment to building structure at exterior as indicated on the drawings. The panel system shall have pattern of holes, sized and distributed to reproduce exactly the gradations of light and dark required to create the design image indicated on the drawings.

1.02 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product data for each product used in ornamental metal and fiberglass work, including finishing materials and methods.

C. Shop drawings showing fabrication and installation of ornamental metalwork including plans, elevations, details of components, and attachments to other units of work. Indicate materials and profiles of each ornamental metal member, fitting, joinery, finishes, fasteners, anchorages, and accessory items.

D. Samples of each profile and pattern of fabricated metal and each type of metal finish required, prepared on metal of same thickness indicated for final unit of work.

1.03 QUALITY ASSURANCES

A. Fabricator Qualifications: Firm experienced in producing metal fabrications similar to those indicated for this project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the work.

B. Contractor is responsible for the design and engineering of the specified panel system and attachments, and their compliance with all applicable codes.

1.04 FIELD MEASUREMENTS

A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

PART 2 - PRODUCTS

2.01 PANELS AND MATERIALS

A. Panels: Stainless Steel perforated panels, as follows equal to Graphic Perf® Panels by Arktura and Laser Cut by Moz Metals', Dridesign or Zahner or American Metalkraft

1. 3/16 inch thick. AISI Type 304, complying with ASTM A 167
2. Finish: angel hair finish by Zahner
3. Panel: Approximately 4" deep with perimeter factory finished aluminum closure angle as indicated on the drawings

B. Installation: Stainless steel adjustable standoff brackets

2.02 FABRICATION

A. Fit and shop assemble in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

D. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

E. All cuts/perforations 90Deg to surface face.

F. All metal bending and forming to be formed within a .03" bending tolerance.

G. No depressions or deformations at perforation edges.

H. Custom Algorithmically Generated Perforation Pattern: Constantly varying hole sizes in multiples of .01". Holes/openings to vary from 200min to 500max unique diameters.

I. Pattern Constraints: Custom modified perforation pattern at all panel edges to accommodate pattern transitions and necessary material borders for material integrity

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.

C. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site

3.02 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects and in panel sequence to achieve the required graphic in strict accordance with manufacturers installation drawings

B. Cutting, Fitting, and Placement: Perform cutting, drilling and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Fit exposed connections accurately together to form hairline joints. Weld connections that cannot be shop-welded because of shipping size limitations.

3.03 PROTECTION

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

B. Restore finishes damaged during installation and construction so that no evidence remains of correction work. Return items that 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

CARPENTRY SECTION 06100

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Blocking in walls and roofs for miscellaneous nailers and supports for all wall hung items, i.e. garb bars, cabinets, toilet partitions, etc..

B. Telephone, IT and electrical panel plywood backboards, fire retardant treated.

C. Preservative treatment of wood.

1.02 REFERENCES

A. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.

B. APA: American Plywood Association.

C. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

D. AWPA (American Wood Preservers Association) C1 - All Timber Products Preservative Treatment by Pressure Process.

E. AWPA (American Wood Preservers Association C20 - Structural Lumber Fire Retardant Treatment by Pressure Process.

F. NHLA (National Hardwood Lumber Association).

G. NFPA: National Forest Products Association.

H. PS 1 - Construction and Industrial Plywood.

I. PS 20 - American Softwood Lumber Standard.

J. SPIB: Southern Pine Inspection Bureau.

1.03 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories to a minimum scale of 1-1/2 inch to 1 ft

C. Product Data: Provide technical data on wood preservative materials and application instructions.

D. Certification of Treating Plant: Wood Preservatives: Submit certificate stating water-borne

chemical and process used, net amount of preservative retained, and compliance with applicable standards. Include statement that moisture content of treated lumber was reduced to a maximum of 15% prior to shipment to site.

1.04 QUALITY ASSURANCE

A. Rough Carpentry Lumber: Visible grade stamp, of agency certified by National Forest Products Association (NFPA).

B. Lumber Standard: Comply with PS 20, except as otherwise indicated.

C. Plywood Standard: Comply with PS 1, and APA grade trademarks.

D. Factory mark each piece of lumber and plywood with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.

E. Shop fabricate carpentry work to the extent feasible and where shop fabrication will result in better workmanship than feasible for on-site fabrication.

F. Pressure-treated lumber shall conform to AWPA requirements for preservative or fire-retardant treated materials. Treatment plant shall be licensed by manufacturer of treated material.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Protect work from moisture damage.

1.06 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.07 COORDINATION

A. Coordinate the work with plumbing and electrical rough-in, installation of associated and adjacent components.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Lumber Grading Rules: NFPA and SPIB.

B. Miscellaneous Blocking: No. 2 Southern Yellow Pine, 15 percent maximum moisture content, pressure preservative treat.

C. Plywood Backboards: APA-Rated Sheathing, Grade C-D, plugged with exterior glue, sanded, fire retardant treated, 3/4" thick, each piece bearing U.L. label.

D. Plywood Sheathing APA - Rated Structural 1 Sheathing, Exposure 1 with exterior glue, thickness as indicated with span rating as required for spacing of framing members.

2.02 ACCESSORIES

A. Fasteners and Anchors:

1. Fasteners: Stainless steel for treated wood locations, unfinished steel elsewhere. Fasteners at the roof sheathing shall be galvanized self tapping screws long enough to penetrate through the deck.
2. Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

2.03 FACTORY WOOD TREATMENT

A. Fire retardant: AWPA Treatment C20, Interior Type, chemically treated and pressure impregnated; capable of providing a maximum flame spread/smoke development rating of 25 /450.

1. Provide at telephone and electrical backboards.

A. Wood Preservative: AWPA Treatment C2, ACQ (Alkaline Coppper Quat) preservative, with a minimum of 0.40 lb/cu./ft. retainage (rated for contact with water). After treatment, kiln-dry lumber to a maximum moisture content of 19% .

1. To prevent deterioration of fasteners and anchors, all anchors and fasteners in contact with the treated wood and plywood shall be 300 series stainless steel, including fasteners for attachment of the treated wood and plywood, and also fasteners and anchors for securing building components (doors, windows, roofing, etc.) into and through the treated wood and plywood. Also, any treated wood in contact with aluminum and ferrous or galvanized steel products shall be isolated from the metal by installing a layer of self adhering modified bitumen sheet or equal (felt is not permitted) to the metal prior to installing the wood and plywood.
2. Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.
3. Complete fabrication of treated items before treatment, where possible. If cut after treatment, apply field treatment complying with AWPA M4 to cut surfaces.

PART 3 - EXECUTION

3.01 INSTALLATION

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

B. Construct curb members of single pieces.

C. Install telephone and electrical panel boards with fire retardent treated plywood. Over size the panel by 12 inches on all sides.

D. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

E. Locations for pressure treated lumber as follows:

1. Use pressure-treated decay and insect resistant lumber for blockings and nailing strips in contact with masonry, concrete, roofing, steel, framing setting on and in contact with concrete, decking and all blocking in exterior wall openings.
2. Apply two (2) drenching coats of preservative compatible with treatment to job cut edges of lumber.

F. Note: Coat all ends of new wood which is bearing on or in contact with masonry walls with copper Napthenate conforming to AWPA Spec. M4.

G. Metal edge securement associated with roofing shall be designed and installed in strict accordance with ANSI/SPRI ES-1, except basic wind speed of 145 mph per 2015 edition of the International Building Code. Nailer securement shall resist a vertical load of 200lbf/Ft or the design load, whichever is greater. Bolts shall be staggered to avoid splitting the wood. Fasteners shall be located approximately 4 inches but not less than 3 inches from each end of the wood blocking. Fasteners shall be staggered, spaced at a maximum 12 inches on center and penetrate the wood sufficiently to achieve the design pullout resistance. Spacing of fasteners shall be on maximum 6 inch centers in corner regions of the building

3.02 INSTALLATION OF PLYWOOD

A. Comply with recommendations of the American Plywood Association (APA), for the installation of plywood.

END OF SECTION

ARCHITECTURAL WOODWORK SECTION 06410

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Plastic laminate finished casework, including cabinets and shelves.

B. Flush wood custom size door with safety glass light (Type G door as indicated on the drawings) for paint finish installed in a painted wood frame. Hardware is specified in Section 08710, except pulls and push hardware as indicated on the drawings is part of this millwork section.

C. Provide all wood blocking required for attachment of architectural woodwork, complying with Section 06100.

D. Quarts tops are specified in Section 06614

1.02 RELATED SECTIONS

A. Section 06100 - Rough Carpentry: Grounds and support framing.

1.03 REFERENCES

A. ANSI/BHMA A1156.9 - Cabinet Hardware

B. AWI - Quality Standards

C. FS MM-L-736 - Lumber, Hardwood

D. FS MMM-A-130 - Adhesive, Contact

E. National Electrical Manufacturers Association (NEMA) LD3 - High Pressure Decorative Laminates

F. PS-1 - Construction and Industrial Plywood

G. PS-20 - American Softwood Lumber Standard

1.04 SUBMITTALS

A. Submit under provision of Section 01300.

B. Product data for each type of product and process specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.

C. Shop Drawings: Include plans, indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location, schedule of finishes and as follows:

1. Show details full size.

2. Show locations and sizes of furring, blocking and hanging strips, including concealed blocking and reinforcing specified in other sections.

3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.

D. Samples for initial selection of the following in the form of manufacturer's color charts consisting of actual units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.

1. Plastic laminates.

1.05 QUALITY ASSURANCE

A. Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grades of interior architectural woodwork, construction, finishes, and other requirements.

B. Prior to installation of custom casework, examine shop fabricated work for completion, and complete work as required, including back priming and removal of packing.

C. Provide custom casework and trim conforming to the following Architectural Woodwork Institute (AWI) Quality Standards as a minimum requirement:

1. Plastic Laminate Finished Casework:

a. AWI Section 400B - Custom Grade

2. Wood Door Frames:

a. Paint Finish: AWI Section 900B - Custom Grade

3. Wood Doors:

a. Paint Finish: AWI Section 1300 - Custom Grade

1.06 QUALIFICATIONS

A. Fabricator: Company specializing in manufacturing the products specified in this section with minimum three (3) years documented experience.

B. Installer Qualifications: Arrange for architectural woodwork installation by a firm that can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this Project.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle products to site under provisions of Section 01600.

B. Protect units from moisture damage.

1.08 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.9 COORDINATION

A. Coordinate the work with plumbing and electrical rough-in.

PART 2 - PRODUCTS

2.01 SHEET MATERIALS

A. Wood Particleboard: PS 1; or AWI Standard, composed of wood chips, medium density, made with water resistant adhesive; of grade to suit application; sanded faces

2.02 LAMINATE MATERIALS

A. Plastic Laminate: AWI 0.050 inch General Purpose quality, color, pattern, and surface texture as selected, high pressure application.

B. Laminate Backing Sheet: 0.020 inch Backing Sheet grade, undecorated plastic laminate.

C. External Vertical Surfaces: 0.028 inch thick General Purpose quality (high-pressure), color, pattern, and surface texture as selected.

D. Cabinet Linings: 0.020 inch thick, Cabinet Liner Type (high-pressure).

2.03 ACCESSORIES

A. Adhesive: FS MMM-A-130 contact adhesive or type recommended by AWI or laminate manufacturer to suit application.

B. Fasteners: Size and type to suit application.

C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application.

D. Concealed Joint Fasteners: Threaded steel.

2.04 HARDWARE

A. Hardware: ANSI/BHMA A156.9

B. Shelf Standards and Rests:

1. Plastic laminate finished casework:

a. Knape & Vogt Model 255 Standards
b. Knape & Vogt Model 256 Supports

2. At loose shelving, provide wall standard/brackets equal to Knape & Vogt 87-187 Heavy Duty system.

C. Drawer Pulls: see drawings, finish as selected by Architect.

D. Door Catches: Magnetic, commercial grade with a minimum 14 lb. pull.

E. Cabinet Hinges: Stanley Series 1500 Series, self closing concealed units.

F. Grommets: Doug Mockett & Company Model TG. Color as selected.

G. Drawer Glides: Equal to Accuride 3832 series; size as required, steel ball bearing rollers, full extension type, rated at 100 lbs., full extension type.

H. Locks: E07121 for doors and E07041 for drawers

2.06 FABRICATION

A. Complete fabrication, including assembly, finishing, and hardware application, before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.

B. Fit shelves, doors, and exposed edges with 3/8 inch minimum matching hardwood edging. Veneer edge with panel for transparent finished casework. Use one piece for full length only.

C. Cap exposed plastic laminate finish edges with materials of same finish and pattern.

D. Door and Drawer Fronts: 3/4 inch thick unless shown unless shown otherwise; flush overlay style.

E. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

F. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

1. Apply laminate cabinet linings to all interior surfaces of cabinets, drawers and shelving within the cabinets.

G. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

H. Shop-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges with a water-resistant coating.

I. Provide a minimum of one (1) adjustable shelf in each cabinet unless more are required by the Drawings.

1. Apply laminate cabinet linings to all interior surfaces of cabinets, drawers and shelving within the cabinets.

S. All shelving shall have hardwood edge banding to receive plastic lminate.

2.07 FLUSH DOORS

A. Flush Interior Doors: $1^3/_4$ inches thick; solid core construction.

B. Construction (Non fire rated): AWI Section 1300, Type PC-5 with $1^3/_8$" vertical stiles and $1^3/_4$" top and bottom rails glued securely to core parts; no voids or finger joint material allowed.

1. Stile edge screw withdrawals when tested in accordance with ASTM D-1037-78 shall exceed 740 lbs. and VA 08210-TM shall exceed 700 lbs.
2. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering.

C. Particle Board Core: Conform to ANSI standard A208.1-1989 Grade 1-LD-2 covering mat formed particle board with face screw holding of 125 pounds, modulus of rupture of 800 psi, modulus of elasticity of 150,000 psi, and density of 32 pounds per cubic foot.

D. Crossbands: Hardwood (no synthetics) crossbands and faces shall be laminated to the core with glue by the hot press process.

E. Veneer Facing (Paint Finish):): AWI Custom quality MDO facing for paint finish

F. Adhesive: Water resistance except Type I - waterproof at face veneers

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

3.02 INSTALLATION

A. Set and secure casework in place; rigid, plumb, and level in accordance with AWI Section 1700.

B. Use fixture attachments in concealed locations for wall mounted components.

C. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose. Refinish cut surfaces or repair damaged finish at cuts.

E. Secure cabinet and counter bases to floor using appropriate angles and anchorages.

F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

G. Cabinets: Install without distortion so that doors and drawers fit openings properly and are 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.

1. Install cabinets with no more than 1/8 inch in 96 inch sag, bow, or other variation from a straight line.

H. Anchor woodwork to anchors or blocking built-in or directly attached to substrate. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for complete installation. Except where prefinished matching fasteners heads are required, use fine finishing nails for exposed nailings, countersunk and filled flush with woodwork, and matching final finish where transparent finish is required.

I. Install doors in accordance with AWI Quality Standard

3.03 ADJUSTING

A. Adjust work under provisions of Section 01700.

B. Adjust moving or operating parts to function smoothly and correctly.

C. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.

3.04 CLEANING

A. Clean work under provisions of Section 01700.

B. Clean casework, counters, shelves, hardware, fittings and fixtures.

END OF SECTION

QUARTZ AND SOLID SURFACE TOPS SECTION 06614

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Quartz and solid surface countertops as indicated on the drawings.

1.02 SUBMITTALS

A. Submit under provision of Section 01300.

B. Product data for each type of product and process specified and installation.

1. Shop Drawings: Include plans, indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings,

C. Samples for initial selection of the following in the form of manufacturer's color charts consisting of actual units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.

1. Solid surface materials

1.03 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle products to site under provisions of Section 01600.

1.04 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

PART 2 - PRODUCTS

2.01 QUARTZ MATERIAL

A. Material: Material: Solid, non-porous homogeneous material compound of natural minerals and high performance acrylics with natural quartz aggregate; stain resistant, highly resistant to impact damage and with performance properties as published in manufacturer's current product data.

B. Manufacturers: see drawings.

C. Colors: see drawings.

D. Thickness: 3cm.

E. Joint Adhesive: Provided by top Manufacturer.

F. Horizontal Setting Adhesive: Silicone Sealant by top Manufacturer.

G. Vertical Setting Adhesive: Panel Adhesive by Du Pont Co. or Type 1 (ANSI A136.1) solvent based spread mastic waterproof adhesive; water based adhesives are not acceptable.

H. Warranty: Ten (10) year product warranty to repair or replace

2.02 SOLID SURAFCE MATERIAL

A. Material: Solid, non-porous homogeneous material compound of natural minerals and high performance acrylics complying with the material and performance requirements of ANSI A124.3, Type 5 or Type 6, without a precoated finish.; stain resistant, highly resistant to impact damage and with performance properties as published in manufacturer's current product data.

B. Manufacturers: Corian by Du Pont Co., Surell; Formica Corp, Fountainhead; Nevamar Corp. or Gibraltar; Ralph Wilson Plastics Co.

C. Colors: As selected by Architect.

D. Thickness: As indicated on the Drawings.

E. Joint Adhesive: Provided by Du Pont Co.

F. Horizontal Setting Adhesive: Silicone Sealant by Du Pont Co.

G. Vertical Setting Adhesive: Panel Adhesive by Du Pont Co. or Type 1 (ANSI A136.1) solvent based spread mastic waterproof adhesive; water based adhesives are not acceptable.

H. Warranty: Ten (10) year product warranty to repair or replace

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and supports.

3.02 INSTALLATION

A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.

1. Provide product in the largest pieces available.
2. Form field joints using manufacturer’s recommended adhesive, with joints inconspicuous in finished work.
    a. Exposed joints/seams shall not be allowed.
3. Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.
4. Cut and finish component edges with clean, sharp returns.
5. Rout radii and contours to template.
6. Anchor securely to base cabinets or other supports.
7. Align adjacent countertops and form seams to comply with manufacturer’s written recommendations using adhesive in color to match countertop.
8. Carefully dress joints smooth, remove surface scratches and clean entire surface.

9. Install countertops with no more than 1/8-inch (3 mm) sag, bow or other variation from a straight line.

B. Applied side:

1. Install applied sides using manufacturer's standard color-matched silicone sealant.
2. Adhere applied sides to countertops using manufacturer's standard color-matched silicone sealant

3.03 CLEANING

A. Clean work under provisions of Section 01700.

END OF SECTION

LIQUID APPLIED VAPOR/AIR BARRIER MEMBRANE SECTION 07130

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Installation of liquid applied vapor/air barrier membrane on all masonry, steel, wood and sheathing surfaces, etc in the exterior wall cavity with scope indicated on drawings, and flashing of openings with sheet membrane as indicated on drawings and specified herein, consisting of preparation of before mentioned surfaces, sealing of cracks, seams, joints and application of liquid applied vapor/air barrier membrane to provide an uninterrupted air/vapor barrier membrane on all exterior wall cavity surfaces and openings. Tape all sheathing joints with 20 mil thick self adhered membrane

B. All flashing sheets shall be rolled at ends to prevent “fish mouths”, and also sealed at the edges. Millage checks for the thickness of the liquid applied vapor barrier

C. Installation of flashings at exterior openings shall comply with the following:

1. At the Window head, sill and jamb details provide the tie-in between the wall water barrier/vapor barrier membrane to the window. The method of constructing the seal depends on the window frame assembly – a bead of sealant or a piece of membrane flashing is typically used.

2. The metal flashing at the head must be incorporated and fully sealed with the exterior wall water barrier/vapor barrier membrane.

3. The metal sill flashing of the window must have a continuous air/water seal with the window and the frame sill must have a water tight seal with water barrier/vapor barrier membrane of the exterior wall.

4. The component “vapor barrier” membrane must be continuous (as it is the last defense against water penetration.)

5. A continuous transition seal between the opening and the wall water/vapor barrier must be achieved. The seal to the window assembly must coincide with the water and air barrier of the opening frame.

1.02 RELATED SECTIONS:

A Section 07900 - Joint Sealers

B. Section 09260 – Exterior wall sheathing

1.03 REFERENCES:

A. ASTM D 412 Tests for Rubber Properties in Tension.

B. ASTM E Puncture Resistance.

C. ASTM E 96(B) Water Vapor Transmission of Materials.

D. ASTMD 1970 Self-Adhering Polymer Modified Bituminous Sheet Materials.
UL 790 Tests for Fire Resistance of Roof Covering Materials.
E. ASTM E 283 Tests for Air Leakage through Exterior Assemblies.
F. ASTM E 331 Tests for Water Penetration of Exterior Assemblies.
G. ASTM E 2178 Test for Air Permeance Rating.
H. ASTM D 1187 Test for Asphalt-Base Emulsions
I. ASTM D 2939 Test for Emulsified Bitumens

1.04 SYSTEM DESCRIPTION:

A. Product provided by this Section is a self-adhesive liquid applied membrane of not less than 40 mils thickness, consisting of a water-based asphalt emulsion modified with a blend of synthetic rubbers and additives which cures to form a flexible, monolithic Vapor/Air Barrier.

1.05 SUBMITTALS:

A. General: Submit in accordance with Section 01300.
B. Product Data: Submit manufacturer's product literature, installation instructions and standard details.
C. Subcontractor approval by manufacturer: Submit document stating manufacturer's acceptance of subcontractor as an Approved Applicator for the specified materials.
D. Warranty: Submit a sample warranty identifying the terms and conditions stated herein.

1.06 QUALITY ASSURANCE:

A. Applicator Qualifications: Applicator shall be experienced in applying the same or similar materials and shall be specifically approved in writing by the membrane manufacturer.
B. Ordinances, and laws regarding use and application of products that contain volatile organic compounds (VOC).
C. Pre-Application Conference: Prior to beginning work, convene a conference to review conditions, installation procedures, schedules and coordination with other work.
D. Product Components: Vapor/Air components shall be sourced from one manufacturer, including sheet membrane, sealants, primers, adhesives and mastics.

1.07 WARRANTY:

A. Upon completion and acceptance of the work required by this section, the manufacturer will issue a warranty agreeing to promptly replace defective materials for a period of 5 years.

1.08 DELIVERIES, STORAGE AND HANDLING:

A. Deliver materials to project site in original, factory-sealed, unopened containers bearing manufacturer's name and label intact and legible with the following information.

1. Name of material.
2. Manufacturer's stock number and date of manufacture. Materials in protected and well ventilated area.

1.09 PROJECT CONDITIONS:

A. Do not apply membrane if temperature is less than 40 degrees F. or to a damp, frosty or contaminated surface.
B. Coordinate vapor/air barrier application with other trades. The applicator shall have sole right of access to the specified areas for the time needed to complete the installation.
C. Warn personnel against breathing of vapors and contact of material with skin or eyes. Wear applicable protective clothing and respiratory protection gear.
D. Keep flammable products away from spark or flame. Do not allow the use of spark producing equipment during application and until all vapors have dissipated. Post "NO SMOKING" signs.
E. Maintain work area in a neat and orderly condition, removing empty containers, rags, and rubbish daily from the site.

PART 2 - PRODUCTS:

2.01 MANUFACTURERS:

A. Specification is based on "Barriseal Membrane" as manufactured by Carlisle Coatings and Waterproofing Incorporated, 900 Hensley Lane; Wylie, Texas 75098, Phone: (800) 527-7092 Fax: (972) 442-0076 or "Perm-A-Barrier NPL 10" by W.R. Grace & Co. or "Air Bloc 32MR" by Henry and Exoair 120 R by Tremco, "Sopraseal LM203" by Soprema and "Air-Shield Lm" by W.R. Meadows.

2.02 PRODUCTS:

A. Self-Adhesive liquid applied Vapor/Air Barrier Membrane: Shall be single coat application of 40 dry mil liquid thick application of rubberized asphalt rubberized asphalt, and shall meet or exceed the following requirements:

1. Resilience: 98% ASTM D-3407
2. Ultimate Elongation: 1300% minimum, ASTM D-41
3. Perm Rating: 0.03 ASTM E-96
4. Transmission: 0.01 gm/sq.ft ASTM E-96
5. Fire Propagation Characteristics: Passes NFPA 285 testing as aprt of an approved wall assembly

2.03 ACCESSORY PRODUCTS:

A. Surface Primer: Shall be CCW-702 Solvent-Based Primer , CCW-AWP Water-Based primer or CCW-CAV-Grip.
B. Detail Membrane: CCW-705 TWF (Carlisle) or Grace V40 tape/Perm-A-Barrier Wall Flashing.
C. Mastic: Shall be CCW-704 Mastic.
D. Sealants: Shall be CCW-703 Vertical Grade Liquiseal membrane, PT-304 one component or CCW-201 two component Polyurethane Sealant.

PART 3 - EXECUTION:

3.01 INSPECTION:

A. Before any barrier application is started the applicator shall thoroughly examine all surfaces for any deficiencies. Should any deficiencies exist, the architect, owner, or general contractor shall be notified in writing and corrections made.
B. Condition of Gypsum Based Sheathing Surfaces:

1. The sheathing surfaces shall be of sound structural grade and shall have a smooth finish, free of voids, ridges, fins or entrained air holes.
2. Sheathing shall be fastened with non-corroding screws.
3. Sheathing shall be butted flush with adjoining panels.
4. Irregularities shall be sanded or filled as required to achieve flush surfaces.
5. All adjacent metal flashing shall be galvanized or non-ferrous metal, tight screwed or nailed.
6. Surfaces at joints shall be on the same plane and taped.

C. Condition of Wood Surfaces:

1. The wood surfaces shall be of sound structural grade and shall have a smooth finish, free of holes, splits, or entrained air holes.
2. Wood shall be fastened with non-corroding screws, twist shank nails or be approved by the Carlisle representative.
3. Wood shall be butted flush with adjoining panels.
4. Irregularities shall be sanded of filled as required to achieve flush surfaces.
5. All adjacent metal flashing shall be galvanized or non-ferrous metal, tight screwed or nailed.
6. Surfaces at joints shall be on the same plane.

D. Condition of Concrete Block Surfaces:

1. Concrete Block surfaces shall be of sound structural grade and shall have a smooth finish, free of holes, cracks, or other defects.
2. All motor joints should be struck flush.
3. Adjoining beams, and other substrates should be butted flush with concrete blocks.
4. Irregularities shall be ground or filled as required to achieve flush surfaces.
5. All adjacent metal flashing shall be galvanized or non-ferrous metal, tight screwed or nailed.
6. Surfaces at joints shall be on the same plane.

3.02 SURFACE PREPARATION:

A. The wall surface must be thoroughly clean, dry and free from any surface contaminates or cleaning residue that may harmfully affect the adhesion of the membrane.
B. All cracks over 1/16" in width should be filled with material compatible to the substrate. Most masonry and wood applications can be filled with exterior grade urethane caulking.
C. All crack filler compound to thoroughly cure prior to proceeding.
D. Trim or detail all door, window, and penetrations using Carlisle's standard details.
E. Brick ledge flashing should be in-place prior to application of Vapor/Air Barrier.

3.03 APPLICATION:

A. Clean surfaces to remove residual dust before priming and install membrane and joint treatments in strict accordance with membrane manufacturers printed instruction.
B. Detail – At all joints, seams, penetrations apply either 30 mil coat of Brriseal containing DCH reinforcing fabric, or apply a strip of CCW-705 membrane to completely cover with generous overlap on a primed surface to maintain the integrity of the vapor barrier.
C. Apply Barriseal from base of wall working up to allow water to drain over the applied area. Install at 31 sq ft per gallon
D. Terminations: Apply the Barriseal on to the edge of brick ledge flashing, door and window flashing tapes. Extend the Barriseal up above the interior living space or on to the roof vapor/air barrier.
E. Protection: Vapor/Air Sheet Membranes are not designed for permanent exposure and should be covered as soon as construction scheduling allows.

END OF SECTION

BUILDING INSULATION SECTION 072100

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Labor, materials, tools, and equipment to perform all operations necessary for thermal insulation work indicated or specified.

B. The applications of thermal insulation specified in this section include the following:

1. Formaldehyde-free blanket type building insulation.

2. Board type cavity wall insulation.

3. Sound absorption semi-rigid board insulation at walls of mechanical rooms.

4. R-values are indicated on the Drawings.

C. Safing insulation is specified in Section 07270 – Firestopping.

1.02 QUALITY ASSURANCE

A. Thermal Resistance Values: Provide, if required, adjusted thicknesses of insulation (based on the insulation's thermal conductivity) to maintain the required thermal resistance. R-values are based on requirements of SPRR 257-55 of the U.S. Department of Commerce.

B. Fire and Insurance Ratings: Comply with the fire resistance, flammability and insurance ratings indicated and comply with code interpretations by governing authorities.

C. Provide insulation with a flame spread rating of less than 25 and a smoke development rating of 50 or less.

D. Single-Source Responsibility for Insulation Products: Obtain each type of insulation from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of work.

1.03 SUBMITTALS

A. Manufacturer's Data: Submit 2 copies of manufacturer's specifications and installation instructions for each type of insulation required. Include data substantiating that the materials comply with specified requirements.

1. Verify in writing compatibility with dampproofing specified in Section 07160.

B. Warranty: Warranty that board insulation will retain 90% of its original R-value for 15 years.

1.04 PRODUCT HANDLING

A. Protection from Deterioration: Do not allow insulation materials to become wet, soiled or covered with ice. Comply with manufacturer's recommendations for handling, storage and protection during installation.

1.05 JOB CONDITIONS

A. Examination of Substrate: The Installer must examine the substrate and the conditions under which the insulation work is to be performed, and notify the Contractor in writing of any unsatisfactory conditions. Do not proceed with the insulation work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Formaldehyde-free Blanket Insulation: Inorganic glass fibers formed with acrylic-thermo setting resins into flexible resilient blankets or semi-rigid resilient boards; complying with ASTM C665, manufacturer's standard lengths and widths as required to coordinate with the spaces to be insulated.

1. Provide unfaced, formaldehyde-free insulation complying with ASTM C665, Type 1, for friction-fitting in walls.
2. Provide edge conditions required for construction indicated on the Drawings and spindle-type anchors to hold insulation permanently in place as indicated below.
3. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation, or thickness indicated, securely in position indicated with self-locking washer in place; and complying with the following requirements:
    a. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
    b. Spindle: Copper-coated low carbon steel, fully annealed, 0.105 inches (2.67 mm) in diameter, length to suit depth of insulation indicated and washer of minimum 1 ½ " diameter.

B. Cavity Board Insulation: Rigid extruded polystyrene XPS board insulation meeting, ASTM C 578-85, Type IV, equal to Dow Chemical Corporation "Styrofoam Square Edge" or "Styrofoam Score Board" and "Formular" by U C Industries, and as follows:

1. Compressive Strength: 25 lb./in.^{2}, minimum (ASTM D 1621).
2. Water Absorption: 0.1% by volume, maximum (ASTM C 272).
3. Foam Blowing Agent: Shall provide at least a 90% reduction in ozone depletion potential as compared with CFCs and shall be certified by foam manufacturer.
4. R-value: 5.0°•ft^2•h/Btu per inch, min. at 75°F mean temperature (ASTM C 518) and warranted by manufacturer to retain at least 90% of its original R-value for 15 years with aged R-value of 5.0 per inch thickness of insulation.
5. Mastic: As recommended by the insulation manufacturer.

C. Sound Absorptive Insulation: 2" thick, 3 lb. density, semi-rigid faced fiber glass insulation board secured to surfaces with adhesive and capped impaling pin fasteners.

1. Approved Products and Manufacturers:

a. Johns Manville InsulShield
b. Owens Corning Type 703
c. CertainTeed Certapro Commercial Board
d. Model 54 panels by Kinetics Noise Control, Inc

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Comply with manufacturer's instructions for the particular conditions 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.

C. Apply a single layer of insulation of the required thickness, unless otherwise shown or required to make up the total thickness.

D. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:

1. Use blanket widths and lengths that fill cavities formed by framing members. Where more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Where insulation is not enclosed by interior finish, i.e. above ceilings fasten insulation spindle anchors to substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Place minimum of two (2) anchors between each stud.
4. After adhesive has dried, install insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers to tips of spindles, taking care not to rupture the insulation.

E. Install cavity wall board insulation horizontally beginning at the bottom of the inner wythe and secure to inner wythe with recommended adhesive. Install subsequent courses of insulation by applying boards directly above the underlying courses with staggered joints. Boards should be tightly butted. Keep insulation above the level of the outer wythe during installation to enable adjustment of insulation. Seal around cut-outs with construction adhesive.

1. On insulation, install small pads of mastic spaced approximately 1'-0" on center both ways on inside face, as recommended by manufacturer. Press courses of insulation between wall anchors and other confining obstructions in the cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
2. Install in accordance with manufacture guidelines,.

F. Sound Absorptive Semi-Rigid Board Application: Insulation shall be adhered at perimeter by a fire retardant adhesive. In addition, insulation shall be secured to substrate using non-ferrous mechanical fasteners. Fasteners shall be 12 gauge perforated base with welded pins and speed clips. Apply fasteners 12" on center maximum with insulation hanger adhesive. Peel and press type fasteners are not acceptable.

1. The pins shall be cut off flush, plastic washers shall be used and installation made so that no gaps or loose edges occur in the insulation. Apply a brush coat of hanger adhesive to washers, extending onto insulation surface a minimum of 2". Top pieces shall be supported by the side pieces. All transverse and longitudinal abutting edges of insulation shall be sealed and lapped 3" with a heavy coat of adhesive.

3.02 PROTECTION

A. General: Protect installed insulation from harmful weather exposures and from possible damage by completing the enclosing construction as soon as possible or by temporary enclosure.

END OF SECTION

FIRESTOPPING SECTION 07270

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Firestopping materials and accessories for all penetrations through existing and new fire rated construction to maintain fire ratings to include, but not limited to the following:

1. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
2. Wall openings at heads of partitions between walls and overhead construction. All penetrations for data/communication cabling shall be firestopped with "putty" type firestopping herein specified to accommodate future removal and reuse

1.02 RELATED SECTIONS

A. Section 09260: Gypsum board systems for fire rated construction.

B. Division 15: Mechanical work requiring firestopping.

C. Division 16: Electrical work requiring firestopping.

1.03 REFERENCES

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. ASTM E814 - Standard Test Method of Fire Tests of Through-Penetration Firestops.

C. UL 1479 Fire Test of Through - Penetration Firestops.

1.04 PERFORMANCE REQUIREMENTS

A. Firestopping Materials: ASTM E814 to achieve a fire rating as noted on Drawings.

B. Surface Burning: ASTM E84 with a flame spread / fuel contributed / smoke developed rating of 20/0/250.

1.05 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data on product characteristics, performance and limitation criteria.

C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

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

1.06 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

B. Applicator: Company specializing in performing the work of this Section approved by manufacturer.

C. Definition of Firestop System: Through Penetration Firestop Systems shall be designed to prevent the spread of fire through openings in fire rated assemblies for a specified period of time. Incorporating the use of specific products installed in a specific manner, they shall only be installed in configurations for which they have been specifically tested and listed by Underwriters Laboratories (UL) per ASTM E 8144 or UL 1479.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire resistance ratings and surface burning characteristics.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when temperature of substrate material and ambient air is below 60 degrees F.

B. Maintain this minimum temperature before, during, and for 3 days after installation of materials.

C. Provide ventilation in areas to receive solvent cured materials.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. 3M

B. Bio Fireshield, Inc.

C. Dow Corning

D. Hilti

2.02 MATERIALS

A. Firestopping Material: Single component elastomeric foam compound or formulated compound mixed with incombustible non-asbestos fibers or mineral fiber stuffing insulation in combination with the above; passing ASTM E814 (UL 1479) Standard Method of Fire Tests for Through Penetration Fire Stops.

B. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces.

2.03 ACCESSORIES

A. Dam Material: Mineral fiber matting, sheet metal, or Alumina silicate fire board, as appropriate for indicated rating, permanently installed and approved by applicable code.

B. Retainers: Clips to support mineral fiber matting.

2.04 FINISHES

A. Color: Dark gray or Black.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that openings are ready to receive the Work of this Section and all work penetrating the openings is completed.

3.02 REPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.

B. Remove incompatible materials which affect bond.

C. Install backing materials to arrest liquid material leakage.

3.03 APPLICATION

A. Apply primer, if necessary, and materials in accordance with manufacturer's instructions.

B. Apply firestopping material in sufficient thickness to achieve rating to uniform density and texture.

C. Install material at walls or partition openings which contain penetrating sleeves, piping, ductwork, conduit and other items requiring firestopping.

D. Dam material to remain in unexposed areas.

3.04 CLEANING

A. Clean Work under provisions of Section 01700.

B. Clean adjacent surfaces of firestopping materials.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

MODIFIED BITUMEN ROOFING SECTION 07500

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Supplementary Conditions, and other General Requirements apply to the work specified in this Section.

1.02 DESCRIPTION OF WORK

A. **Asphalt modified bitumen roofing** shall include:

1. **Metal Deck**: two (2) or more layers of 25 psi insulation, tapered isocyanurate board (minimum 1-1/2 inch thick) mechanically fastened to the deck to meet uplift requirements and 1/2 inch thick overlay board installed on the insulation with low rise foam adhesive, base sheet of modified bitumen membrane applied and top layer with granular surfacing both applied by torched application, and parapet treatment and flashing systems applied by torched application. Provide walk pads where indicated on the drawings

a. **Note:** ½ inch overlay board required at parapet walls to receive parapet flashing.

2. Provide roofing system, type and spacing of fasteners and application to meet the wind uplift requirements , as calculated by ASCE/SEI 7-10 latest edition, and at metal deck application, dd fasteners at the perimeter and corners as required by FM LPDS 1-29: The net design and pressures below represent the net pressures (sum of internal and external) to be applied normal to each building surface, as required by and calculated in accordance with the International Building Code 2021 and any local supplements, and ASCE 7-10 latest edition, based on wind pressures indicated in the S-series drawings and perimeter and corners as required by Codes figured without parapets.

4. Approved Roofing/Flashing Systems: as follows for torch application:

1. Siplast Inc.:
Cap Sheet: Paradiene 30 HT FRTG.
Interply: Paradiene 20 PRTG.
Flashing: Veral Aluminum (138 mils/3.8 mm thick; weight 82 lbs per square;
2. Johns Manville Corporation:
Cap Sheet: JM-Dynaweld Cap FR250
Interply: DynaWeld 180S
Flashing: DynaClad (158 mils/4.0 mm thick; weight 101 lbs per square, with fiberglass mat installed in a two ply system over a base layer of DynaBase)
3. Soprema, Inc.
Cap Sheet: Sopralene 250 Flam FR
Interply: Elastophene HS.
Flashing: Sopralast TV Aluminum, fiberglass reinforced (162 mils/4.2 mm thick, 97 lbs per square), torch applied.
4. Firestone Building Products Company
Cap Sheet: SBS Premium FR Torch White.

Interply: SBS PolyTorch Base
Flashing: Firestone SBS Metal Flash-AL, (150 mils/3.8.mm thick; weight 100 lbs. per square with glass fiber/scrim mat) heat fused.

General notes:

a. All foil faced flashing products shall be resistant to thermal shock.
b. Flashing systems are to be two ply systems (specify backer ply).
c. Note: If required, provide heavier base sheets or other components if required by the roofing manufacturer for the application being used.
d. Provide liquid flashing system (catalyzed acrylic resin and fleece inner layer), where indicated on the drawings and also at pipe and other similar penetrations.

5. If application methods and materials are required to differ from those listed above due to new or existing slopes that are in excess of the slope limit of the specified systems, provide materials and application methods as recommended by the roofing manufacture for those conditions. It is the Contractor's responsibility to verify all slopes and coordinate with roofing manufacturer's requirements.

6. Provide specified insulation with thicknesses to provide an average R-value of 21.

7. Install manufacturer’s walk pads from roof hatch to and around the rooftop equipments, etc. and where indicated on the drawings.

B. Sheet metal work shall include:

1. Metal flashings, scuppers, downspouts, copings, etc as indicated on the drawings associated with the modified bitumen roofing specified in Section 07620-Flashing and Sheetmetal
2. Lead vents.

C. Rough Carpentry: Treated wood nailers.

1.03 QUALITY ASSURANCE

A. Thermal Performance: The roofing system, including roofing, (not including ceiling), and insulation (thickness as required) shall provide an minimum average R-value of 30 with minimum thickness at low point of 1.0 inch thickness at tapered locations.

1. "R" values required are based on requirements of SPR R 257-55 the U.S. Department of Commerce.
2. Provide insulation thicknesses required to achieve slopes indicated which may provide better thermal performance than specified above.

B. Insulation shall have a flame spread of 25 or less and smoke developed factor of 450 or less per ASTM E84.

C. Installer: Roofing and sheet metal work shall be by a single firm that has been in business at least five (5) years, called the Installer in this Section, specializing in the type(s) of roofing required, so that there will be undivided responsibility for the performance of the work.

D. Installer shall be certified as an approved applicator in writing by the roofing materials manufacturer prior to award of contract for the installation of a fully guaranteed roof as required by this specification.

E. UL Rating: Provide materials and roofing systems which have been tested, listed and labeled by UL for the following Class or Rating as roofing:

F. Provide "Class A" rating, except as otherwise indicated.

G. Factory Mutual Rating: Provide materials and roofing systems which have been tested and rated by Factory Mutual Research Corporation for compliance with Class I construction when applied in accordance with Factory Mutual Loss Prevention Data Sheet 1-28 and the Factory Mutual Approval Guide.

H. Manufacturer of Roofing Materials: Obtain primary materials from a single manufacturer, who publishes complete information on the required system, and offers to guarantee or bond the completed roofing installation as required. Obtain secondary materials from sources acceptable to the manufacturer of the primary materials.

I. The roofing system product supplier shall furnish the Roofing Contractor with Material Safety data Sheet/Sheets (MSDS), incorporating OHSA approved form, current edition. Said sheets shall be available at the site at all times until project completion.

J. On Site Inspector: The Owner may require that an inspector be in attendance continually from the beginning of roofing operations.

1.04 MODIFIED BITUMEN CRITERIA

A. General Requirements: All SBS membrane systems shall be a multi-layer, homogeneous roofing sheet assembly with a granular surfacing on the cap sheet layer. All roofing sheets shall be made with identical SBS blend formulations and manufactured using the same process for sheet construction.

B. Performance Features: All SBS membrane systems shall have the following performance features as a minimum.

1. Phased Construction: Each SBS sheet shall be manufactured as an independent waterproofing layer. The independent waterproofing layer design shall allow for phased construction between layers.
2. Granule Surfacing: The finished membrane system shall have a factory applied granule surfacing to allow for ease of inspection, maintenance and repair.
3. Detail Treatments: The SBS membrane terminations and associated roof penetrations shall be waterproofed using conservative detail configurations according to the following basic criteria.
    a. Flanged metal flashings shall be set in mastic over the first SBS layer and waterproofed using a minimum of 2 additional layers of the SBS membrane.
    b. Walls, curbed penetrations, etc. shall be waterproofed using a minimum total of 4 layers of the SBS membrane at junctures of the roof deck to the penetration. The 4 layered construction shall consist of: SBS base ply layer; SBS reinforcing ply layer; SBS cap sheet layer; SBS flashing sheet layer.

4. Underwriters Laboratories Rated: The SBS membrane system shall be UL rated Class A without the necessity for maintenance oriented coatings or surfacings.
5. Physical Properties: Each SBS sheet shall have the physical properties as a minimum specified under Part 2 herein.

1.05 PRE-INSTALLATION CONFERENCE

A. Approximately two weeks prior to beginning of roofing operations, the roofing Contractor shall arrange to meet with the Architect, his inspector (if any), a representative of the material's manufacturer, and his project foreman which will be required to be on the roof at all times when any roofing is being done, for the purpose of reviewing specification requirements, construction procedures, and the prevalent job conditions under which the work is to be performed.

1. Meet with Owner; Architect; Owner's insurer, if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and attachment to structural members.
4. Review loading limitations of deck during and after roofing.
5. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
6. Review governing regulations and requirements for insurance, certifications, and inspection and testing, if applicable.
7. Review temporary protection requirements for roofing system during and after installation.
8. Review roof observation and repair procedures after roofing installation.
9. Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.

1.06 ACCEPTANCE OF ROOF DECK

A. Roofing Contractor shall inspect the roof deck and shall either accept the roof deck or shall indicate to the General Contractor where the deck is not acceptable for proper application of the roofing membrane.

1.07 NOTIFICATION OF START OF WORK

A. The Contractor shall notify the Architect of his intention to begin work not less than 48 hours (2 working days) in advance so that arrangements may be made for an inspector to be present. No work is to be performed without the presence of the inspector.

1.08 SUBMITTALS

A. Manufacturer's Data: Submit two copies of specifications, installation instructions and sample warranty from the manufacturer for each major roofing product, insulation and sheet metal required. Include data substantiating compliance with the requirements. Indicate by transmittal form that the Installer has received a copy of the manufacturer's instructions and recommendations.

B. Furnish approved application recommendations which must include itemizing sequences of applications to provide for (1) inspection and approval by the Manufacturer's representative and the Owner's representative of the first ply or interply membrane complete with flashing installation prior to (2) application of the cap sheet and final finishing work on the flashings, both base and edge.

C. Contractor's Certification: The Contractor shall certify in writing that the materials he will be using in the roofing system(s) shall be in accordance with the specifications.

D. Manufacturer's Certification - Bulk Bitumen: If bulk bitumen is used, submit two copies of manufacturer's certification indicating that materials delivered comply with the required standards. Include statistical and descriptive data for each product. Submit certificate with each load before it is used; or arrange with Architect to submit blanket certification to follow the last load, listing the dates, amounts and other statistical data for each load.

1. Submit continuous log of time and temperature for each load of bitumen, show date obtained from manufacturer, where held and how transported prior to final heating and application on roof.
2. Submit softening point test reports on samples of the bitumen used on the project, taken at the beginning of the days work and at 2-hour intervals during the course of the work thereafter. Test by Ring and Ball Test, ASTM D 36.

E. Sheetmetal Shop Drawings showing layout, profiles, methods of joining, and anchorages details, including counter-flashings, and expansion joint covers. Provide layouts 1/4 inch scale and details at 3 inch scale.

F. Submit, in a ring binder, three (3) copies of all roofing data, including manufacturer's catalogs/manuals of materials and accessories used in the Project, including manufacturer's Maintenance recommendations, for distribution to the User and Umbrella Agencies as directed by the Owner. See Section 01700 - Project Closeout.

1.09 STORAGE AND HANDLING

A. All materials shall be stored off the ground on pallets and protected from damage and moisture by tarpaulins. Do not store felts or roofing materials on the ground or over new concrete floors. Stack roofing felt or roofing materials on the ground or over new concrete floors. Stack roofing felt reels on end during storage. No damp felts, insulation, or gravel shall be used. Avoid prolonged storage of felts at the site. All materials must be absolutely dry and in good condition when ready for use. All materials which in the opinion of the Architect, have become damaged or otherwise unfit for use during delivery or storage shall be replaced at the expense of the Contractor.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Precipitation; Do not apply roofing materials during precipitation or in the event there is a probability of precipitation during application.

B. Temperature Restrictions-asphalt: At ambient temperatures of 40 degrees F and below, special precautions must be taken to ensure that the specified Type IV asphalt maintains a minimum acceptable 400 degrees F at the point of sheet application. The asphalt must not be overheated to compensate for cold conditions, Kettles, carts, etc shall be insulated. Luggers

and carts shall never be more than half filled at all times.

C. Temperature Restrictions-cold adhesive: At low temperatures, the specified adhesive becomes more viscous, making even distribution more difficult. The optimal temperature is 70 degrees F. To facilitate application when ambient temperatures are below 50 degrees F, store the adhesive and roll goods in a warm place immediately prior to use. Roll or broom the sheets to ensure contact with underlying adhesive. Suspend application where the adhesive cannot be kept at temperatures allowing for even distribution.

1.11 PROTECTION REQUIREMENTS

A. Torch Safety: Designate one person on each crew to perform a daily fire watch. The designated crew member shall watch for fires or smoldering materials on all areas of the roof construction. Continue the fire watch after roofing material application has been suspended for the day.

B. Debris Removal: Remove al debris daily from the project site and take to legal dumping area authorized to receive such materials.

1.10 WARRANTY

A. Manufacturer's Warranty: Submit executed copy of roofing manufacturer's watertight "No Dollar Limit" membrane guarantee acceptable to Owner for labor and material of insulation, roofing membrane including flashing endorsement, signed by an authorized representative of the roofing manufacturer, on form which was published with product literature as of the date of Contract Documents, for the following period of time. The roofing guarantee shall not exclude random areas of ponding from the coverage defined as “no standing water after 48-hours from the last rain”.

1. Twenty (20) years from date of substantial completion including specified wind loads.

B. The Roofing Manufacturer's Warranty shall guarantee at the manufacturer's own cost and expense, to make or cause to be made such repairs to or replacement of, to correct any and all faulty installations or materials of the roofing system, to keep the roofing system in a watertight condition throughout the 20 year guarantee period. The guarantee shall not be prorated. The executed guarantee shall be delivered to the Architect in three original counterparts prior to acceptance of the Work. No signature by the Owner shall be required.

PART 2 - PRODUCTS

2.01 MATERIALS GENERAL

A. General: Furnish the specified materials for this roofing operation. Furnish all accessories necessary for a complete roofing and sheet metal job even if not specifically shown or specified. Substitution of any other materials or assemblies will not be permitted without prior approval before bid time.

B. Primer: Provide primer on all substrates to receive roofing components. Primer(s) shall be as recommended by roofing component manufacturers.

2.02 ASPHALT MODIFIED BITUMEN ROOFING

A. Roofing Membrane Assembly: The roof membrane assembly shall consist of two (2) plies of a prefabricated, fiberglass reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane. The cap sheet shall have factory applied granular surfacing. The modified bitumen base ply shall be fully adhered to the prepared substrate as specified herein, and shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system. The modified bitumen cap sheet membrane shall be fully adhered to the modified bitumen base ply as specified herein.

B. Flashing Membrane Assembly: The flashing membrane assembly shall consist of a prefabricated, fiberglass scrim-mat reinforced, Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane with a continuous, channel-embossed metal-foil surfacing. A low softening point asphalt shall be incorporated into the membrane between the metal foil surfacing and the SBS modified bitumen asphalt membrane, at the channels, in order to preclude foil delamination during daily thermal cycling.

C. Granule Surfaced Two-Ply SBS Roofing Membrane System: As follows:

1. Modified Bitumen Base Ply in accordance with ASTM D5147 Test Method:

   a. Compound Stability: Min. 100°C (212°F)
   b. Low Temperature Flexibility: @-25°C (-13°F)
   c. Elongation @23°C (73°F): 3% min. @ 5% max. load
   d. Dimensional Stability: <0.1%
   e. Elongation @-18°C (0°F): 4.5%
   f. Ultimate Elongation**: 50%
   g. Water Absorption (Maximum): 2%

2. Modified Bitumen Cap Sheet in accordance with ASTM D5147 Test Method:

   a. Compound Stability: Min. 100°C (212°F)
   b. Low Temperature Flexibility: @-25°C (-13°F)
   c. Elongation @23°C (73°F): 3% min. @ 5% max. load
   d. Dimensional Stability: <0.1%
   e. Granule Embedment*: <1.5 g. per sample*
   f Breaking Load @-73°F (Ave): 30 lbf/inch
   gb. Ultimate Elongation**: 55%

* This test is based on #11 ceramic coated granules used as surfacing. Using this granule type, there are approximately 6 grams total in the abraded test area.

** Ultimate elongation is measured at the point on the stress-strain curve where the load is reduced to 5% of the reported tensile strength.

D. SBS Flashing Membrane Sheet

1. Modified Bitumen Flashing Sheet in accordance with ASTM D5147 Test Methods:

a. High Temperature Compound Stability: Min. 116°C (240°F)
b. Low Temperature Flexibility: -20°C (-5°F)
c. Tensile Strength (lbs/in.): 100 lbs.
d. Dimensional Stability: 0.5% max.
e. Ultimate Elongation**: 40%

** Ultimate elongation is measured at the point on the stress-strain curve where the load is reduced to 5% of the reported tensile strength.

E. Primer: Primer(s) shall be as recommended by roofing component manufacturers.

1. At wood use asphalt primer complying with ASTM D-41.

F. Asphalt Bitumen: ASTM D 312, Type IV

G. Cant Strips: Fibrous adhered in system complying with uplift requirements.

H. Flashing Cement: ASTM D 2822 Bituminous plastic roofing cement, non-asbestos containing formulation or ASTM D4586, Type II.

I. Lead sheet: Fed. Spec. QQ-L-201, Grade D, hard lead, 4.0 lb.

J. Walkway Protection Board: As part of roofing system; equal to Paratred with CR finish, as a part of the roofing system prefabricated, puncture resistant polyester core reinforced, polymer modified bitumen sheet material topped with a ceramic-coated granule wearing surface to match CR finish ply and as follows:

1. Thickness: 0.217 in (5.5 mm)
2. Weight: 1.8 lb/ft² (8.8 kg/m²)
3. Width: 30 in (76.2 cm)

K. Mechanical Anchors: Type 304 stainless steel, type and size as specifically recommended by the insulation manufacturer for the type of deck used and complying with specified wind load rating requirements.

L. Catalyzed Acrylic Resin Liquid Flashing System: A specialty flashing system consisting of a liquid-applied, fully reinforced, multi-component acrylic membrane installed over a prepared or primed substrate. The flashing
system consists of a catalyzed acrylic resin primer, basecoat and topcoat, combined with a non-woven polyester fleece. The resin and catalyst are pre-mixed immediately prior to installation. The use of the specialty flashing system shall be specifically approved in advance by the membrane manufacturer for each application Provide Parapro 123 Flashing System by Siplast or equal systems by specified manufacturers.

M. Low Rise Foam Adhesive: Single component polyurethane adhesive dispensed from a portable pre-pressurized container requiring no external power source- range of working temperatures (33° F/0.5° C to 111° F/43° C. Equal to INSTA STIK™ Quik Set Commercial Roofing Adhesive by Insta-Foam Products, Div. of Dow Chemical Corp and "OlyBond500" adhesive by OMG

2.03 SHEET METAL AND ACCESSORIES

A. See Section 07620

2.04 ROOF INSULATION

A. Base Layer (Straight and Tapered): A closed cell, rigid polyisocyanurate foam core material, integrally laminated between glass fiber facers. The isocyanurate panel shall be in full compliance with ASTM C1289, Type II, Class1, Grade 3 (25 psi).The panels shall have a minimum thickness of 1 inch and total nominal thickness indicated on the drawings. The insulation, for thermal performance , shall provide an R-value of 6 for each 1.0 thickness installed. Acceptable types are as follows:

1. Equal to " Tapered Partherm" by Siplast, AC Foam II by Atlas Energy Products, and ISO 95+ Insulation by Firestone Building Products, Inc.
2. Tapered units shall have a minimum of 1/4" per foot slope

B. Overlay Panels: Nonstructural, non-woven, non asphaltic glass matts embedded into both faces and 500 PSI moisture-resistant treated faced gypsum core, "Securock" by USG or equal, not requiring priming and compatible with specified roofing system.

1. Insulation panels installed in Low Rise Foam Adhesive shall have a maximum panel size of four (4) feet x four (4) feet.

PART 3 - EXECUTION

3.01 GENERAL

A. All surfaces to be covered shall be smooth, dry and free from dirt, debris and foreign material which will affect the adherence and integrity of the specified materials. Installation of the roofing systems constitutes the acceptance of the roof deck by the Installer.

B. Do not place any load on the roof that will exceed the safe design load.

C. Provide barricades and, where necessary, signs to ensure the safety of the general public and other workmen on the job from fire and falling materials.

D. The Roofing Contractor shall be responsible for the proper attachment of the specified work to any work embedded in, in contact with, or forming an integral part of the specified roofing system.

E. All roof areas shall be accurately laid out for proper lap and sequence of plies, and all plies laid to chalked line. Each ply shall be broomed in place. Felts shall be free from fishmouths, buckles, blisters, or other faulty workmanship.

F. Water Cut Offs: Provide water cut-offs at the end of each day's work or whenever operations cease due to weather conditions. Water cut-offs shall seal the exposed edges of roof insulation and shall consist of two plies of No. 15 tarred felt extending from a point 12" on the roof deck carrying up and over the roofing and extending 6". Hot mop both edges so that they are weathertight. Follow with a glaze coat. Remove the cut-off before commencing work at that point at a later date.

G MAINTAIN A FIRE WATCH FOR TWO (2) HOURS AFTER TORCHING OPERATIONS AS WELL AS WALKING THE ENTIRE ROOF CHECKING FOR “HOT SPOTS” BY USING AN INFRARED HEAT-SENSING THERMOMETER

3.02 INSULATION

A. Comply with the manufacturer's instructions for the particular condition of installation including treatment at edges of each insulated area. Extend insulation in thickness as shown over concrete deck. Cut and fit tightly around obstructions, and fill voids with insulation and mastic. Form crickets and tapered areas as shown and as required for proper drainage of the membrane.

B. Run long joints of insulation in continuous straight line, perpendicular to roof slope, with end joints staggered between rows. Stagger joints two ways in each course by not less than 1/3 of the narrow boards dimension

3.03 ASPHALT MODIFIED BITUMEN ROOFING INSTALLATION

A. Asphalt Modified Bitumen Roofing: Two (2) plies of modified bitumen asphalt membrane set torch application equal to systems specified installed in strict accordance with roof manufacturer's printed instructions.

B. Priming: Prime metal flanges (all jacks, edge metal, lead drain flashings, etc.) and concrete and masonry surfaces with a uniform coating of asphalt primer ASTM D-41-73.

C. Roofing Application: All layers of roofing shall be laid free of wrinkles, creases or fishmouths. Sufficient pressure shall be exerted on the roll during application to ensure prevention of air pockets. Lap seams of the cap sheet layer. The courses shall be staggered to ensure this.
   1. All layers of roofing shall be laid in relation to the slope of the deck as recommended by the manufacturer.
   2. The base ply shall be fully bonded to the prepared substrate and shall have a minimum of three (3) inch side and end laps. Each sheet shall be applied directly behind the asphalt applicator.
   3. The cap sheet shall be bonded to the base ply and have a minimum of three (3) inch side and end laps.
   4. Sufficient pressure shall be exerted on the metal clad modified bitumen sheet to ensure the prevention of air pockets. This can be accomplished by using a damp, kitchen type sponge mop or a damp, heavy duty cotton nap paint roller.
   5. All end laps of the metal-clad modified bitumen flashing sheet shall be primed with a uniform coating of the specified asphalt primer and allowed to thoroughly dry prior to overlapping of adjoining sheets.
   6. All side laps of the metal-clad modified bitumen flashing sheet shall be heat fused to ensure a complete seal.
   7. Maximum sheet lengths and special fastening of the specified roof membrane system may b e required at various slope increments where the roof deck slope exceeds one-half (1/2) inch per foot. The manufacturer shall provide acceptable sheet lengths and the required for all roofing sheet applications to applicable roof slopes.

D. Granule Embedment: Mineral granules shall be broadcast over all bitumen overruns on the

cap sheet surface, while the bitumen is still hot, to ensure a monolithic surface color.

E. Flashing Application at Vertical Walls: Flashing shall be accomplished using the reinforcing sheet and metal foil flashing membrane. The flashing shall be applied in three foot lengths (cut from the end of roll) using the factory selvage edge for laps. The reinforcing sheet shall be lapped a minimum of three (3) inches to itself and shall extend a minimum of three (3) inches onto the base surface and three (3) inches up the parapet wall above the cant. Lap seams in the reinforcing layer shall never coincide with the laps of the metal foil flashing layer. The reinforcing sheet shall be adhered by a mopping of asphalt both wall and sheet. After the cap sheet has been applied to the top of the cant, the surface area that is to receive flashing coverage shall be prepared by torch heating granular surfaces or application of asphalt primer to foil surfaces allowing primer to dry thoroughly. The metal foil flashing sheet shall be torched in place. Pressure shall be exerted on the flashing sheet during application to ensure complete contact with the wall/roof surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. All loose laps and edges shall be checked and sealed. The top edge of the flashing shall be nailed on nine (9) inch centers.

F. Use Of Metallic Powder: Metallic powder shall be broadcast over all bitumen overruns on the metal foil membrane surface color.

G. Lead Pipe Flashings: The lead flanges shall be completely primed and allowed to dry prior to installation. After the base ply has been applied, the flange shall be set in mastic and stripped in using nine (9) inch wide strips of the base ply material. The cap sheet shall then be applied, terminating at the flange-sleeve juncture of the pipe flashing.

H. Sheet Metal Components: In all cases, unless otherwise approved by the roofing manufacturer, flanged components shall be incorporated into the system between the application of the base ply and the cap sheet. The flange must be primed with a uniform coating of approved ASTM D41-73 asphalt primer and allowed to dry thoroughly; all flanges must be set in approved mastic.

I. Catalyzed Acrylic Resin Liquid Flashing System: Install the liquid-applied primer and flashing system in accordance with the membrane system manufacturer’s printed installer’s guidelines and other applicable written recommendations as provided by the manufacturer.

3.05 ROOF ACCESSORIES

A. Install roof accessories in accordance with manufacturer's recommendations. All roof accessories shall be left in a clean and first class condition.

END OF SECTION

SHEET METAL ROOFING SECTION 07610

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Standing seam, concealed fastener, 2 inch high double–lock seams, sheet metal roof system mechanically fastened to metal decking as required to meet the uplift loads and related fascias (14 gauge), gutters, downspouts, flashings and accessory components. 16 gauge galvanized cleats at edge metal fastened to metal deck to meet wind load/uplift requirements; factory finished galvanized metal system, and watertight curbs for roof mounted equipment as part of the roofing work.

B. 25 psi polyiocyanurate roof insulation applied over entire roof, with top layer of insulation applied to base insulation with low rise foam adhesive, with self-adhered waterproof membrane underlayment rated for “high temperature” and slip sheet over entire roof to receive metal roofing , and extending under the internal gutter.

C. Exterior vented metal soffits and also fascias.

1.02 REFERENCES

A. ANSI/ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

B. ANSI/ASTM A167 - Stainless and Heat-Resisting Chromium Nickel Steel Plate, Sheet, and Strip.

C. ANSI/ASTM A446 - 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, General Requirements.

E. ASTM A606 - Steel Sheet and Strip, Hot-Rolled and Cold-Rolled, High-Strength, Low-Alloy, with Improved Corrosion Resistance.

F. ANSI/ASTM E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.

G. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

H. ANSI/ASTM E331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

I. American Iron & Steel Institute (AISI) Specification for the Design of Coldformed Steel Structural Members.

J. SMACNA - Architectural Sheet Metal Manual.

K. AAMA 2605.2 - Specification for High Performance Organic Coating on Architectural Extrusions and Panels.

L. Building Materials Directory - Underwriter's Laboratories, Test Procedure 580.

1.03 SYSTEM DESCRIPTION

A. Roofing System: Preformed and prefinished metal 2 inch high standing seam concealed fastener roofing system with double–lock seams constructed of 24 gauge prefinished galvanized metal equal to “Double-Lock Zee-Lock” roof system by Berridge and “Tite-Loc Plus” by Pac-Clad.

1.04 DESIGN REQUIREMENTS

A. Design and sixe, type and spacing of fasteners, size components to withstand dead and live loads caused by wind uplify and positive
and negative uplift wind pressure acting normal to plane of roof as required by and
calculated in accordance with the International Building Code 2021 and Supplements (local City) and ASCE 7-10 latest edition, based on wind pressure included in the S-series drawings, and corners as defined in Code., and as follows:

1. Limit deflection to L/175.

B. Provide roofing system complying with requirements of Underwriters Laboratory Label UL90 and uplift requirements of ASTM E1592.
1. In addition, the roof system has been tested and certified in accordance with the Army Corps of Engineers Guide Specification 07416 (Test Method for Structural Performance of Standing Seam Metal Roof Systems By Uniform Static Air Pressure Difference).

C. Air Infiltration: Limit air leakage through assembly to 0.06 cfm/min/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with ANSI/ASTM E1680.

D. Water Infiltration: No uncontrolled leakage when measured in accordance with ASTM E1646 with a test pressure difference of 20% of design loads with water rate of 5 gallons per hr. per sq. ft., nor any water leakage at a dynamic pressure at an air stream equivalent to the static pressure specified.

E. System shall accommodate, without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads and deflection of structural support framing.

F. System to provide for expansion and contraction within system components caused by a cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental affect to system components.

G. Thermal Performance: The roofing system, including roofing, (not including ceiling), and insulation (thickness as required) shall provide an minimum long-term thermal Resistance Value of 20.0.

1. "R" values required are based on requirements of SPR R 257-55 the U.S. Department of Commerce.

1.01 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate dimensions, layout, joints, construction details, and methods of anchorage.

C. Samples: Submit two samples of prefinished roofing panel, 12 x 17 inch in size illustrating finish color, sheen and texture.

D. Submit results indicating compliance with minimum requirements of the following performance tests:

1. Air Infiltration ASTM E1680
2. Water Infiltration ASTM E1646
3. Wind Uplift - U.L. 90 and ASTM E 1592
4. Structural Performance - U.S. Army Corps of Engineers 07416.

E. Submit calculations with Louisiana registered engineer seal, verifying roof panel and attachment method resists wind pressures imposed on it pursuant to applicable building codes.

1.02 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

B. Installer: Company specializing in performing the Work of this section with minimum five years documented experience and approved by manufacturer.

1.03 PRE-INSTALLATION CONFERENCE

A. Approximately two weeks prior to beginning of roofing operations and reviewed shop drawing distributed, the roofing Contractor shall arrange to meet with the Architect, his inspector (if any), a representative of the material’s manufacturer, and his project foreman which will be required to be on the roof at all times when any roofing is being done, for the purpose of reviewing specification requirements, construction procedures, and the prevalent job conditions under which the work is to be performed.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.

C. Stack pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

D. Prevent contact with materials which may cause discoloration or staining including exposure to sunlight.

1.10 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.11 WARRANTY

A. Aluminized steel material shall have a twenty year guarantee against failure due to corrosion, rupture or perforation:

B. Manufacturer, along with the applicator, shall provided an NDL warranty agreeing to repair or replace metal roof panel assemblies that fail to remain weathertight, including leaks for the period of ten (10) years from the date of Substantial Completion or longer period as allowed by law

C. Applicator shall furnish NDL guarantee covering watertightness of the roofing system for the period of two (2) years from the date of substantial completion. See Maintenance Guarantee form following this Section

PART 2 - PRODUCTS

2.01 EXTERIOR SHEET METAL

A. Sheetmetal – Aluminum-zinc coated steel, ASTM A792, type AZ-50, Grade 50, minimum 24 gauge, prepared for specified paint finish without negating the 20 year warranty for the aluminized metal.

2.02 ACCESSORIES

A. Sealants: Manufacturer's standard type suitable for use with installation of system; non-staining, skinning, non-shrinking and non-sagging; ultra-violet and ozone resistant; color as selected, equal to Spectrum One by Tremco or equivalent preformed butyl tape.

B. Fasteners: Manufacturer's standard type to suit application (fully concealed); stainless steel.

C. Field Touch-up Paint: As recommended by panel manufacturer.

D. Bituminous Paint: Asphalt base.

2.03 COMPONENTS

A. Exterior Sheet: Minimum 24 gage pre-finished steel stock, profile as indicated; standing seam fitted with continuous gasket cap.

B. Expansion Joints: Same material, thickness and finish as exterior sheets; of profile to suit system.

C. Trim, Closure Pieces, Gutters, Caps and Flashings: Same material, thickness and finish as

exterior sheets; brake formed to required profiles.

1. Comply with SMACNA requirements.
2. Hem all exposed edges of flashing on underside, 1/2 inch.

D. Anchors: Stainless steel.

E. Gutters: Form in sections not less than 8 ft. in length, complete with end pieces, outlet tubes, and any special pieces that may be required. Join sections with riveted and soldered or sealed joints. Unless otherwise indicated, provide expansion-type slip joint at the center of runs. Furnish gutter supports spaced at 36" o.c., constructed of same metal as gutters. Material and finish to match roof panels.

F. Downspouts: Formed in sections approximately 10 ft. long, complete with elbows and offsets. Join sections with minimum 1-1/2" telescoping joints. Provide fasteners for top, bottom, and 5' o.c. intermittently between, designed to securely hold downspouts not less than 1" away from walls. Material and finish to match roof panels.

G. Exterior Metal Soffit Panels: prefinished 24 gauge steel roll-formed. continuous lengths. Panels shall have flat, 12" wide with a “vee” groove every 6” (152 mm) center-to-center,; interlocking male-female side lap; and utilize concealed fasteners

H. Roof Underlayment: Manufacturer's standard composite flashing product consisting of a pliable and highly adhesive rubberized asphalt compound 32 mils thick, bonded completely and integrally to a high-density, cross-laminated polyethylene film, 8 mils (0.2 mm thick, to produce an overall thickness of 40 mils (1.0 mm), rated for 260° F equal to Henry Blueskin PE200HT

1. Primer: Flashing manufacturer's standard product or product recommended by flashing manufacturer for bonding flashing sheets to substrate

I. Base Layer: A closed cell, rigid polyisocyanurate foam core material, integrally laminated between glass fiber facers. The isocyanurate panel shall be in full compliance with ASTM C1289, Type II, Class1, Grade 3 (25 psi).The panels shall have a minimum thickness of 1 inch and total nominal thickness indicated on the drawings. The insulation, for thermal performance , shall provide an R-value of 6 for each 1.0 thickness installed. Acceptable types are as follows:

2. Equal to “Partherm” by Siplast, AC Foam II by Atlas Energy Products, and ISO 95+ Insulation by Firestone Building Products, Inc.

J. Low Rise Foam Adhesive: Single component polyurethane adhesive dispensed from a portable pre-pressurized container requiring no external power source- range of working temperatures (33° F/0.5° C to 111° F/43° C. Equal to INSTA STIK™ Quik Set Commercial Roofing Adhesive by Insta-Foam Products, Div. of Dow Chemical Corp and “OlyBond500” adhesive by OMG

2.03 FABRICATION

F. Form sections true to shape, accurate in size, square, and free from distortion of defects.

G. Panels shall have on-center seam spacing indicated and if not indicated 12 "-16 ", with a seam height of 2" and shall have no exposed fasteners. Panel shall have striations for reinforcement against oil canning

H. Panels shall be roll-formed in continuous lengths from eave to ridge.

I. Concealed continuous anchor clips (minimum16 gauge galvanized steel) shall be spaced as required to meet uplift loads.

1. Clips shall allow roof panels to move as required to accommodate expansion and contraction of panels without contract with factory installed seam sealants.

J. Vertical turn down of roofing shall be continuous without joints; applied cap at change of direction is not permitted.

G. Gutters: Form in sections not less than 8 ft. in length, complete with end pieces, outlet tubes, and any special pieces that may be required. Join sections with riveted and soldered or sealed joints. Unless otherwise indicated, provide expansion-type slip joint at the center of runs. Furnish gutter supports spaced at 36" o.c., constructed of same metal as gutters. Material and finish to match roof panels.

H. Downspouts: Formed in sections approximately 10 ft. long, complete with elbows and offsets. Join sections with minimum 1-1/2" telescoping joints. Provide fasteners for top, bottom, and 5' o.c. intermittently between, designed to securely hold downspouts not less than 1" away from walls. Material and finish to match roof panels

2.05 EXTERIOR METAL SOFFIT PANELS

A. Panels shall be prefinished 24 gauge steel roll-formed in continuous lengths of maximum 40 ft.

B. Panels shall have flat vented panels, 12" wide, 1" depth; interlocking male-female side lap; and utilize concealed fasteners.

C. Attachment to metal supports with #8 x 1/2" TEK screws at maximum spacing of 20" on center

D. McElroy Vented Metal Soffit panels: Marquee-Lok 11”, Color: Charcoal

2.06 FINISH

A. Fluropolymer Coating; Exterior Surfaces: High performance fluoropolymer coloring coating meeting AAMA 605.2 and containing thermocuring polyvinylidene fluoride (70% solids by weight) supplied under license by manufacturers with minimum rated service life of 20 years as published by the manufacturer. Pre-treatment, epoxy primer, and finish coat(s) shall be factory baked-on of 1.0 - 1.25 dry mil thickness (minimum 0.2 - 0.3 dry mil primer and minimum 0.8 dry mil finish).

1. Color: As selected by the Architect

B. Bottom side of sheets shall receive primer of 0.25 dry mil thickness.

C. Polyvinylidene Fluoride (PVDF) Resin Manufacturers:

1. Hylar 5000™, Ausiomont USA, Inc.
2. Kynar 500®, Elf Atochem North America, Inc.

D. Coating Manufacturers: One of the following:

1. Akzo Chemical, Trinar
2. Lilly Co.,; Nubelar
3. Morton International; Fluoroceram
4. PPG Industries, Inc.; Duranar
5. Valspar Corp.; Fluropon

E. Performance Requirements: Provide applied coatings that meet or exceed the criteria for the following tests using the test procedures specified in AAMA 605.2:

F. Qualifications of Applicator: Licensed by the coating manufacturer. Use one applicator for all fluoropolymer coatings in the Project.

G. Provide strippable cover sheet on panels for protection during construction.

PART 3 - EXECUTION

3.01 GENERAL

A. Verify substrate framing.

B. Verify that roof deck is ready to received sheet metal roofing system.

3.02 INSTALLATION - SUBSTRATE

A. Roof insulation: Install insulation with non-corrosive screw fasteners in strict accordance with manufacturers printed installation

B. Sheet Membrane: Prepare substrate surfaces so that they are smooth and free from projections that could puncture flashing. Seal penetrations in flashing with adhesive/sealant/tape as recommended by flashing manufacturer. Prime if recommended by the manufacturer.

1. Install membrane over entire roof area and seal penetrations in strict accordance with the membrane manufacturers printed instructions with overlap joints. Turn up ends not less than 4" to form a continuous pan where installed horizontally. Roll edges and joints to eliminate “fishmouths”.
2, Apply red rosin slip sheet.

3.03 INSTALLATION - SHEET METAL ROOFING AND SOFFITS

A. Comply with manufacturers printed instructions and/or 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 immediately prior to installation of roof panels.

E. Fasten metal roof panels to supports with concealed clips at each standing-seam joint location, spacing, and with self-tapping fasteners recommended by manufacturer, spaced in accordance with approved shop drawings and required by loading.

1. Crimp standing seams with manufacturer-approved motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engage. Install sealants and/or butyl tape for preformed roofing panels as required for weathertightness

F. Install sealants and/or butyl tape for preformed roofing panels as required for weathertightness.

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. Remove and replace any panels or components which are damaged beyond successful repair.

K. Install gutters and downspouts in accordance with SMACNA; slope gutters for positive drainage.

3.04 TOLERANCES

A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.

B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch in 20 feet.

3.05 CLEANING

A. Clean work under provisions of 01700.

B. Remove site cuttings from finish surfaces.

C. Clean and wash pre-finished surfaces with mild soap and water, rinse with clean water.

END OF SECTION

FLASHING AND SHEET METAL SECTION 07620

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Prefinished galvanized metal copings, fascia and internal gutters 160 gauge galvanized cleats; factory finished galvanized metal system. Fascia panels shall be 14 ga with flat-lock seams.

B. Miscellaneous sheet metal flashings, counterflashing, and accessories, stainless steel.

C. Sheetmetal flashings, gutters, etc associated witeh metal roofing is specified in Section 07610

1.02 RELATED SECTIONS

A Section 07610 - Sheet Metal Roofing for flashings and trim associated with that system.

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1.03 SUBMITTALS

A. Manufacturer's Data: Submit two copies of specifications, installation instructions and sample warranty from the manufacturer for flashing and sheetmetal required. Include data substantiating compliance with the requirements.

B. Sheetmetal Shop Drawings: Showing layout, profiles, methods of joining, and anchorages details. Provide layouts 1/4 inch scale and details at 3 inch scale.

C. Samples of the following sheet metal and accessory items:

1. 8 inch square samples of specified sheet materials to be exposed as finished surfaces.
2. 12 inch long samples of factory-fabricated products exposed as finished work. Provide complete with specified factory finish.

1.04 QUALITY ASSURANCE

A. Insurance Requirements: Provide fascia systems complying with Factory Mutual Loss Prevention Data Sheets 1-49 "Perimeter Flashing" requirements in either of the following categories and wind zones.

B. Industry Standards: Provide products which comply with applicable requirements of SMACNA "Architectural Sheet Metal Manual" except as otherwise indicated.

C. Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as required by and calculated in accordance with the International Building Code 2015 and Supplements (local Parish) and ASCE 7-10, measured in accordance with ANSI/ASTM E330 and when tested in accordance with ANSI/ASTM E330, based on wind pressure indicated on the S-series drawings, and corners as required by Codes

C. The edge metal product shall be UL Classified by Underwriters Laboratories, Inc.® or other 3rd party verification of compliance with the ANSI/SPRI ES-1 Wind Design Standard for Edge Systems Used With Low Slope Roofing

PART 2 - PRODUCTS

2.01 SHEET METAL MATERIALS AND ACCESSORIES

A. Stainless Steel: AISI Type 302/304, complying with ASTM A 167, 2B Inviramatte finish, soft, except where harder temper required for forming or performance; 24 gauge except as otherwise indicated.

1. Solder: ASTM B 32 50% tin, 50% lead with flux approved for use with specified steel sheet metal.

C. Prefinished Galvanized Sheet Metal: Commercial quality carbon steel sheets with minimum of 0.20% copper content complying with ASTM A 526, except provide ASTM A 527 where lock-forming is required; hot-dip galvanized to comply with ASTM A 525, designation 90, prefinished with specified PVF2 coating; minumun 24 gauge unless otherwise noted or required by SMACNA for particular application.

1.. High Performance Finish Coating: AA-C12C42R1x (cleaned with inhibitive chemicals, conversion coated with an acid-chromate-fluoride-phosphate treatment and painted with organic coating specified below). Apply in strict compliance with coating and resin manufacturer's instructions using a licensed applicator.

2. Fluorocarbon PVF 2 Coating: Inhibitive thermo-cured primer, minimum 0.2-mil dry film thickness, and thermo-cured fluorocarbon coating containing 70% strength "Kynar 500" or "Hylar 5000" resin, two coat system with minimum 1.0-mil dry film thickness complying with AAMA 2603

D. Miscellaneous Materials and Accessories:

1. Solder: For use with steel or copper, provide 50 - 50 tin/lead solder (ASTM B 32), with rosin flux.

2. Fasteners: 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.

3. Bituminous Coating: SSPC - Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.

4. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, non-drying, nonmigrating sealant.

5. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealers".

6. Metal Accessories: Provide sheet metal clips, straps, anchoring devices and similar

accessory units as required for installation of work, matching material being installed, noncorrosive, size and gage required for performance but not less than item being anchored.

7. Roofing Cement: ASTM D 2822, asphaltic.

8. Epoxy Seam Sealer: 2 part noncorrosive metal seam cementing compound, recommended by metal manufacturer for exterior/interior nonmoving joints included riveted joints

9. Cleats shall be 20 gauge galvanized steel

2.02 SHEETMETAL FABRICATION

A. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels indicated.

1. Exposed edges folded back to form hems.

B. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.

C. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

D. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints)..

E. Gutters: Form in sections not less than 8 ft. in length, complete with end pieces, outlet tubes, and any special pieces that may be required. Join sections with riveted and soldered or sealed joints. Unless otherwise indicated, provide expansion-type slip joint at the center of runs. Furnish gutter supports spaced at 30" o.c., constructed of same metal as gutters.

G. Downspouts: Formed in sections approximately 10 ft. long, complete with elbows and offsets. Join sections with minimum 1-1/2" telescoping joints. Provide fasteners for top, bottom, and 4' o.c. intermittently between, designed to securely hold downspouts not less than 1" away from walls

2.03 MEMBRANE SHEET FLASHINGS

A. Rubberized Asphalt Sheet Flashing: Manufacturer's standard composite flashing product consisting of a pliable and highly adhesive rubberized asphalt compound 32 mils thick, bonded completely and integrally to a high-density, cross-laminated polyethylene film, 8 mils (0.2 mm thick, to produce an overall thickness of 40 mils (1.0 mm), Perm-A Barrier by W.R. Grace and equal product by Sandal.

1. Primer: Flashing manufacturer's standard product or product recommended by flashing manufacturer for bonding flashing sheets to masonry and concrete

PART 3 - EXECUTION

3.01 SHEET METAL

A. Furnish and install sheet metal roof edges, copings, flashing and counterflashing and protrusions in a manner indicated or implied by the Plans and Specifications and as recommended by the manufacturer and SMACNA.

B. Join sheet metal using a flat locked seam or lapped and securely soldered joints. For gravel guards butt ends together and furnish a joint cover 4" wide, fully bedded in flashing cement, and securely locked to the gravel guard. Make allowance at all joints for expansion and contraction. At exposed edges, sheet metal shall be hemmed and returned upon itself 1/2" for strength. At lap joints, make hems together so that one slides into the other. Nail down all metal flanges 3" on center.

C. All corners shall be factory fabricated.

D. All items passing through the roof whether shown or not shall be provided with collar and umbrella flashing or pipe penetration seals.

E. Metal Pipe Flashings: Consist of a two (2) component assembly as follows:

1. The first component shall be a stainless steel metal roof jack having a minimum four (4) inch perimeter flange, and a sleeve opening to fit closely around the penetration without forcing, with a minimum eight (8) inch height. All metal laps shall be fastened and soldered.

2. The second component shall be a stainless steel, watertight umbrella, fabricated to be mechanically secured tightly by stainless steel drawband around the roof penetration and extended beyond the roof jack opening by a minimum radius of three (3) inches. The top edge of the watertight umbrella shall be caulked using an approved sealant.

F. Cleaning: Upon completion, all exposed sheet metal work shall be cleaned of all grease spots, oil, dirt, solder spatter, and the work shall be left in a clean and first class condition.

G. Underlayment: Where stainless steel or aluminum is to be installed directly on cementitious or wood substrates, install a slip sheet of red rosin paper and a course of polyethylene underlayment.

H. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.

I. Install counterflashing in reglets, either by snap-in seal arrangement or by welding in place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure.

K. Install gutters and downspouts in accordance with SMACNA; slope gutters for positive drainage

L. Downspouts shall be installed with a minimum of three (3) straps for every 8 ft. of run

M. Metal edge securement shall be designed and installed in strict accordance with ANSI/SPRI ES-1, except basic wind speed shall be determined from Figure 1609 of the 2006 edition of the International Building Code. Nailer securement shall resist a vertical load of 200lbf/Ft or the design load, whichever is greater. Bolts shall be staggered to avoid splitting the wood. Fasteners shall be located approximately 4 inches but not less than 3 inches from each end of the wood blocking Fasteners shall be staggered, spaced at a maximum 12 inches on center and penetrate the wood sufficiently to achieve the design pullout resistance. Spacing of fasteners shall be on maximum 6 inch centers in corner regions of the buildingNail flanges of expansion joint units to curb nailers, at maximum spacing of 6 inches o.c. Fabricate seams at joints between units with minimum 3 inch overlap, to form a continuous, waterproof system.

3.02 RUBBERIZED SHEET MEMBRANE FLASHINGS

A. Prepare substrate surfaces so that they are smooth and free from projections that could puncture flashing. Seal penetrations in flashing with adhesive/sealant/tape as recommended by flashing manufacturer. Prime if recommended by the manufacturer

B. Install membrane and seal penetrations in strict accordance with the membrane manufacturers printed instructions. Turn up ends not less than 4" to form a continuous pan where installed horizontally. Roll edges and joints to eliminate “fishmouths”.

END OF SECTION

ROOF ACCESSORIES SECTION 07800

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Roof hatches of size indicated on the drawings, able to resist 145 mph winds

1.02 RELATED SECTIONS

A. Section 07600 - Roofing and Sheetmetal

1.03 SUBMITTALS

A. Submit under provision of Section 01300.

B. Product Data: Provide product data on system including flashing materials, and insulation.

C. Shop Drawings: Submit shop drawings of units where Product Data does not adequately depict the units. Include roof plan indicating model numbers at required roof accessory locations.

1.04 PRE-INSTALLATION CONFERENCE

A. Review procedures and coordination required with related Work.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original containers, dry, undamaged, sealed and labels intact.

B. Store products in weather protected environment, clear of ground and moisture.

1.06 COORDINATION

A. Coordinate the work with the installation of roofing and associated metal flashings, as the work of this section proceeds.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Zinc-Coated Steel: Commercial quality with 0.20% copper, ASTM A 525, G90 hot-dip galvanized, mill phosphatized.

B. Insulation: Manufacturer's standard rigid or semi-rigid board of glass fiber of thickness indicated.

C. Wood Nailers: Softwood lumber, pressure treated with water-borne preservatives for above-ground use, complying with AWPB LP-2; not less than 1-1/2" thick.

D. Fasteners: Same metal as metals being fastened, or non-magnetic stainless steel or other non-corrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.

1. Where removal of exterior exposed fasteners affords access to building, provide non-removable fastener heads.

2.02 PRODUCTS AND FABRICATION, GENERAL

A. Provide manufacturer's standard products except as otherwise indicated and comply with applicable recommendations and details of the "Architectural Sheet Metal Manual" by SMACNA for custom fabricated work.

B. Fabricate units to withstand 50-lb. live loading, except for other superimposed loading as shown.

2.03 ROOF HATCHES

A. Fabricate units of sizes shown, single-leaf type unless otherwise indicated, for 40 lbs. per sq. ft. external loading and 20 lbs. per sq. ft. internal loading pressure. Frame with integral-curb double-wall construction with insulation and cap flashing (roofing counterflashing), with welded corner joints. Provide single cover (lid) construction with insulation core. Equip units with complete hardware set including hold-open devices, interior padlock hasps, and both interior and exterior latch handles. Provide gasketing for a watertight installation. Fabricate units of following materials:

1. Metal: 11 gauge aluminum curb and 11 gauge aluminum hatch door.

2. Well Liner: Manufacturer's standard sheet metal well liner, primed for paint finish.

3. 3” of polyisocyanurate insulation provides an R-value of 20

4. Manufacturers - Roof Hatches:
   1. Bilco Company; Type TB (all types and special size): www.bilco.com/sle.
   2. J.L. Industries by Activar Construction Products Group, Inc.; Model RHA: www.activarcpg.com/jl-industries.
   3. Milcor, Inc.; M-1: www.milcorinc.com.
   4. Nystrom Building Products; Model RHEA: www.nystrom.com

B. Railing: Fixed hatch railing system complying with OSHA fall protection regulations (29 FR 1910.23, equal to "Bil-Guard Hatch Railing System" by Bilco.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck surfaces are dry.

3.02 INSTALLATION

A. General: Comply with manufacturer's printed 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.

1. Except as otherwise indicated, install roof accessory items in accordance with construction details of "NRCA Roofing and Waterproofing Manual".

B. Isolation: Where metal surfaces of units are to be installed in contact with non-compatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.

C. Flange Seals: Except as otherwise indicated, set flanges of accessory units in a thick bed of roofing cement, to form a seal.

D. Cap Flashing: Where cap, flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing (as counter flashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.

E. Operational Units: Test operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

3.03 MISCELLANEOUS FLASHINGS AND ACCESSORIES

A. Comply with manufacturer's printed instructions and recommendations. Coordinate with installation of substrates to receive accessory units, 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.

1. Except as otherwise indicated, install roof accessory items in accordance with construction details of "NRCA Roofing and Waterproofing Manual."

3.04 CLEANING

A. In areas where finished surfaces are soiled by Work of this section, consult manufacturer of surfaces for cleaning advice and conform to their instructions.

3.05 PROTECTION

A. Protect building surfaces against damage from roofing work.

END OF SECTION

JOINT SEALERS SECTION 07900

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Preparing substrate surfaces.

B. Sealant and joint backing for walls, joints, paving joints, etc. Also, preformed compressible joint sealers at penetrations where indicated on the drawings.

1.02 RELATED SECTIONS

A. Section 07270 - Firestopping: Sealants required in conjunction with firestopping.

B. Section 07600 - Roofing and Sheet Metal: Sealants required in conjunction with roofing and flashing.

C. Section 08800 and 08900 - Glazing: Sealants required in conjunction with glazing methods.

1.03 REFERENCES

A. ASTM C790 - Use of Latex Sealing Compounds.

B. ASTM C804 - Use of Solvent-Release Type Sealants.

C. ASTM C834 - Latex Sealing Compounds.

D. ASTM C920 - Elastomeric Joint Sealants.

E. ASTM C962 - Use of Elastomeric Joint Sealers.

F. ASTM C1193 - Guide for Use of Joint Sealants.

G. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations and color availability.

C. Samples: Submit two samples, 1/2” x 3” inch in size illustrating sealant colors for selection.

D. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

E. Test Reports: Submit the following test reports by the sealant manufacturer:

1. Compatibility and adhesion test reports indicating that materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion.
2. Preconstruction joint sealer-substrate test results including recommendations of joint sealer manufacturer for joint preparation and application of joint sealers applicable to project conditions.
3. Certified test reports for elastomeric sealants evidencing compliance with requirements specified based on comprehensive testing of current product formulations within a 24-month period of preceding date of submission of test reports to Architect. Include test results for aged performances including hardness, stain resistance, adhesion and cohesion under cyclic movement (ASTM C719), low-temperature flexibility, modulus of elasticity at 100% strain, effects of heat aging, and effects of accelerated weathering.
4. Preconstruction field test results reported by Installer indicating which products and joint preparation methods demonstrated acceptable adhesion to joint substrates.

F. Certificates: Submit certificates from manufacturers of joint sealers attesting that their products comply with specification requirements, are compatible with all materials in contact with joint backers and sealants, and will not bleed into adjacent surfaces, and are suitable for the use indicated.

1.05 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants for exterior applications that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates and adjacent surfaces.

B. Provide joint sealants for interior applications that have been produced and installed to establish and maintain air tight continuous seals that are water resistant and cause no staining or deterioration of joint substrates and adjacent surfaces.

1.06 QUALITY ASSURANCE

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

B. Maintain copies of each document on site.

C. Single Source Responsibility: Obtain joint sealer materials from a single manufacturer for each different product required.

D. Testing Laboratory Qualifications: To qualify for acceptance, an independent testing laboratory must demonstrate to Architect's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct satisfactorily the testing indicated without delaying progress of the work.

1. All cost of testing laboratory services shall be borne by the Contractor.

E. Preconstruction Compatibility and Adhesion Tests: Submit substrate materials representative of actual joint surfaces to be sealed to manufacturer of joint sealer products for laboratory testing of sealants for adhesion to primed and unprimed substrates and for compatibility with secondary seals, if required, as indicated below:

1. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealers to joint substrates under environmental conditions that will exist during actual installation.
2. Submit not less than 9 pieces of each type of material, including joint substrates, shims, joint sealant backings, secondary seals, and miscellaneous materials.
3. Schedule sufficient time for testing and analysis of results to prevent delay in the progress of the work.
4. Investigate materials failing compatibility or adhesion tests and obtain joint sealant manufacturer's written recommendations for corrective measures, including use of specially formulated primers.

F. Preconstruction Field Tests: Prior to installation of joint sealants, field-test adhesion to joint substrates as follows:

1. Install joint sealants in 5-feet joint lengths using same materials and methods required for completed work. Allow sealants to cure before testing. Test adhesion to joint substrates by manually trying to pull joint sealant out of joint.
   a. Make knife cuts horizontally from one side of joint to the other followed by 2 vertical cuts approximately 2 inches long at side of joint and meeting horizontal cut at tom of 3 inch cuts. Place a mark 1 inch from top of 2 inch piece.
   b. Use fingers to grasp 2 inch piece of sealant just above 1 inch mark; pull firmly down at a 90 degree angle or more while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
2. Locate test joints where indicated or, if not indicated, as directed by Architect.
3. Perform field tests for each application as follows:
   a. Each type of elastomeric sealant and joint substrate application indicated.
   b. Perform tests in Architect's presence.
4. Report whether or not sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.
5. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

G. Field-Constructed Mock-Ups: Prior to installation of joint sealers, apply elastomeric sealants to the following selected building joint as indicated below for further verification of colors selected from sample submittals and to represent completed work for qualities of appearance, materials and applications.
1. Joints in field-constructed mock-ups of assemblies specified in other sections which are indicated to receive elastomeric joint sealants as work of this section.
2. Retain mock-up during construction as standard for judging completed work.

1.07 QUALIFICATIONS

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

B. Applicator: Company specializing in performing the work of this section with minimum 5 years documented experience and approved by manufacturer.

1.08 ENVIRONMENTAL REQUIREMENTS

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

1.09 COORDINATION

A. Coordinate work.

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

1.10 WARRANTY

A. Provide five (5) year labor warranty and twenty (20) year material warranty under provisions of Section 01400.

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

PART 2 – PRODUCTS

2.01 MATERIALS, GENERAL

A. Colors: For exposed materials, provide color as selected by Architect from manufacturer's standard colors. For concealed materials, provide the natural color which has the best overall performance characteristics.

B. Compatibility: Before purchase of each required material, confirm its compatibility with each other material it will be exposed to and be in contact with in the joint system.

C. Size and Shape of Joint: As shown, or if not shown, as recommended by the manufacturer for the type and condition of joint, and for the indicated joint performance or movement.

2.02 SEALANTS

A. Exterior Silicone Elastomeric Sealant **(Type A)**: One-Part Neutral-Curing, ASTM C 920, Type S; Grade NS, Class 05; Uses NT, G, A, and O as applicable to uses indicated, ± 50% movement capability after 5 years, and complying with requirements for medium modulus as required for indicated application and recommended by the manufacturer.

1. Dowsil 756 SMS (Non-Staining) sealant
2. Silpruf NB 9000 (Non-Staining) ; G.E

NOTE: Sealant must be tested and certified in writing not to stain or discolor adjacent surfaces.

B. Polyurethane Sealant **(Type B)**: ASTM C920, Type S, Grade NS, Class 25, Use NT, M, A and O, single component, chemical curing, non-staining, non-bleeding, non-sagging:

1. Sikaflex-la; Sika Chemical Corp.
2. Sonolastic, NPI; Sonneborn/Contech, Inc.
3. Dymonic; Tremco
4. Vulken 921; Mameco International, Inc.

C. Polyurethane Sealant **(Type C)**: ASTM C920, Grade P/NS, Class 25, Type M/S; multi-component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, self-leveling type:

1. TCH-900/901; Tremco
2. Chem-Calk 550; Woodmont Products, Inc.
3. Sonolastic Pavement Joint Sealer; Sonneborn/Contech, Inc.
4. NR-200 Urexpan; Pecora Chemical Co.
5. Vulken 245; Mameco International, Inc.

D. Butyl Sealant **(Type D)**: ASTM C920, Grade single component, solvent release, non-skinning, non-sagging:

1. Elongation Capability 7 to 10 percent
2. Service Temperature Range -13 to 180 degrees F.
3. Shore A Hardness Range 10 to 30

E. Acrylic Emulsion Latex **(Type E)**: ASTM C834, single component:

1. AC20 Acrylic Latex Caulk; Pecora Chemical Co.
2. Latex Caulk; DAP
3. Chem-Calk 600; Woodmont Products, Inc.
4. Acrylic Latex Caulk; Tremco

F. Silicone Sanitary Sealant **(Type F)**: ASTM C920, Grade P/NS, Class 25, single component, solvent curing, non-sagging, non-staining, fungus/mildew resistant, non bleeding.

1. Sanitary 1700; G.E.
2. Dowsil™786 Silicone Sealant

2.03 PREFORMED COMPRESSIBLE JOINT SEALER

A. Permanently elastic, high density, open-cell polyurethane foam, impregnated with water based polymer modified asphalt, compressed to approximately 25% of its uncompressed form dimension. Equal to 25V by Emseal corp.

2.04 ACCESSORIES

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: ASTM C962; round, closed cell, non absorbent to liquid water and gas, non-outgassing polyethylene foam rod; acceptable to the manufacturer, oversized 30 to 50 percent larger than joint width equal to:

1. Ethofoam by Dow Chemical Co.
2. Minicel by Haveq Industries

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

E. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

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

3.02 PREPARATION

A. Perform preparation in accordance with manufacturer's instructions.

B. Immediately before installing sealants remove loose materials and foreign matter which might impair adhesion of sealant.

C. Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

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

1. Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION

A. Install sealant in accordance with manufacturer's printed instructions and ASTM C 1193.

B. Measure joint dimensions and size materials to achieve width/depth ratios recommended by the manufacturer.

C. Install backer rods of type indicated to provide support of sealants during application and at a position required to product uniform cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability. All joints shall be used 25 - 30% under compression.
   1. Do not leave gaps between ends of joint fillers.
   2. Do not stretch, twist, puncture, or tear joint fillers.
   3. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.

D. Install bond breaker tape wherever required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly and when backer rod cannot be implemented.

E. Install sealants to depths as shown or, if not shown, as recommended by the sealant manufacturer.

F. Apply sealant with sufficient pressure to completely fill the void space and to assure complete wetting of contact area to obtain uniform adhesion. During the application, keep the tip of nozzle at the bottom of joint, forcing sealant to fill from bottom to top. Move tip along joint at a rate as to completely fill the joint.

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

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

I. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
   1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

3.04 CLEANING

A. Clean work under provisions of 01700.

B. Clean adjacent soiled surfaces.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished installation under provisions of Section 01500.

B. Protect sealants until cured.

3.06 SCHEDULE

A. **Sealant Type A:** as follows:

1. Exterior Openings: Caulk perimeter joints of exterior openings, such as doors, louvers, windows, penetrations, etc. and all penetrations to exclude water, i.e. handrail brackets, outlet boxes, fixture attachments, etc

B. **Sealant Type B:** As follows:

1. Interior Joints: Caulk all interior joints 3/8" wide or more.
2. Flashing at Roof: See section 07600, caulk all joints.

C. **Sealant Type C:** As follows:

1. Expansion Joints: Caulk all expansion joints of traffic-bearing decorative paving including exterior decorative paving where indicated "sealant" on the Drawings.

D. **Sealant Type D:** As follows:

1. Thresholds: Set thresholds in bed of sealant; where thresholds have weep holes, keep the weep clear and remove excess sealant.

E. **Interior Caulking Type E:** As follows:

1. Door Frames: Caulk perimeter joints of metal frames.
2. Casework: Caulk at contact with wall construction where gaps occur.
3. Joints: Caulk all joints 1/4" wide or less, except use Type B sealant at joints 3/8" wide or more.

F. **Interior Sealant Type F:** As follows:

1. Caulk at all plumbing fixtures and countertops in “wet areas” contact with wall construction and all food preparation areas.
2. Expansion joints in tile finish.

END OF SECTION

STEEL DOORS AND FRAMES SECTION 08112

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Steel doors and frames; interior and exterior, and frames for glazing; paint finish.

1.02 RELATED SECTIONS

A. Section 08710 - Door Hardware

B. Section 08800 - Glazing

C. Section 09900 - Painting: Field painting of doors

1.03 REFERENCES

A. ANSI A117.1 - Specifications for Making Building and Facilities Accessible to an Usable by Physically Handicapped People

B. ANSI/SDI-100 - Standard Steel Doors and Frames

C. ASTM A224.1 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces.

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

E. DHI - Door Hardware Institute: The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware

F. ASTM E152 - Methods of Fire Tests of Door Assemblies

G. NFPA 80 - Fire Doors and Windows

H. NFPA 252 - Fire Tests for Door Assemblies

I. UL 10B - Fire Tests of Door Assemblies

J. U.S. Department of State, Bureau of Diplomatic Security; SD-STD-01.01, Revision G Amended April 30, 1993

1.04 SUBMITTALS

A. Submit under provisions of Section 01300

B. Product Data: Indicate frame configuration, anchor types and spacings, location of cut-outs for hardware, reinforcement.

C. Manufacturer's Installation Instructions: Indicate special installation instructions.

D. Shop Drawings: Indicate door elevations, internal reinforcement, closure method, and cut-outs for glazing, louvers, and finish.

1.05 QUALITY ASSURANCE

A. Conform to requirements of ANSI/SDI-100 by the Steel Door Institute and ANSI A117.1.

B. Maintain one copy of each document on site.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.

1.07 REGULATORY REQUIREMENTS

A. Fire Rated Construction: Conform to ASTM E152, NFPA 252 or UL 10B.

B. Installed Assembly: Conform to NFPA 80 for fire rated class as scheduled.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Section 01600.

B. Accept doors and frames on site in manufacturer's packaging. Inspect for damage.

1.08 COORDINATION

A. Coordinate the work with frame opening construction, door and hardware installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Steelcraft Manufacturing Company

B. Republic Steel Corporation

C. Amweld Building Products Division

D. Ceco Industries, Medallion Design

E. Curries

F. Amertex

G. Pioneer Industries, Inc.

H. Steward Steel, Inc

I. Metal Products, Inc

2.02 MATERIALS

A. Hot-Rolled Steel Sheets: Commercial quality carbon steel, pickled and oiled, complying with ASTM A1011 and ASTM A568.

B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A1008 and ASTM A568.

C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A924 and ASTM A653, with ASTM A525 G90 zinc coating, mill phosphatized for preparation of paint coating.

D. Supports and Anchors: Fabricate of not less than 18 gage galvanized sheet steel.

E. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanized items to be built into exterior walls, complying with ASTM A153, Class C or D as applicable.

F. Shop Applied Paint: Rust-inhibitive primer, either air-drying or baking, suitable as a base for specified finish paints.

2.03 FRAMES

A. Exterior Frames: 14 gauge thick galvanized steel material, base metal thickness fully welded frame units.

B. Interior Frames: 16 gauge thick cold-rolled or hot-rolled steel material, base metal thickness fully welded frame units.

C. Jamb Anchors:

1. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
2. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.

D. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

E. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.04 DOORS

A. Exterior Doors: SDI-100 Level 3, (Extra Heavy Duty) Model 2 (Seamless Design) of galvanized steel.

B. Interior Doors (Non-rated): SDI-100 Level 3, (Extra Heavy Duty) Model 2 (Seamless Design) of cold-rolled steel.

C. Interior Doors (Fire Rated): SDI-100 Level 3, (Extra Heavy Duty) Model 2 (Seamless Design) of cold-rolled steel.

D. Face: Steel sheet in accordance with ANSI/SDI 100 but not less than 16 gauge; stainless steel where indicated.

E. Core: 20 gage steel channel vertical steel stiffeners at 6" o.c. with noncombustible insulation solidly packed between steel members or solid spray polyurethane foam insulation core per ANSI A250.8, Section 2.3.2 at exterior locations, and manufacturers standard noncombustible honeycomb core at interior locations.

2.05 ACCESSORIES

A. Silencers: Resilient rubber fitted into drilled hole.

2.06 FABRICATION

A. Fabricate frames as a single welded unit.

1. Knock down frames are not acceptable.

B. Fabricate frames with hardware reinforcement plates welded in place.

C. Fabricate doors with hardware reinforcement welded in place.

D. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.

E. Prepare frame for silencers. Provide three single silencers for single doors on strike side. Provide two single silencers on frame head at double doors without mullions.

F. Door shall be 1-3/4" thick unless otherwise indicated.

G. Astragals for double doors: Steel, T-shaped, specifically for double doors.

H. Close top edge of exterior doors with flush end closure. Seal joints watertight.

I. Door faces shall be joined at vertical edges of door by a continuous weld extending full height of door. Welds shall be ground, filled and dressed smooth to provide a smooth flush surface.

J. Top and bottom edges of doors shall be closed with a continuous recessed steel channel not less than 16 gauge, extending full width of door and spot weld to both faces. Exterior doors shall have an additional flush closing channel at top and bottom edges. Openings shall be provided in the bottom closure channel at top and bottom edges. Openings shall be provided in the bottom closure of exterior doors to permit the escape of entrapped moisture.

2.07 HARDWARE PREPARATION

A. Mortise Hardware Preparation: Reinforce, drill and tap doors and frames to receive mortised hinges, locks, latches, flush bolts and concealed door closers as required. Preparation shall be in accordance with applicable requirements of ANSI A115.

B. Surface Applied Hardware: Field drilling and/or tapping for surface applied hardware by others is standard.

C. Reinforcings: Provide minimum hardware reinforcing gages as noted in SDI-107.

D. Locate finish hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware", published by Door and Hardware Institute.

2.08 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator’s shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 0 gauge thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames

2.08 NOMINAL DESIGN CLEARANCES

A. The nominal clearance between the door and frame head and jamb s shall be 1/8" in the case of both single swing and pairs of doors.

B. The nominal clearance between the meeting edges of pairs of doors can range from 1/8" to 1/4" (1/8" for fire rated doors).

C. The nominal clearance at the bottom shall be 3/4".

D. The nominal clearance between the face of the door and door stop shall be 1/16".

E. All clearances are subject to a tolerance of + or - 1/32".

2.09 STEEL SHEET FINISH

A. Doors and frames leading to the exterior shall be galvanized in accordance with ASTM A525 G60.

B. Primer: Air dried or baked complying with requirements for acceptance stated in ANSI A224.1 with minimum 1.2 dry mil thickness. Doors and frames shall be thoroughly cleaned, and chemically treated to insure maximum paint adhesion. All surfaces of the door and frame exposed to view shall receive a factory applied coat of rust inhibiting primer, either air-dried or baked-on. The finish shall meet the requirements for acceptance stated in ANSI/SDI A250.10 "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes and tolerances are acceptable.

3.02 INSTALLATION

A. Install doors and frames in accordance with ANSI/SDI-100 and DHI.

B. Place frames in accordance with SDI-105 "Recommended Erection Instructions for Steel Frames", with a minimum of three (3) wall anchors per at hinge and strike levels and four (4) anchors for frames over 7'-6" in height.

C. Doors shall be installed and fastened to maintain alignment with frames to achieve maximum operational effectiveness and appearance. Doors shall be adjusted to maintain perimeter clearances specified. Shimming shall be performed by the installer as needed to assure the proper clearances are achieved

D. Coordinate installation of doors and frames with installation of hardware specified in Section 08710.

E. Coordinate with glass and glazing.

F. Install fire rated assemblies in accordance with NFPA 80.

3.03 ERECTION TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.04 ADJUSTING

A. Adjust door for smooth and balanced door movement.

END OF SECTION

WOOD DOORS SECTION 08200

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Interior flush solid core wood doors for transparent finish.

B. Interior stile and rail glazed doors (manufacturers standard design with sticking and glass panels to for as indicated on the drawings for transparent finish

C. Factory finishing of all doors and frames.

D. Factory prefit and premachine doors.

E. Fire Rated assemblies.

1.02 RELATED SECTIONS

A. Section 08112 - Steel Frames

B. Section 08710 - Door Hardware

1.03 REFERENCES

A. AWI - Quality Standards of the Architectural Woodwork Institute.

B. ASTM E152 - Methods of Fire Tests of Door Assemblies.

C. NFPA 80 - Fire Doors and Windows.

D. NFPA 252 - Standard Method of Fire Tests for Door Assemblies.

E. UL 10B - Fire Tests of Door Assemblies.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Illustrate door opening criteria, sizes, types, swings, special blocking for hardware, identify cutouts for glazing.

C. Product Data: Indicate door core materials and construction; veneer species, type and characteristics and factory finishing criteria.

D. Manufacturer's installation Instructions: Indicate special installation instructions, if any.

E. Samples: Wood veneers illustrating wood grain, stain color and sheen.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with AWI Quality Standard, Section 1300 (flush doors) and 1400 (Stile & Rail Doors)..

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products.

B. Package, deliver and store doors in accordance with AWI Standard.

1.07 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.08 COORDINATION

A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.09 REGULATORY REQUIREMENTS

A. Fire Rated Construction: Conform to ASTM E152, NFPA 252 or UL 10B.

B. Installed Assembly: Conform to NFPA 80 for fire rated class as scheduled.

1.10 WARRANTY

A. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch (6.35 mm) in a 42 by 84 inch (1067 by 2134 mm) section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3 inch (0.25 mm in a 75 mm) span, or do not conform to tolerance limitations of referenced quality standards.

1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors where defect was not apparent prior to hanging.
2. Warranty shall be in effect during the following period of time after date of Substantial Completion: Life of Installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Masonite Architectural.

B. Buell Doors

C. Eggers Hardwood Products, Inc.

D. IPIK Door Company

E. Southwood Door Co

F. Graham Door Co

2.02 FLUSH DOORS

A. Flush Interior Doors: $1^{3}/_{4}$ inches thick; solid core construction.

B. Construction (Non fire rated): AWI Section 1300, Type PC-5 with $1^{3}/_{8}$" vertical stiles and $1^{3}/_{4}$" top and bottom rails glued securely to core parts; no voids or finger joint material allowed.

1. Stile edge screw withdrawals when tested in accordance with ASTM D-1037-78 shall exceed 740 lbs. and VA 08210-TM shall exceed 700 lbs.
2. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering.

C. Particle Board Core: Conform to ANSI standard A208.1-1989 Grade 1-LD-2 covering mat formed particle board with face screw holding of 125 pounds, modulus of rupture of 800 psi, modulus of elasticity of 150,000 psi, and density of 32 pounds per cubic foot.

D. Crossbands: Hardwood (no synthetics) crossbands and faces shall be laminated to the core with glue by the hot press process.

E. Veneer Facing (Transparent Finish): AWI Premium quality species wood, as follows for transparent finish with book matched or slip match veneers to prevent dark/light striping affect of adjacent flitches, minimum 1/32" thick before sanding at 12% moisture content.

1. Species/Cut: Rift sawn, White Oak
2. Pairs and Sets: Provide pair matching and set matching for pairs of doors and for doors hung in adjacent sets.
3. Transoms and Doors: End match

F. Adhesive: Water resistance except Type I - waterproof at face veneers.

G. Fire Rated Door (45 min. and higher): Constructed as above except with inert mineral core, minimum 1/2" top rail, minimum $1^{1}/_{4}$" bottom rail and 5" reinforcement header at closers.

2.03 FABRICATION

A. Fabricate doors in accordance with AWI Quality Standards.

B. Factory-prefit and premachine doors to fit frame opening sizes indicated with the following uniform clearances and bevels:

1. Comply with tolerance requirements of AWI for prefitting and as follows:
   a. 1/8" on top, hinge and lock edges.
   b. 1/8" at meeting edges on paired doors.

c. Bevel both edges 1/8" in 2".

2. Coordinate measurements of hardware mortises in frames to verify dimensions and alignment before proceeding with factory premachining. Comply with final hardware schedules and door frame shop drawings and with hardware templates.

C. Vertical exposed Edge of Stiles: Of same species as veneer facing for transparent finish.

D. Fit door edge trim to edge of stiles after applying veneer facing.

E. Bond edge banding to cores.

F. At double doors continue sequence of matching veneers across the face of both doors.

G. Provide additional solid blocking at stiles and rails for hardware reinforcement for hinges, closers and lockset/latchsets.

H. Fabricate fire rated doors in accordance with AWI Quality Standards and to UL requirements.

2.04 INTERIOR STILE AND RAIL DOORS

A. Construction: AWI Section 1400, Custom Grade for transparent finish; finger joints are not permitted.

B. Solid and Veneer Wood: Solid wood and composite engineered wood stile, rails and glass, wood to match flush doors

C. Construction methods shall include panels tongue grooved into adjacent stiles and rails. Connecting joints between stiles, rails and mullions shall be doweled and glued under pressure using #1 PVA adhesive. Glass to be retained by solid sticking (rim banded) or an applied bead

2.04 FACTORY FINISHING (TRANSPARENT FINISH)

A. Factory finish wood doors in accordance with AWI - Section 1500 System TR-4, Conversion Varnish, nonyellowing alkyd based, as follows to provide a satin-medium rubbed effect 10° - 20°.

1. Sand (100 - 200 grit stearated paper)
2. Washcoat (conversion varnish reduced)
3. Stain (to match Architects sample)
4. Sealer (conversion varnish reduced)
5. Sand (220 grit stearated paper)
6. Topcoat
7. Topcoat

B. Coordinate with wood finished specified in Section 06410 - Architectural Woodwork.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes and tolerances are acceptable.

B. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with AWI Quality Standard.

1. Comply with NFPA 80 at fire rated doors.

B. Trim door height by cutting bottom edges to a maximum of 3/4 inch.

C. Pilot drill screw and bolt holes.

D. Machine cut for hardware. Core for handsets and cylinders.

E. Coordinate installation of doors with installation of frames specified in Division 8 and hardware specified in Section 08710.

3.03 INSTALLATION TOLERANCES

A. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over an imaginary 36 x 84 inch surface area.

B. Maximum Vertical Distortion (Bow): 1/8" measured with straight edge or taut string, top to bottom, over an imaginary 36 x 84 inch surface area.

C. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 x 84 inch surface area.

3.04 ADJUSTING

A. Adjust work.

B. Adjust door for smooth and balanced door movement.

END OF SECTION

WOOD DOORS SECTION 08200

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Interior flush solid core wood doors for transparent finish.

B. Interior stile and rail glazed doors (manufacturers standard design with sticking and glass panels to for as indicated on the drawings for transparent finish

C. Factory finishing of all doors and frames.

D. Factory prefit and premachine doors.

E. Fire Rated assemblies.

1.02 RELATED SECTIONS

A. Section 08112 - Steel Frames

B. Section 08710 - Door Hardware

1.03 REFERENCES

A. AWI - Quality Standards of the Architectural Woodwork Institute.

B. ASTM E152 - Methods of Fire Tests of Door Assemblies.

C. NFPA 80 - Fire Doors and Windows.

D. NFPA 252 - Standard Method of Fire Tests for Door Assemblies.

E. UL 10B - Fire Tests of Door Assemblies.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Illustrate door opening criteria, sizes, types, swings, special blocking for hardware, identify cutouts for glazing.

C. Product Data: Indicate door core materials and construction; veneer species, type and characteristics and factory finishing criteria.

D. Manufacturer's installation Instructions: Indicate special installation instructions, if any.

E. Samples: Wood veneers illustrating wood grain, stain color and sheen.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with AWI Quality Standard, Section 1300 (flush doors) and 1400 (Stile & Rail Doors)..

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products.

B. Package, deliver and store doors in accordance with AWI Standard.

1.07 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.08 COORDINATION

A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.09 REGULATORY REQUIREMENTS

A. Fire Rated Construction: Conform to ASTM E152, NFPA 252 or UL 10B.

B. Installed Assembly: Conform to NFPA 80 for fire rated class as scheduled.

1.10 WARRANTY

A. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch (6.35 mm) in a 42 by 84 inch (1067 by 2134 mm) section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3 inch (0.25 mm in a 75 mm) span, or do not conform to tolerance limitations of referenced quality standards.

1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors where defect was not apparent prior to hanging.
2. Warranty shall be in effect during the following period of time after date of Substantial Completion: Life of Installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Masonite Architectural.

B. Buell Doors

C. Eggers Hardwood Products, Inc.

D. IPIK Door Company

E. Southwood Door Co

F. Graham Door Co

2.02 FLUSH DOORS

A. Flush Interior Doors: $1^{3}/_{4}$ inches thick; solid core construction.

B. Construction (Non fire rated): AWI Section 1300, Type PC-5 with $1^{3}/_{8}$" vertical stiles and $1^{3}/_{4}$" top and bottom rails glued securely to core parts; no voids or finger joint material allowed.

1. Stile edge screw withdrawals when tested in accordance with ASTM D-1037-78 shall exceed 740 lbs. and VA 08210-TM shall exceed 700 lbs.
2. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering.

C. Particle Board Core: Conform to ANSI standard A208.1-1989 Grade 1-LD-2 covering mat formed particle board with face screw holding of 125 pounds, modulus of rupture of 800 psi, modulus of elasticity of 150,000 psi, and density of 32 pounds per cubic foot.

D. Crossbands: Hardwood (no synthetics) crossbands and faces shall be laminated to the core with glue by the hot press process.

E. Veneer Facing (Transparent Finish): AWI Premium quality species wood, as follows for transparent finish with book matched or slip match veneers to prevent dark/light striping affect of adjacent flitches, minimum 1/32" thick before sanding at 12% moisture content.

1. Species/Cut: Rift sawn, White Oak
2. Pairs and Sets: Provide pair matching and set matching for pairs of doors and for doors hung in adjacent sets.
3. Transoms and Doors: End match

F. Adhesive: Water resistance except Type I - waterproof at face veneers.

G. Fire Rated Door (45 min. and higher): Constructed as above except with inert mineral core, minimum 1/2" top rail, minimum $1^{1}/_{4}$" bottom rail and 5" reinforcement header at closers.

2.03 FABRICATION

A. Fabricate doors in accordance with AWI Quality Standards.

B. Factory-prefit and premachine doors to fit frame opening sizes indicated with the following uniform clearances and bevels:

1. Comply with tolerance requirements of AWI for prefitting and as follows:
   a. 1/8" on top, hinge and lock edges.
   b. 1/8" at meeting edges on paired doors.
   c. Bevel both edges 1/8" in 2".
2. Coordinate measurements of hardware mortises in frames to verify dimensions and alignment before proceeding with factory premachining. Comply with final hardware schedules and door frame shop drawings and with hardware templates.

C. Vertical exposed Edge of Stiles: Of same species as veneer facing for transparent finish.

D. Fit door edge trim to edge of stiles after applying veneer facing.

E. Bond edge banding to cores.

F. At double doors continue sequence of matching veneers across the face of both doors.

G. Provide additional solid blocking at stiles and rails for hardware reinforcement for hinges, closers and lockset/latchsets.

H. Fabricate fire rated doors in accordance with AWI Quality Standards and to UL requirements.

2.04 INTERIOR STILE AND RAIL DOORS

A. Construction: AWI Section 1400, Custom Grade for transparent finish; finger joints are not permitted.

B. Solid and Veneer Wood: Solid wood and composite engineered wood stile, rails and glass, wood to match flush doors

C. Construction methods shall include panels tongue grooved into adjacent stiles and rails. Connecting joints between stiles, rails and mullions shall be doweled and glued under pressure using #1 PVA adhesive. Glass to be retained by solid sticking (rim banded) or an applied bead

2.04 FACTORY FINISHING (TRANSPARENT FINISH)

A. Factory finish wood doors in accordance with AWI - Section 1500 System TR-4, Conversion Varnish, nonyellowing alkyd based, as follows to provide a satin-medium rubbed effect 10° - 20°.

1. Sand (100 - 200 grit stearated paper)
2. Washcoat (conversion varnish reduced)
3. Stain (to match Architects sample)
4. Sealer (conversion varnish reduced)
5. Sand (220 grit stearated paper)
6. Topcoat
7. Topcoat

B. Coordinate with wood finished specified in Section 06410 - Architectural Woodwork.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes and tolerances are acceptable.

B. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with AWI Quality Standard.

1. Comply with NFPA 80 at fire rated doors.

B. Trim door height by cutting bottom edges to a maximum of 3/4 inch.

C. Pilot drill screw and bolt holes.

D. Machine cut for hardware. Core for handsets and cylinders.

E. Coordinate installation of doors with installation of frames specified in Division 8 and hardware specified in Section 08710.

3.03 INSTALLATION TOLERANCES

A. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over an imaginary 36 x 84 inch surface area.

B. Maximum Vertical Distortion (Bow): 1/8" measured with straight edge or taut string, top to bottom, over an imaginary 36 x 84 inch surface area.

C. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 x 84 inch surface area.

3.04 ADJUSTING

A. Adjust work.

B. Adjust door for smooth and balanced door movement.

END OF SECTION

ACOUSTICAL DOORS SECTION 08300

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Acoustical metal door systems, including doors, frames, perimeter seals, cam-lift hinges, flush metal floor plates, latching hardware and accessories to maintain door operation and the required STC-50 rating. A**ll doors shall have cam-lift hinges and compression type door bottoms to set on 1/4" thick solid aluminum floor plates with 45 degree 1/8" bevel edge. Butt hinges and automatic door bottoms are not acceptable, even if standard with the manufacturer**.

B. Locksets, cylinders, closers, stops, etc. for herein specified metal acoustic doors are specified and furnished in Section 08710 and are a part of the acoustical door work including installation of aforementioned hardware in this section for single source responsibility.

1.02 REFERENCES

A. ASTM E90-90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions

B. ASTM E336-90 - Standard Test Method for Measurement of Airborne Sound Insulation in Buildings.

C. ASTM E413-87 - Classification for Rating Sound Insulation.

1.03 QUALITY ASSURANCE

A. Manufacturer: Unless otherwise acceptable to Architect, furnish all sound control doors by one manufacturer for entire project.

B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work.

C. Inserts and Anchorages: Furnish inserts and anchoring devices which must be built into other work. Coordinate delivery with other work to avoid delay.

D. Certification: Door/frame assemblies shall conform with the requirements of test method ASTM E90-90 and STC determined in accordance with ASTM E413-87. Tests shall be produced at an accredited independent acoustical laboratory, which is a member of the National Volunteer Laboratory Accreditation Program (NVLAP) of the U.S. Bureau of Standards.

1.04 SUBMITTALS

A. Manufacturer's Data: Submit two copies of the manufacturer's detailed technical data for materials, fabrication, and installation. Include catalog cuts of hardware, anchors, fastenings, and accessories.

B. Provide illustrations and descriptions of all seals and hardware items which will be exposed on doors and frames.

C. Provide complete installation and adjustment information.

D. Shop Drawings: Submit shop drawings for the fabrication and erection of assemblies which are not fully described by manufacturer's data. Show all anchorage and accessory items and finishes.

1. Submit setting drawings, templates, and instructions for installation of anchorage devices built into other work.
2. Provide full size details of frames and sound gasket components.
3. Provide installation details applicable to the construction in which the sound control doors and frames will be installed.
4. Indicate construction, sizes, thicknesses, reinforcing, anchoring, and finishes of all materials.

E. Samples: Submit three (3) samples of each color and finish required. Samples will be reviewed for color, texture and surface reflectivity only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

F. Certified test reports indicating the acoustical performance of the door meets the Sound Transmission Class (STC) performance as indicated in the door schedule. Test data shall be produced from an accredited independent acoustical laboratory which is a member of the National Volunteer Laboratory Accreditation Program (NVLAP) of the U.S. Bureau of Standards. Reports shall indicate that the test was performed on the doors and frames of the type to be supplied in conformance with the requirements of test method ASTM E90-90 and STC determined in accordance with ASTM E413-87. Earlier test reports will not be acceptable. The test results shall be representative of the performance of the specified sound control door assembly and must reference the testing laboratory’s name, test report number and date of test.

G. Test reports on at least two (2) field tests on proposed products by an independent Acoustical Engineer certifying an Noise Isolation Class (NIC), in conformance with the requirements of test method ASTM E336-84, in excess of the following:

NIC-45 for STC-50 doors
NIC-51 for STC-55- doors

H. Written guarantee that door is constructed in accordance with the laboratory tested door and free of defects in material and workmanship for a period of three years after installation.

1.05 SEQUENCING AND DELIVERY

A. Upon award of contract and before commencement of building construction, submit to the Architect any special requirements (scheduling, flatness of floor, etc.) which are necessary to assure successful installation.

B. Protect door systems during transit, handling and storage to prevent damage, soiling, and

deterioration.

C. Deliver frames to General Contractor with complete installation drawings and instructions for installation by the General Contractor.

D. Deliver doors to project site only after the building has been closed in. Store doors in the building in a dry location and stack in accordance with the manufacturer's instructions.

E. Protect door assemblies, especially sound gaskets, from damage before, during, and after their installation.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS

Industrial Acoustics Company; Bronx, NY
Jamison Door Company; Hagerstown, MD
Krieger Steel Products Co.; Pico Rivera, CA
Overly Manufacturing Co.; Greensburg,
Security Acoustics (Security Metal Products Corporation); Culver City, CA

2.02 METAL DOOR AND FRAME TESTED ASSEMBLIES

A. General: The door assemblies shall be configured as indicated on the Contract Drawings and as follows and comply with Section 08112-Metal Doors and Frames:

1. The weight of each door shall not be less than: 10 lbs.per sq ft for STC-50 doors
12 lbs.per sq ft for STC-55 doors

2. The door hardware shall be sized to support the weight of the door and provide easy movement by one person.

3. The gasketing system shall provide an airtight seal around the entire perimeter of the door when closed. The force to compress the seal shall not exceed 20(ed.) pounds applied to the lockset.

B. Provide all door assemblies with complete frame assemblies including the extended frame(s), thresholds and joint covers required for split wall construction.

C. Doors shall be 1-3/4" to 2-3/4" thick as required for specified STC rating, flush design of cold-rolled steel construction, 16 gauge minimum thickness. Stiffen face sheets and fill the void between faces filled with sound-deadening material in accordance with the acoustical laboratory tested door to achieve the STC rating The core shall be minimum 5 lb./ft.^{2} density acoustically non-coupling and shall be non-combustible. Door shall be made of commercial quality, level, cold rolled steel conforming to ASTM A366-79 and free of scale, pitting or other surface defects and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Join door faces at their vertical edges by a continuous weld extending the full height of the door and by a continuous weld extending the full height of the door. Ground, fill and dress smooth welds to make them invisible and to provide a smooth flush surface. Door shall be strong, rigid and neat in appearance, free from warpage or

buckle. Corner beads shall be true and straight and of minimum radius for the gauge of metal used

D. Door hardware reinforcements:

1. Mortised, reinforce, drill and tap doors at the factory for fully templated mortised hardware only. Where surface-mounted hardware is to be applied, frames shall have reinforcing plates.
2. Minimum thickness of hardware reinforcing plates shall be as follows:
   a. Hinge and pivot reinforcements - 7 ga.
   b. Reinforcement for lock face, flush bolts, concealed holders, concealed or surface mounted closers - 12 ga.
   c. Reinforcements for all other surface-mounted hardware - 16 ga.

E. Frames shall be formed to sizes and shapes indicated and shall have full welded unit-type construction at corners and other joints and packed with glass or mineral fiber. Frames shall be of cold-rolled steel construction, 16 gage minimum thickness at single interior frames, 14 gauge at interior double doors, conforming to ASTM A366. All contact edges shall be closed tight. Welds on corners and exposed surfaces shall be pressed flush and smooth. Steel frame members shall be pre-straightened, free of wind or twist. Frame shall be factory-aligned to a diagonal tolerance of ± 1/16". Corner joints shall have all contact edges closed tight, with trim faces mitered and continuously welded. The use of gussets will not be permitted. All finished work shall be strong and rigid, neat in appearance, square, true and free of defects, warp or buckle. Moulded members shall be clean cut, straight and of uniform profile throughout their lengths. **Knocked-down frames will not be accepted**

1. Jamb and head anchors: Frame shall be provided with 1-1/2" x 3/16" x 8" long steel plates with dovetail ends, 16" o.c. 8" from top and bottom of frame for securing back into the block wall. If required, frame shall have two 1/4" x 2" steel diagonal braces between each hinge and frame. The brace shall be welded to 1/2" steel tapping and 3/8" backup hinge tapping plates.

F. Floor Anchors:

1. Floor anchors shall be securely welded inside each jamb.
2. Minimum thickness of floor anchors shall be 3/16".

G. Where a transom panel is required, that panel shall provide acoustical performance at least as good as the door STC rating.

H. All doors shall have cam-lift action hinges and steel thresholds. The cam-lift shall lower the door onto the sill as the door is closed, and provide a tight positive seal with the floor plate. When opening the door shall rise fast enough to minimize drag on the floor plate.

1. Surface strap or butt hinges are not acceptable.

I. The cam-lift seal shall be a full mortised neoprene door bottom and shall close the entire gap between the door and the floor plate. The cam-lift seal shall assure a continuous, positive seal at the floor plate with minimum friction, drag and roll of the assembly on the floor.

J. All hardware shall be supplied as part of the acoustical doors; see Section 08710 for hardware

supplied in that section for installation in Section 08300.

1. Finish hardware shall have finish specified in Section 08710.

K. All doors and frames shall receive manufacturer's standard alkyd based prime paint finish.

L. Perimeter Treatment:

1. All head and jamb seals shall be compression stop in a fully adjustable retainer assembly.
2. Clearance between frame and door shall not exceed 1/8". Raised thresholds will not be permitted.
3. Hinge, lock and head of the door shall close against positive neoprene compression seals that are mounted in the frame.
4. The door shall be supplied with a bottom neoprene seal covered in teflon type material. The seal shall be adjustable with flush Phillips head screws, to conform to job site sill conditions. Exposed screws are not acceptable. Automatic drop bottoms will not be permitted.
5. Where a double leaf door is specified, the astragal shall be rabbeted or bevelled and contain neoprene compression and/or magnetic seals for the full height of the door. There shall be no gaps in the seals at the head and sill of the door. There shall be continuous pressure applied to the astragal to compress the seals and prevent the leafs from bowing out and disengaging the astragal seals. Double door acoustic test data shall be submitted. Single leaf test data will not be acceptable for double doors.

2.03 FINISH

A. After fabrication, remove all tool marks and surface imperfections and exposed faces of all welded joints shall be dressed smooth.. Dress smooth all exposed faces of all welded joints. Assemblies shall be treated and shall be coated on all accessible surfaces with rust-inhibitive primer which meets ASTM B117 salt spray for 150 hours, and ASTM D1735 water fog test for organic coatings for 200 hours, and which is fully cured prior to shipment

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions in which the work of this section is to be installed, including condition of substrate to which the item is to be attached. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION - GENERAL

A. General: Comply with the recommendations of the manufacturer for secure and proper installation in accordance with final shop drawings. Install the work in locations indicated on the drawings, with proper clearances, elevation and anchorage. Provide accessories indicated and anchors, inserts, and other items required for installation of items and attachment to adjoining construction.

B. Install seals so they are in intimate contact with the entire length of the jambs, head and floor plates.

3.03 PLACING FRAMES

A. Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames", and Section 08112, and AWI standards for wood doors as apecifed in Section 08210 .

B. Place all frames for acoustical doors after all walls are set and in place. Set frames accurately in position, plumbed, aligned and braced securely until permanent anchors are set.

C. Locate 3 wall anchors per jamb at hinge and strike levels.

D. At in-place concrete, masonry or steel construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices in accordance with all approved shop drawings.

E. In masonry construction, building-in of anchors is included in Section 04200.

F. Grouting of frames, complete with any rebar reinforcement and installation of insulation in the frame, shall be performed by the installing contractor as part of his work to insure the acoustical and structural integrity of the assembly.

G. Install fire-rated frames in accordance with NFPA Std. No. 80.

H. Remove spread bars only after frames have been properly set and secured.

3.04 DOOR INSTALLATION

A. Fit acoustical doors accurately in frames, within clearances specified in SDI-100 and as herein specified.

B. Doors must be installed plumb and aligned.

C. Place fire-rated doors with clearances as specified in NFPA Std. No. 80.

D. Set doors, and adjust all adjustable acoustical perimeter seals and floor plates to insure a tight fit per manufacturer's recommendations.

3.05 ADJUST AND CLEAN

A. Prime Coat Touch-Up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

B. Final Adjustments: Check and readjust operating finish hardware items and acoustical seals, leaving steel doors and frames undamaged and in complete and proper operating condition. Check for any air, light (and sound) gaps at door jambs, head and sill and adjust seals as necessary.

C. Upon completion of the installation, put each operating component through at least 10 operating cycles. Adjust to achieve optimum operation.

3.06 FIELD SUPERVISION

A. The door manufacturer shall provide factory trained supervision personnel during installation and final adjustment of sound seals. The manufacturer shall issue a letter of compliance certifying the completion of a successful installation.

END OF SECTION

ACCESS DOORS SECTION 08305

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Steel access doors.

B. Provide fire rated doors when penetrating fire rated construction.

1.02 RELATED WORK

A. Painting of Access Doors: Section 09900, Painting

1.03 FIRE RATING CLASSIFICATION

A. Fire rated access doors shall bear the Underwriters Laboratories, Inc., l-l/2 hour "B" Label (250 degrees rating).

1.04 SUBMITTALS

A. In accordance with Section 0l300.

B. Shop Drawings: Access doors, each type, showing construction, location and installation details.

C. Manufacturer's Literature and Data: Access doors, each type.

1.05 APPLICABLE PUBLICATIONS

A. The National Association of Architectural Metal Manufacturers (NAAMM):

Metal Finishes Manual (August, l969)

1.06 MANUFACTURERS

A. Approved Manufacturers: Babcock-Davis, The Bilco Co. and J.L. Industries

PART 2 - PRODUCTS

2.01 FABRICATION, GENERAL

A. Fabricate components so as to be straight, square, flat and in same plane where required. Slightly round exposed edges and provide access without burrs, snags and sharp edges. Welds where exposed shall be continuous and ground smooth.

B. Number of locks and non-continuous hinges shall be as required to maintain alignment of panel with frame, except for fire rated doors, the number shall be the same as required by the

fire test.

C. Provide anchors or make provisions in frame for anchoring to adjacent construction. Provide size, number and location of anchors as required to secure access door in opening and as required by fire test.

2.02 ACCESS DOORS, FIRE RATED

A. Door Panel: Form of 0.0359 inch thick galvanized steel sheet, insulated sandwich type construction.

B. Frame: Form of 0.0598 inch thick galvanized steel sheet of depth and configuration to suit material and type of construction where installed. Provide frame flange at perimeter where installed in concrete and masonry openings. Weld exposed joints in flange and grind smooth.

C. Automatic Closing Device: Provide automatic closing device for each door.

D. Hinge: Continuous steel hinge with stainless steel pin.

E. Lock: Self-latching, with provision for fitting flush a standard screw-in type lock cylinder. Lock cylinder is specified in Section 08710- Hardware. Provide latch release device operable from inside of door. Mortise lock case in door.

2.03 ACCESS DOORS, FLUSH PANEL

A. Door Panel: Form of 0.0747 inch thick galvanized steel sheet. Reinforce as required to maintain flat surface.

B. Frame: Form of 0.0598 inch thick galvanized steel sheet of depth and configuration to suit material and type of construction where installed and to align flush with surrounding construction. Provide surface mounted units having frame flange at perimeter where installed in concrete or masonry construction. Weld exposed joints in flange and grind smooth.

1. At drywall construction provide perforated portion of frame with bead for joint treatment flush with face of gypsum board; overlapping flange is not permitted.

C. Hinge: Concealed spring hinge to allow panel to open l75 degrees. Provide removable hinge pin to allow removal of panel from frame.

D. Lock: Flush, screwdriver operated cam lock.

2.04 FINISH

A. Steel Surfaces: Baked-on prime coat over a protective phosphate coating.

2.05 SIZE

A. Access doors shall be minimum 12 inches, unless otherwise shown.

PART 3 - EXECUTION

3.01 LOCATION

A. Provide access panels or doors wherever any valves, traps, air splitter dampers, cleanouts and other control items of mechanical, and electrical work are concealed in wall, partition or ceiling construction.

3.02 INSTALLATION, GENERAL

A. Install access doors in openings to have sides vertical in wall installations, and parallel to ceiling grid or side walls when installed in ceiling. Set frames so that edge of frames without flanges will finish flush with surrounding finish surfaces.

3.03 ANCHORAGE

A. Secure frames to adjacent construction using anchors attached to the frames or by use of bolts or screws through the frame members. Type, size and number of anchoring device shall be suitable for the material surrounding the opening, and as required to maintain alignment and resist displacement during normal use of the access door and the building.

1. Anchors for fire rated access doors shall be as required by the fire test.

3.04 ADJUSTMENT

A. Adjust hardware so that the door panel will open freely, and when closed the door panel will be centered within the frame.

END OF SECTION

INTERIOR ALUMINUM ENTRANCES AND STOREFRONTS SECTION 08410

PART 1 - GENERAL

1. 01 SECTION INCLUDES

A. Interior aluminum storefronts, entrance doors and frames.

1. Interior units receive clear anodized finish.

B. Hardware is specified in Section 08710

1. 02 RELATED SECTIONS

A. Section 07900 - Joint Sealers: System perimeter sealant and back-up materials.

B. Section 08710 - Door Hardware.

1. 03 REFERENCES

A. AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. AAMA - Curtain Wall Manual #10 - Care and Handling of Architectural Aluminum From Shop to Site.

C. AAMA 501 - Methods of Test for Metal Curtain Walls.

D. AAMA SFM-1 - Aluminum Storefront and Entrance Manual.

E. ADA - American with Disabilities Act of 1990, Title III (Accessibility Regulations for Private Entities) and latest amendments (if any).

F. ANSI A117.1 - Safety Standards for the Handicapped.

G. ANSI/ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

H. ANSI/ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube..

1. 04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Submit for each aluminum entrance and storefront system required, including:

1. System dimensions.
2. Framed opening requirements and tolerances.

3. Layout and installation details, including relationship to and inclusion of adjacent work.
4. Elevations and plans at 1/4 inch scale.
5. Detail sections of typical composite members.
6. Anchors and reinforcement.
7. Hardware mounting heights.
8. Provisions for expansion and contraction.
9. Glazing details.

C. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware and internal drainage details.

D. Hardware Schedule: Submit complete hardware schedule organized into sets based on hardware specified. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish. Include item name, name of the manufacturer and complete designations of every item required for each door opening.

E. Samples: Submit two samples 2 x 4 inches in size illustrating pre-finished aluminum surface.

1. 05 QUALITY ASSURANCE

A. Perform Work in accordance with AAMA SFM-1 and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. Conform to requirements of ANSI A117.1.

C. Comply with requirements of the American with Disabilities Act of 1990, Title III (Accessibility Regulations for Private Entities) and latest amendments (if any).

1. 06 QUALIFICATIONS

A. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum three years documented experience.

1. 07 PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this Section.

1. 08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Handle work of this section in accordance with AAMA - Curtain Wall Manual #10.

C. Protect pre-finished aluminum surfaces with wrapping or stripable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1. 09 ENVIRONMENTAL REQUIREMENTS

A. Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1. 010 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1. 011 WARRANTY

A. Provide three year warranty under provisions of Section 01700.

B. Warranty: Include coverage for complete system for failure to meet specified requirements.

PART 2 - PRODUCTS

2. 01 MANUFACTURERS - ENTRANCES AND STOREFRONTS

A. “4500” (1-3/4 inch x 4.5 inch deep enter glazed system), with Medium Stile with 10” high base rail swing doors by Tubelite or equal systems by Kawneer, Old Castle and YKK.

2. 02 MATERIALS

A. Extruded Aluminum: ANSI/ASTM B221; 6063 alloy, T5 temper for doors, door frames, fixed glass sidelights, storefronts and transoms, T6 temper for extruded structural members.

B. Sheet Aluminum: ANSI/ASTM B209; alloy and temper suitable for use.

C. Fasteners: Non-magnetic stainless steel.

1. Do not use exposed fasteners except where unavoidable for application of hardware.

D. Brackets and Reinforcements: Provide high-strength aluminum brackets and reinforcements; where use of aluminum is not feasible provide nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A 123.

E. Compression Weatherstripping: Manufacturer's standard replaceable compressible weatherstripping gaskets of molded neoprene complying with ASTM D 2000 or molded PVC complying with ASTM D 2287.

F. Sliding Weatherstripping: Manu facturer's standard replaceable weatherstripping of wool, polypropylene, or nylon woven pile, with nylon fabric or aluminum strip backing, complying with AAMA 701.2.

2. 03 COMPONENTS

A. Storefront Framing System: Provide storefront and entrance framing systems fabricated from extruded aluminum members of size and profile indicated. Include subframes and other reinforcing members of the type indicated. Provide for flush glazing storefront from the exterior on all sides without projecting stops. Shop-fabricate and preassemble frame components where

possible. Provide storefront frame sections without exposed seams.

1. Profile: 4.5"deep at center glazed interior to accommodate specified glass.
2. Mullion Configurations: Provide pockets at the inside glazing face to receive resilient elastomeric glazing. Mullions and horizontals shall be one piece. Make provisions to drain moisture accumulation to the exterior.

B. Entrance Door Frames: Provide tubular and channel frame entrance door frame assemblies, as indicated, with welded joints in accordance with manufacturer's standards. Reinforce as necessary to support required loads.

C. Stile-and-Rail Type Entrance Doors: Provide tubular frame members, fabricated with welded joints.

1. Glazing: Fabricate doors to facilitate replacement of glass or panels, without disassembly of stiles and rails. Provide snap-on extruded aluminum square glazing stops, with exterior stops anchored for nonremoval.
2. Design: Provide 1-3/4 inch thick doors of design indicated.

a. Medium stile (minimum 3-1/2 inch nominal width for top and vertical stiles and 10 inch wide bottom rail).

D. Weatherstripping: Where exterior door stiles or head rails do not close against fixed stops equipped with compression weatherstripping, provide sliding weatherstripping, retained in an adjustable strip in a mortise centered in the edge of the door.

2. 04 GLASS AND GLAZING MATERIALS

A. Glass in Interior Storefront and Doors: 1/4" monolithic tempered clear safety glass

B. Gaskets: Manufacturer standard neoprene or EPDM wedge type gaskets produced for the specified framing system.

2. 05 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

1. Minimum thickness of frame and sill components shall be .125 inches.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Arrange fasteners and attachments to conceal from view.

E. Reinforce interior horizontal head rail to receive closer.

F. Prepare components with internal reinforcement for door hardware and door operator hinge

hardware.

G. Reinforce framing members for imposed loads.

2. 06 FINISHES

A. Class I Clear Anodized Finish: AA-M12C22A41 (Mechanical Finish: as fabricated, nonspecular; Chemical Finish: etched, medium matte; Anodic Coating: Class I Architectural, clear film thicker than 0.7 mil) complying with AAMA 61111.

PART 3 - EXECUTION

3. 01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify wall openings and adjoining materials are ready to receive work of this Section.

3. 02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings at abutting construction; turn up flashing a minimum of 1/2" to form a concealed continuous pan with soldered/sealed watertight joints including rear and end dams.

G. Set thresholds in bed of mastic and secure.

H. Install hardware using templates provided.

J. Where wedge-shaped gaskets are driven into one side of the channel to pressurize the gasket on the opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when subjected to dynamic movement. Anchor gasket to stop with matching ribs, or by proven adhesives, including embedment of gasket tail in cured heel bead. Miter cut and permanently bond gasket ends together by vulcanized process or silicone adhesive at corners so that gaskets will not pull away from the corners and result in voids or leaks in the glazing

I. Install perimeter sealant in accordance with Section 07900.

3. 03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3. 04 ADJUSTING

A. Adjust work under provisions of Section 01700.

B. Adjust operating hardware and sash for smooth operation.

3. 05 CLEANING

A. Clean work under provisions of 01700.

B. Remove protective material from pre-finished aluminum surfaces.

C. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

D. Remove excess sealant by method acceptable to sealant manufacturer.

3. 06 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. Protect finished Work from damage.

END OF SECTION

EXTERIOR ALUMINUM ENTRANCES AND STOREFRONTS SECTION 08415

PART 1 - GENERAL

1. 01 SECTION INCLUDES

A. Exterior aluminum entrance doors, frames and storefronts.

B. Exterior glass and framing of specified systems shall meet specified wind loads and also large missile impact criteria per requirements of ASTM E1886 and E1996.

C. 1-5/16" insulated hurricane/impact resistance glazing at storefront and 9/16" laminated safety glass hurricane/impact resistance, matching the adjacent insulated units at doors

D. Door hardware for complete swing function. Glazed exterior entrances including hardware specified in Section 08710

1. 02 RELATED SECTIONS

A. Section 07900 - Joint Sealers: System perimeter sealant and back-up materials.

B. Section 08710 - Door Hardware.

1. 03 REFERENCES

A. AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. AAMA - Curtain Wall Manual #10 - Care and Handling of Architectural Aluminum From Shop to Site.

C. AAMA 501 - Methods of Test for Metal Curtain Walls.

D. AAMA SFM-1 - Aluminum Storefront and Entrance Manual.

E. ADA - American with Disabilities Act of 1990, Title III (Accessibility Regulations for Private Entities) and latest amendments (if any).

F. ANSI A117.1 - Safety Standards for the Handicapped.

G. ANSI/ASTM A36 - Structural Steel.

H. ANSI/ASTM A386 - Zinc Coating (Hot Dip) on Assembled Steel Products.

I. ANSI/ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

J. ANSI/ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

K. ANSI/ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.

L. ANSI/ASTM E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.

M. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

N. ANSI/ASTM E331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

1. 04 SYSTEM PERFORMANCE REQUIREMENTS

A. Structural Performance: Conduct tests for structural performance with ANSI/ASTM E 330. At the conclusion of the tests there shall be no glass breakage or permanent damage to fasteners, anchors, hardware or actuating mechanism. Framing members shall have no permanent deformation in excess of 0.2 percent of their clear span.

1. Design and size components, connections, bracing, etc. to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as required by and calculated in accordance with the International Building Code 2021 and Supplements from applicable parish and ASCE 7-10 latest edition, measured in accordance with ANSI/ASTM E330 and when tested in accordance with ANSI/ASTM E330, based on wind speeds indicated on the S-series drawings; also withstand all dead loads of attached/bearing construction.; also withstand all dead loads of attached/bearing construction.
2. Limit mullion deflection when subjected to wind load specified to flexure limit of glass or L/175 whichever is less and in no case greater than 3/4”; with full recovery of glazing materials and allowable stress with a safety factor of 1.65.
3. Deflection Parallel to the Plane of the Wall: Test pressures required to measure deflection parallel to the plane of the wall shall be equal to 1.5 times the wind pressures specified above. Deflection of any member carrying its full dead load shall not exceed an amount that will reduce glass bite below 75 percent of the design dimension and shall not reduce the edge clearance between the member and the fixed panel, glass or other fixed member above to less than 1/8 inch. The clearance between the member and an operable door or window shall be at least 1/16 inch.
4. System to accommodate, without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads and deflection of structural support framing.

B. Air Infiltration: Limit air leakage through assembly to 0.060 cfm/min/sq ft of wall area, measured at a reference differential pressure across assembly of 20% of design load as measured in accordance with AAMA 501 or ANSI/ASTM E283 but not less than 6.24 psf..

C. Water Leakage: None, when measured in accordance with AAMA 501 or ASTM E331 with a test pressure difference of 20% of design load, but in no case less than 10.5 per sq. ft .

D. Thermal Movement: System to provide for expansion and contraction within system components caused by a cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental affect to system components.

E. Thermal Performance (Fixed Storefront Only): When tested in accordance with AAMA 1503, and AAMA 507
   1. Condensation Resistance Factor (CRF): A minimum of 59
   2. Thermal Transmittance U-Factor: 0.45 BTU/HR/FT²/°F or less in accordance with AAMA 507

F. Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

G. Exterior glass and framing of specified systems shall meet specified wind loads and also large missile impact criteria per requirements of ASTM E1886 and E1996

1. 05 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Submit for each aluminum entrance and storefront system required, including:

   1. System dimensions.
   2. Framed opening requirements and tolerances.
   3. Layout and installation details, including relationship to and inclusion of adjacent work.
   4. Elevations and plans at 1/4 inch scale.
   5. Detail sections of typical composite members.
   6. Anchors and reinforcement.
   7. Hardware mounting heights.
   8. Provisions for expansion and contraction.
   9. Glazing details.

C. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware and internal drainage details.

D. Hardware Schedule: Submit complete hardware schedule organized into sets based on hardware specified. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish. Include item name, name of the manufacturer and complete designations of every item required for each door opening.

E. Samples: Submit two samples 2 x 4 inches in size illustrating pre-finished aluminum surface.

F. Test Reports: Provide certified test reports from a qualified independent testing laboratory showing that aluminum entrance and storefront systems have been tested in accordance with specified test procedures and comply with performance characteristics indicated.

1. 06 QUALITY ASSURANCE

A. Perform Work in accordance with AAMA SFM-1 and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. Conform to requirements of ANSI A117.1.

C. Comply with requirements of the American with Disabilities Act of 1990, Title III (Accessibility Regulations for Private Entities) and latest amendments (if any).

1. 07 QUALIFICATIONS

A. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum three years documented experience.

1. 08 PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this Section.

1. 09 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Handle work of this section in accordance with AAMA - Curtain Wall Manual #10.

C. Protect pre-finished aluminum surfaces with wrapping or stripable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1. 010 ENVIRONMENTAL REQUIREMENTS

A. Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1. 011 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1. 012 WARRANTY

A. Provide three year warranty under provisions of Section 01700.

B. Warranty: Include coverage for complete system for failure to meet specified requirements.

PART 2 - PRODUCTS

2. 01 MANUFACTURERS - ENTRANCES AND STOREFRONTS

A. ForceFront Storm “E44000” (2-1/2 inch face x 5 inch deep center glazed system storefront system rated as hurricane resistant) with ForceFront Storm Medium Stile with 10” high base rail swing doors, rated as hurricane resistant) by Tubelite or equal systems by Kawneer, Old Castle

and YKK

2. 02 MATERIALS

A. Extruded Aluminum: ANSI/ASTM B221; 6063 alloy, T5 temper for doors, door frames, fixed glass sidelights, storefronts and transoms, T6 temper for extruded structural members.

B. Sheet Aluminum: ANSI/ASTM B209; alloy and temper suitable for use.

C. Fasteners: Non-magnetic stainless steel.

1. Do not use exposed fasteners except where unavoidable for application of hardware.

D. Concealed Flashing: 0.0179 inch (26 gage) minimum dead-soft stainless steel, or 0.026 inch thick minimum extruded aluminum of alloy and type selected by manufacturer for compatibility with other components.

E. Brackets and Reinforcements: Provide high-strength aluminum brackets and reinforcements; where use of aluminum is not feasible provide nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A 123.

F. Concrete and Masonry Inserts: Provide cast iron, Malleable iron, or hot-dip galvanized steel inserts complying with ASTM A 123.

G. Compression Weatherstripping: Manufacturer's standard replaceable compressible weatherstripping gaskets of molded neoprene complying with ASTM D 2000 or molded PVC complying with ASTM D 2287.

H. Sliding Weatherstripping: Manu facturer's standard replaceable weatherstripping of wool, polypropylene, or nylon woven pile, with nylon fabric or aluminum strip backing, complying with AAMA 701.2.

2. 03 COMPONENTS

A. Storefront Framing System: Provide storefront and entrance framing systems fabricated from extruded aluminum members of size and profile indicated. Include subframes and other reinforcing members of the type indicated. Provide for flush glazing storefront from the exterior on all sides without projecting stops. Shop-fabricate and preassemble frame components where possible. Provide storefront frame sections without exposed seams.

1. Profile: 2-1/2" face by 5"deep center glazed at exterior.
2. Mullion Configurations: Provide pockets at the inside glazing face to receive resilient elastomeric glazing. Mullions and horizontals shall be one piece. Make provisions to drain moisture accumulation to the exterior.

B. Entrance Door Frames: Provide tubular and channel frame entrance door frame assemblies, as indicated, with welded joints in accordance with manufacturer's standards. Reinforce as

necessary to support required loads.

C. Stile-and-Rail Type Entrance Doors: Provide tubular frame members, fabricated with welded joints.

1. Glazing: Fabricate doors to facilitate replacement of glass or panels, without disassembly of stiles and rails. Provide snap-on extruded aluminum square glazing stops, with exterior stops anchored for nonremoval.
2. Design: Provide 1-3/4 inch thick doors of design indicated.

a. Medium stile (minimum 3-1/2 inch nominal width for top and vertical stiles and 10 inch wide bottom rail).

D. Weatherstripping: Where exterior door stiles or head rails do not close against fixed stops equipped with compression weatherstripping, provide sliding weatherstripping, retained in an adjustable strip in a mortise centered in the edge of the door.

E. Flashings: 0.0625 inch thick aluminum, finish to match mullion sections where exposed.

F.

2. 04 GLASS AND GLAZING MATERIALS

A. Exterior Glass and Glazing Materials: 1-5/16” thick insulated glass units, with glass and framing meeting large missile impact criteria per requirements of SSTD-12, hurricane/impact resistance complying with Code.

B. Gaskets: Manufacturer standard neoprene or EPDM wedge type gaskets produced for the specified framing system.

2. 05 SEALANT MATERIALS

A. Sealant and Backing Materials: Comply with Section 07900 - Joint Sealers of Types described below.

1. Exterior Perimeter Sealant: Type A.
2. Interior Perimeter Sealant: Type B.
3. Sealant Used Within System (Not Used for Glazing): As recommended by curtainwall manufacturer equal to types recommended by sealant manufacturer to remain permanently elastic, tacky, non-drying, non-migrating and weathertight.

2.06 STRUCTURAL SILICONE SEALANT

A. Structural Silicone Sealant: Type recommended by sealant and system manufacturers that complies with ASTM C 1184 requirements, is compatible with system components with which it comes in contact, and is specifically formulated and tested for use as a structural and weatherseal sealant as follows:

1. "Ultraglaze SSG 4000" by G.E.
2. "983 SSG" by Dow.

B. Color: As selected by Architect from manufacturer's full range of colors.

C. Tensile Strength: 100 psi (689.5 kPa) minimum.

D. Provide sealant with high modulus of elasticity that will not allow movement of more than 25 percent of joint width, unless less movement is required by structural-sealant-glazed systems' design.

2. 07 HARDWARE

A. Hardware: specified in Section 08710

2. 08 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

1. Minimum thickness of frame and sill components shall be .125 inches.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Arrange fasteners and attachments to conceal from view.

E. Reinforce interior horizontal head rail to receive closer.

F. Prepare components with internal reinforcement for door hardware and door operator hinge hardware.

G. Reinforce framing members for imposed loads.

2. 09 FINISHES

A. Class I Clear Anodized Finish: AA-M12C22A41 (Mechanical Finish: as fabricated, nonspecular; Chemical Finish: etched, medium matte; Anodic Coating: Class I Architectural, clear film thicker than 0.7 mil) complying with AAMA 611.

B. Apply one coat of bituminous paint to concealed aluminum and in contact with cementitious or dissimilar materials.

PART 3 - EXECUTION

3. 01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify wall openings and adjoining materials are ready to receive work of this Section.

3. 02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings at abutting construction; turn up flashing a minimum of 1/2" to form a concealed continuous pan with soldered/sealed watertight joints including rear and end dams.

G. Set thresholds in bed of mastic and secure.

H. Install hardware using templates provided.

I. Watertight and airtight installation of each piece of glass is required. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors) without failure of any kind including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work. Comply with "Glazing Manual" by Flat Glass Marketing Association except as shown and specified otherwise, and except as specifically recommend otherwise by the manufacturers of the glass and glazing materials.

1. Provide a minimum nominal glass bite of 1/2"

J. Where wedge-shaped gaskets are driven into one side of the channel to pressurize the gasket on the opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when subjected to dynamic movement. Anchor gasket to stop with matching ribs, or by proven adhesives, including embedment of gasket tail in cured heel bead. Miter cut and permanently bond gasket ends together by vulcanized process or silicone adhesive at corners so that gaskets will not pull away from the corners and result in voids or leaks in the glazing

J. Install perimeter sealant in accordance with Section 07900.

3. 03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3. 04 ADJUSTING

A. Adjust work under provisions of Section 01700.

B. Adjust operating hardware and sash for smooth operation.

3. 05 CLEANING

A. Clean work under provisions of 01700.

B. Remove protective material from pre-finished aluminum surfaces.

C. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

D. Remove excess sealant by method acceptable to sealant manufacturer.

3. 06 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. Protect finished Work from damage.

3.07 FIELD TESTS

A. Contactor is responsible for and shall pay for field water tests by static test method at 10 psf (no reductions allowed) for 15 minutes in accordance with ASTM E1105-15 and with latest updates as required to test glazing system and surrounding construction, shall be performed by the Contractor on completed portions of the curtainwall. In the event that such testing should result in any leakage, eliminate the causes of such leakage at no additional cost to the Owner. Remedial measures must maintain standards of quality and durability and are subject to review by the Architect. Provide powered scaffold, hose, and sufficient personnel to operate scaffold and hose.

1. Two (2) successful water tests shall be conducted at the Architect's direction and at his selected areas. Unsuccessful water tests will not be counted a fulfillment of this requirement.
2. Procedures for evaluating the performance for resistance to water and air shall comply with ASTM E1105-15.

B. Calibration of Equipment

1. All equipment used to provide testing shall be calibrated in the method and within the time periods recommend by the AAMA/ASTM International Specifications.
2. Documentation indicating proper calibration shall be provided to all interested parties.

C. Test Specimen Size and Location

1. Unless otherwise specified by the Architect the test specimen size and location shall be delegated to the third party testing agency.

2. As soon as practical after installation has began, and after the test specimens have been completely installed, adjusted, cleaned and perimeter sealed (including adequate time for sealant to cure) the specimens shall be tested for water penetration.

3. The area to be tested shall include, perimeter caulking, typical splices, frame intersections and, if applicable, at least two entire vision lites and two entire spandrel lites containing an intermediate vertical member and intermediate horizontal member.

D. Field Testing Procedure

1. Water penetration resistance performance shall be determined per ASTM E 1105 using procedure A “Uniform Static Air Pressure Difference”

2.Water penetration attributable to the product specimen shall be defined as penetration of uncontrolled water beyond a plane parallel to the innermost edges of the product.

3. Water contained within drained flashings, gutters and sills in not considered water leakage.

4. If the test specimen fails any part of the test, the responsible contractor shall remediate and the testing agency shall re-test the same test area until it passes. All remedial work must be documented and are subject to review by the architect.

5. All other areas of the test specimen that have the same defect shall as be remediated. Further, the architect has the option to have the testing agency re-test two additional test areas for each test area that subsequently fails.

6. The expense of all remediation and re-testing shall be borne by the Contractor

END OF SECTION

DOOR HARDWARE SECTION 08710

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Sliding doors.
3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.
3. Automatic operators.
4. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Hollow Metal Doors and Frames”.
2. Division 08 Section “Flush Wood Doors”.
3. Division 08 Section “Sound Control Hollow Metal Door Assemblies”.
4. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.
5. Division 08 Section “Automatic Door Operators”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. UL/ULC and CSA C22.2 – Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
8. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series
2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

   a. Type, style, function, size, label, hand, and finish of each door hardware item.
   b. Manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   e. Explanation of abbreviations, symbols, and codes contained in schedule.
   f. Mounting locations for door hardware.
   g. Door and frame sizes and materials.
   h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

   a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.

b. Complete (risers, point-to-point) access control system block wiring diagrams.
c. Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.4 QUALITY ASSURANCE

A. Hardware Supplier and Hardware Installer must obtain a license with the Louisiana Office of State Fire Marshall in accordance to RS 40:1464 and RS 40:1664.

B. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:

1. Ten years for mortise locks and latches.
2. Five years for exit hardware.
3. Twenty five years for manual surface door closer bodies.
4. Five years for motorized electric latch retraction exit devices.
5. Two years for electromechanical door hardware.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

a. Two Hinges: For doors with heights up to 60 inches.
b. Three Hinges: For doors with heights 61 to 90 inches.
c. Four Hinges: For doors with heights 91 to 120 inches.
d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Cam Lift Hinges: Where specified provide hinges that move the door up and then lower it to create a tight seal when the door is closed.

6. Manufacturers:

a. Bommer Industries (BO) - LB Series.
b. Hager Companies (HA) - CB Series.
c. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - TA Series.

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

a. Bommer Industries (BO).
b. Hager Companies (HA).
c. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2.3 POWER TRANSFER DEVICES

A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

a. Hager Companies (HA) - ETW-QC (# wires) Option.
b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - QC (# wires) Option.

B. Electrified Quick Connect Continuous Geared Transfer Hinges: Provide electrified transfer continuous geared hinges with a 12" removable service panel cutout accessible without de-mounting door from the frame. Furnish with Molex™ standardized plug connectors with sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

a. Bommer Industries (BO) - SER-QC (# of wires) Option.

b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - SER-QC (# wires) Option.
c. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE) - SER-QC (# wires) Option.

C. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:

a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Electrical Connecting Kit: QC-R001.
b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:

a. Hager Companies (HA) - Quick Connect.
b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) – QC-C Series.

2.4 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:

a. Burns Manufacturing (BU).
b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
c. Trimco (TC).

B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Manufacturers:

a. Burns Manufacturing (BU).

b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
c. Trimco (TC).

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

5. Manufacturers:

a. Burns Manufacturing (BU).
b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
c. Trimco (TC).

2.5 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

C. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
5. Keyway: Match Facility Restricted Keyway.

D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
1. Removable Cores: Core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware. Provide removable core (small or large format) as specified in Hardware Sets.

E. Patented Cylinders: ANSI/BHMA A156.5, Grade 1, certified cylinders employing a utility patented and restricted keyway requiring the use of patented controlled keys. Provide bump resistant, fixed core cylinders as standard with solid recessed cylinder collars. Cylinders are to be factory keyed where permanent keying records will be established and maintained.

1. Provide a 6 pin multi-level master key system comprised of patented controlled keys and security and high security cylinders operated by one (1) key of the highest level.

    a. Level 1 Cylinders: Provide utility patented controlled keyway cylinders that are furnished with patented keys available only from authorized distribution.

2. Manufacturers:

    a. Sargent Manufacturing (SA) - Degree Series.
    b. Corbin Russwin (RU) – Access 3 Series.
    c. Schlage Lock (SC) - Everest D Series.

F. Keying System: Each type of lock and cylinders to be factory keyed.

1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. New System: Key locks to a new key system as directed by the Owner.

G. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Three (3).
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).
4. Construction Control Keys (where required): Two (2).
5. Permanent Control Keys (where required): Two (2).

H. Construction Keying: Provide temporary keyed construction cores.

I. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

J. Key Control Software: Provide one network version of "Key Wizard" branded key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into “Key Wizard” software.

2.6 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Mortise locks to be certified Security Grade 1.

2. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.13 requirements to 10 million cycles.

3. Manufacturers:

    a. Corbin Russwin Hardware (RU) – ML2000 Series.
    b. Sargent Manufacturing (SA) – 8200 Series.
    c. Schlage (SC) – L9000 Series.

2.7 INTEGRATED WIEGAND OUTPUT LOCKING DEVICES – MULTI-CLASS READER

A. Integrated Wiegand Output Multi-Class Mortise Locks: Wiegand output ANSI A156.13, Grade 1, mortise lockset with integrated card reader, request-to-exit signaling, door position status switch, and latchbolt monitoring in one complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle trim, 3/4" deadlocking anti-friction latch, and 1" case-hardened steel deadbolt. Lock is U.L listed and labeled for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.
    1. Open architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand compatible access control systems. Latchbolt monitoring and door position switch act in conjunction to report door-in-frame (DPS) and door latched (door closed and latched) conditions.
    2. Integrated reader supports the following credentials:

        a. 125kHz proximity credentials: HID, AWID, Indala, and EM4102.
        b. 13.56 MHz proximity credentials: HID iClass, HID iClass SE, SE for MIFARE Classic, DESFire EV1.

    3. 12VDC external power supply required for reader and lock, with optional 24VDC lock solenoid. Fail safe or fail secure options.
    4. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
    5. Support end-of-line resistors contained within the lock case.
    6. Installation requires only one cable run from the lock to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
    7. Installation to include manufacturer's access control panel interface board or module where required for Wiegand output protocol.

    8. Manufacturers:

        a. Corbin Russwin (RU) – ML2000 SE-LP10 Series.
        b. Sargent Manufacturing (SA) – M1 8200 Series.

2.8 AUXILIARY LOCKS

A. Narrow Case Deadlocks and Deadlatches: ANSI/BHMA 156.13 Series 1000 Grade 1 certified narrow case deadlocks and deadlatches for swinging or sliding door applications. All functions shall be manufactured in a single sized case formed from 12 gauge minimum, corrosion resistant steel (option for fully stainless steel case and components). Provide minimum 2 7/8" throw laminated stainless steel bolt. Bottom rail deadlocks to have 3/8” diameter bolts.

    1. Manufacturers:

        a. Adams Rite Manufacturing (AD) - MS1850S / MS1950 Series.

2.9 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.10 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.

3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

5. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.

6. Electromechanical Options: Subject to same compliance standards and requirements as mechanical exit devices, electrified devices to be of type and design as specified in

hardware sets. Include any specific controllers when conventional power supplies are not sufficient to provide the proper inrush current.

7. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.

8. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

   a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
   b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

9. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

10. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.

11. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

12. Rail Sizing: Provide exit device rails factory sized for proper door width application.

13. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:

   a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
   b. Sargent Manufacturing (SA) - 80 Series.
   c. Von Duprin (VD) - 35A/98 XP Series.

2.11 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.

4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) - DC8000 Series.
b. LCN Closers (LC) - 4040 Series.
c. Sargent Manufacturing (SA) - 351 Series.
d. Yale Locks and Hardware (YA) - 4400 Series.

2.12 ELECTROMECHANICAL DOOR OPERATORS

A. General: Provide low energy operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for compliance with UL 325. Coordinate operator mechanisms with door operation, hinges, and activation devices.

1. Fire-Rated Doors: Provide door operators for fire-rated door assemblies that comply with NFPA 80 for fire-rated door components and are listed and labeled by a qualified testing agency.

B. Standard: Certified ANSI/BHMA A156.19.

C. Performance Requirements:

1. Opening Force if Power Fails: Not more than 15 lbf required to release a latch if provided, not more than 30 lbf required to manually set door in motion, and not more than 15 lbf required to fully open door.
2. Entrapment Protection: Not more than 15 lbf required to prevent stopped door from closing or opening.

D. Configuration: Surface mounted or in-ground as required. Door operators to control single swinging and pair of swinging doors.

E. Operation: Power opening and spring closing operation capable of meeting ANSI A117.1 accessibility guideline. Provide time delay for door to remain open before initiating closing cycle as required by ANSI/BHMA A156.19.

F. Features: Operator units to have full feature adjustments for door opening and closing force and speed, backcheck, motor assist acceleration from 0 to 30 seconds, time delay, vestibule interface delay, obstruction recycle, and hold open time from 0 up to 30 seconds.

G. Provide outputs and relays on board the operator to allow for coordination of exit device latch retraction, electric strikes, magnetic locks, card readers, safety and motion sensors and specified auxiliary contacts.

H. Brackets and Reinforcements: Manufacturer's standard, fabricated from aluminum with nonferrous shims for aligning system components.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Norton Door Controls (NO) - 6300 Series.

2.13 SURFACE MOUNTED CLOSER HOLDERS

A. Multi-Point Closer Holders with Motion Sensor: ANSI A156.15, Grade 1 certified multi-point, closer holder devices designed to keep doors in a held-open position if presence is detected within the opening. Push side or pull side mounting applications having a maximum opening of 180° (hold open to 175°) and dual voltage input (24V /120V). Voltage to be 24VDC unless otherwise specified. Units are fail safe, closing the door in the event of fire alarm system or electrical power interruption.

1. Safe Zone Detection: Closer holders units to have an integral motion sensor device monitoring a "zone of safety" at the door opening. Safe zone detection prevents the door from closing in event of movement within the adjustable sensing field. Movement is detectable in both directions with selectable closer hold open time and senor sensitivity. Provide optional handheld device for programming safe zone sensor settings.

2. Manufacturers:

    a. Norton Door Controls (NO) - 7100SZ Series.
    b. LCN Door Closers (LC) – 4310/4410HSA Series.

2.14 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:

    a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

6. Manufacturers:

    a. Burns Manufacturing (BU).
    b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
    c. Trimco (TC).

2.15 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

    a. Burns Manufacturing (BU).
    b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
    c. Trimco (TC).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:

    a. Rixson Door Controls (RF).
    b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

c. Sargent Manufacturing (SA).

2.16 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

1. Manufacturers:

a. National Guard Products (NG).
b. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
c. Reese Enterprises, Inc. (RE).

2.17 ELECTRONIC ACCESSORIES

A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.

1. Manufacturers:

a. Securitron (SU) - DPS Series.

B. Switching Power Supplies: Provide switching power supplies that are dual voltage, UL listed, supervised units. Units shall be field selectable with a dedicated battery charging circuit that

provide 4 Amp at 12VDC or 24VDC continuous, with up to 16 independently controlled power limited outputs. Units shall tolerate brownout or overvoltage input ± 15% of nominal voltage and have thermal shutdown protection with auto restart. Circuit breaker shall protect against overcurrent and reverse battery faults and units shall be available with a single relay fire trigger or individually triggered relayed outputs. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

1. Manufacturers:

    a. Securitron (SU) - AQ Series.

C. Energy Efficient Switching Power Supplies: Provide UL listed or recognized filtered and regulated power supplies. Provide single voltage units as shown in the hardware sets. Units must have one access control input and one fire alarm input. Standby power consumption of unit must be less than 10mW at 120VAC. Provide integral battery backup as standard for all units. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

1. Manufacturers:

    a. Securitron (SU) – EPS Series.

2.18 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.19 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.

C. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. RO - Rockwood
4. SA - SARGENT
5. AD - Adams Rite
6. RF - Rixson
7. NO - Norton
8. SU - Securitron
9. OT - Other

Hardware Sets

Set: 1.0
Doors: 101
Description: Ext - Alum Pair - CVR/NL-ELR - AO - Closer/stop

2	Continuous Hinge	_FM__SLI-HD1 SERxx	Match Dr	PE
1	CVR Exit, NL, ELR	DG163 56 AD8610 106	US32D	SA
1	CVR Exit, Exit Only	56 AD8610 EO	US32D	SA
2	Offset Door Pull	RM3310-80 Mtg-Type 12XHD MP	US32D	RO
2	Automatic Opener	6300 Series	689	NO
1	Threshold	2006AT		PE
2	ElectroLynx Harness	QC-Cxxx sized for door width		MK
2	ElectroLynx Harness	QC-C1500P		MK
2	Position Switch	DPS-M-BK		SU
1	Card Reader	By security provider		OT
2	Actuator	505		NO
1	Power Supply	AQD6		SU

Notes:
Weatherstripping by Alum Door manufacturer

Coordinate voltage, operation and electrical characteristics with all related trades.

Card Reader, wiring and connections by security provider.

Set: 2.0
Doors: 109B, 113C
Description: Ext - Alum Sgl - Rim/EO - Closer/stop

1	Continuous Hinge	_FM_SLF-HD1	Match Dr	PE
1	Rim Exit Device, Exit Only	8810 EO	US32D	SA
1	Surface Closer	351 CPS	EN	SA
1	Threshold	2006AT		PE
1	Position Switch	DPS-M-BK		SU

Notes:
Weatherstripping by Door manufacturer.

Set: 3.0
Doors: 125, 133
Description: Ext - Alum Sgl - Push/Pull - Deadlock - Closer/stop

1	Continuous Hinge	_FM_SLF-HD1	Match Dr	PE
1	Mortise Deadlock	MS1850S	628	AD
1	Mortise Cylinder	DG163 41	US32D	SA
1	Cylinder Thumb Turn	4066-xx	130	AD
2	Offset Door Pull	RM3310-80 Mtg-Type 12XHD MP	US32D	RO
1	Surface Closer	351 CPS	EN	SA
1	Threshold	2006AT		PE
1	Position Switch	DPS-M-BK		SU

Notes:
Weatherstripping by Door manufacturer.

Set: 4.0
Doors: 148
Description: Ext - Alum - Sgl - Rim/EO - Delayed Egress / Alarmed - Closer/stop

1	Continuous Hinge	_FM__SLI-HD1 SERxx	Match Dr	PE
1	Rim Exit Device, Exit Only	59 8810 EO	US32D	SA
1	Surface Closer	351 CPS	EN	SA
1	Threshold	2006AT		PE
1	Rain Guard	346C		PE
1	ElectroLynx Harness	QC-Cxxx sized for door width		MK
1	ElectroLynx Harness	QC-C1500P		MK
1	Position Switch	DPS-M-BK		SU
1	Power Supply	EPS-05		SU

Notes:
Coordinate voltage, operation and electrical characteristics with all related trades.

Set: 5.0
Doors: 127, 138
Description: Ext - Pair - Storeroom - MFB - Closer/stop

2	Continuous Hinge	CFM__HD1		PE
2	Flush Bolt	555	US26D	RO
1	Storeroom/Closet Lock	DG163 8204 LNMD	US26D	SA
1	Surf Overhead Stop	9-X36	630	RF
1	Surface Closer	351 PS	EN	SA
1	Threshold	2006AT		PE
1	Rain Guard	346C		PE
1	Position Switch	DPS-M-BK		SU

Notes:
Hollow metal frame manufacturer to provide weather stripping in the Thermal Break frame.

Set: 6.0
Doors: 116
Description: Ext - Pair – SELP10 - MFB - Closer/electro ho

1	Continuous Hinge	CFM__HD1		PE
1	Continuous Hinge	CFM__HD1 SERxx	Match Dr	PE
2	Flush Bolt	555	US26D	RO
1	Access Control Mort Lock	DG163 M1-82270-BIPS LNMD	US26D	SA
1	Surf Overhead Stop	9-X36	630	RF
1	Electromech Closer w/Motion Sensor	7133SZ	689	NO
1	Door Stop	471	US26D	RO
1	Threshold	2006AT		PE
1	Astragal	S771D		PE
1	ElectroLynx Harness	QC-Cxxx sized for door width		MK
1	ElectroLynx Harness	QC-C1500P		MK
1	Power Supply	EPS-05		SU

Notes:
Hollow metal frame manufacturer to provide weather stripping in the Thermal Break frame.
Coordinate voltage, operation and electrical characteristics with all related trades.

Set: 7.0
Doors: 126C
Description: Ext - Sgl - Rim/EO - Delayed Egress - Closer/stop

1	Continuous Hinge	CFM__HD1 SER1xx		PE
1	Rim Exit Device, Exit Only	59 8810 EO	US32D	SA
1	Surface Closer	351 CPS	EN	SA
1	Threshold	2006AT		PE
1	Position Switch	DPS-M-BK		SU

Notes:
Hollow metal frame manufacturer to provide weather stripping in the Thermal Break frame.

Set: 8.0
Doors: 115A
Description: Alum Pair - CVR/NL ELR - AO

2	Continuous Hinge	_FM__SLI-HD1 SERxx	Match Dr	PE
2	CVR Exit, NL, ELR	56 AD8610 106	US32D	SA
2	Offset Door Pull	RM3310-80 Mtg-Type 12XHD MP	US32D	RO
2	Automatic Opener	6300 Series	689	NO
2	ElectroLynx Harness	QC-Cxxx sized for door width		MK
2	ElectroLynx Harness	QC-C1500P		MK
2	Actuator	505		NO
1	Power Supply	AQD6		SU

Notes:
Coordinate voltage, operation and electrical characteristics with all related trades.
Security system to retract latches during business hours to all entry.

Set: 9.0
Doors: 113B
Description: Alum Pair - CVR/Lever - Closer/stop ho

2	Continuous Hinge	_FM_SLF-HD1	Match Dr	PE
2	CVR Exit, Classroom	DG163 AD8613 ETMD	US32D	SA
2	Surface Closer	351 PSH	EN	SA

Set: 10.0
Doors: 115B
Description: Alum Sgl - Rim/EO Delayed Egress - Closer

1	Continuous Hinge	_FM__SLI-HD1 SERxx	Match Dr	PE
1	Rim Exit Device, Exit Only	59 8810 EO	US32D	SA
1	Surface Closer	351 O/P10	EN	SA
1	W/F Stop	406 / 441CU	US26D	RO
1	ElectroLynx Harness	QC-Cxxx sized for door width		MK
1	ElectroLynx Harness	QC-C1500P		MK
1	Power Supply	EPS-05		SU

Set: 11.0
Doors: 112
Description: Alum Sgl – SELP10 - Closer

1	Continuous Hinge	_FM__SLI-HD1 SERxx	Match Dr	PE
1	Access Control Mort Lock	DG163 M1-82270-BIPS LNMD	US26D	SA
1	Surface Closer	351 O/P10	EN	SA
1	W/F Stop	406 / 441CU	US26D	RO
1	ElectroLynx Harness	QC-Cxxx sized for door width		MK
1	ElectroLynx Harness	QC-C1500P		MK
1	Power Supply	EPS-05		SU

Notes:
Coordinate voltage, operation and electrical characteristics with all related trades.
Card Reader, wiring and connections by security provider.

Set: 12.0
Doors: 111A, 111B
Description: Pair - Storeroom - AFB, Closer/stop

6	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Automatic Flush Bolt	2842/2942	US26D	RO
1	Dust Proof Strike	570	US26D	RO
1	Storeroom/Closet Lock	DG163 8204 LNMD	US26D	SA
1	Coordinator	2672	US28	RO
2	Mounting Bracket	2601AB or 2601C	Black	RO
2	Surface Closer	351 PS	EN	SA
1	Astragal	3572SP		PE
2	Silencer - Metal Frame	608		RO

Set: 13.0
Doors: 109A
Description: Pair - SVR/SELP10 - Closer/psh - KP

4	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
2	Electric Hinge	TA2714-QCxx 4-1/2" x 4-1/2"	US26D	MK
2	SVR Exit, SELP10	DG163 M1 8773-BIPS 03 ETMD	US32D	SA
2	Surface Closer	351 PSH	EN	SA
2	Kick Plate	K1050 10" 4BE CSK	US32D	RO
2	Silencer - Metal Frame	608		RO
2	ElectroLynx Harness	QC-Cxxx sized for door width		MK
2	ElectroLynx Harness	QC-C1500P		MK
1	Power Supply	EPS-05		SU

Notes:
Coordinate voltage, operation and electrical characteristics with all related trades.
Card Reader, wiring and connections by security provider.

Set: 14.0

Doors: 128
Description: Sgl - Exit- Closer

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Rim Exit devise	DG163 12 8804 ETMD	US32D	SA
1	Surface Closer	351 O/P10	EN	SA
1	W/F Stop	406 / 441CU	US26D	RO
1	Gasketing Sgl	S88BL		PE

Set: 15.0
Doors: 134, 135, 136, 137, 142, 143
Description: Sgl - SELP10 Lock - OH Stop -Sound Seals

2	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Electric Hinge	TA2714-QCxx 4-1/2" x 4-1/2"	US26D	MK
1	Access Control Mort Lock	DG163 M1-82270-BIPS LNMD	US26D	SA
1	Surf Overhead Stop	55-X36	652	RF
1	Threshold	151A		PE
2	Gasketing Sgl	S88BL		PE
1	Door Bottom	STC4131CPK		PE
1	ElectroLynx Harness	QC-Cxxx sized for door width		MK
1	ElectroLynx Harness	QC-C1500P		MK
1	Power Supply	EPS-05		SU

Notes:
Coordinate voltage, operation and electrical characteristics with all related trades.

Card Reader, wiring and connections by security provider.

Set: 16.0
Doors: 114, 139
Description: Sgl - Storeroom - Closer

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Storeroom/Closet Lock	DG163 8204 LNMD	US26D	SA
1	Surface Closer	351 O/P10	EN	SA
1	W/F Stop	406 / 441CU	US26D	RO
1	Gasketing Sgl	S88BL		PE

Set: 17.0
Doors: 106
Description: Sgl - Storeroom, - Closer

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Storeroom/Closet Lock	DG163 8204 LNMD	US26D	SA
1	Surface Closer	351 O/P10	EN	SA
1	W/F Stop	406 / 441CU	US26D	RO
3	Silencer - Metal Frame	608		RO

Set: 18.0
Doors: 117, 131, 141
Description: Sgl - SELP10 Lock - Closer/stop

2	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Electric Hinge	TA2714-QCxx 4-1/2" x 4-1/2"	US26D	MK
1	Access Control Mort Lock	DG163 M1-82270-BIPS LNMD	US26D	SA
1	Surface Closer	351 PS	EN	SA
1	Gasketing Sgl	S88BL		PE
1	ElectroLynx Harness	QC-Cxxx sized for door width		MK
1	ElectroLynx Harness	QC-C1500P		MK
1	Power Supply	EPS-05		SU

Notes:
Coordinate voltage, operation and electrical characteristics with all related trades.

Card Reader, wiring and connections by security provider.

Set: 19.0
Doors: 105, 110
Description: Sgl - Storage

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Storeroom/Closet Lock	DG163 8204 LNMD	US26D	SA
1	W/F Stop	406 / 441CU	US26D	RO
2	Gasketing Sgl	S88BL		PE
1	Door Bottom	STC4131CPK		PE

Set: 20.0
Doors: 113A
Description: Sgl – SELP10 - Closer

2	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Electric Hinge	TA2714-QCxx 4-1/2" x 4-1/2"	US26D	MK
1	Access Control Mort Lock	DG163 M1-82270-BIPS LNMD	US26D	SA
1	Surface Closer	351 O/P10	EN	SA
1	W/F Stop	406 / 441CU	US26D	RO
1	Gasketing Sgl	S88BL		PE
1	ElectroLynx Harness	QC-Cxxx sized for door width		MK
1	ElectroLynx Harness	QC-C1500P		MK
1	Power Supply	EPS-05		SU

Notes:
Coordinate voltage, operation and electrical characteristics with all related trades.
Card Reader, wiring and connections by security provider.

Set: 21.0
Doors: 108A, 108B, 122A, 122B, 122C
Description: Sgl - Office - Closer

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Office/Entry Lock	DG163 8205 LNMD	US26D	SA
1	Surface Closer	351 O/P10	EN	SA
1	W/F Stop	406 / 441CU	US26D	RO
3	Silencer - Metal Frame	608		RO

Set: 22.0
Doors: 123, 126A
Description: Sgl - Office

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Office/Entry Lock	DG163 8205 LNMD	US26D	SA
1	W/F Stop	406 / 441CU	US26D	RO
1	Silencer - Metal Frame	608		RO

Set: 23.0 NOT USED

Set: 24.0
Doors: 118
Description: Sgl - Storeroom - Closer

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Classroom Lock	DG163 8204 LNMD	US26D	SA
1	Surface Closer	351 O/P10	EN	SA
1	W/F Stop	406 / 441CU	US26D	RO
3	Silencer - Metal Frame	608		RO

Set: 25.0 NOT USED

Set: 26.0
Doors: 132
Description: Sgl - Passage - Closer

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Passage Latch	8215 LNMD	US26D	SA
1	Surface Closer	351 O/P10	EN	SA
1	W/F Stop	406 / 441CU	US26D	RO
1	Gasketing Sgl	S88BL		PE

Set: 27.0
Doors: 121
Description: Sgl - Passage - Closer/ho

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Passage Latch	8215 LNMD	US26D	SA
1	Surface Closer	351 H	EN	SA
1	W/F Stop	406 / 441CU	US26D	RO
3	Silencer - Metal Frame	608		RO

Set: 28.0
Doors: 103, 119, 120, 129, 130
Description: Sgl - Privacy/IND - Closer

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Privacy Lock	49 8265 LNMD	US26D	SA
1	Surface Closer	351 O/P10	EN	SA
1	W/F Stop	406 / 441CU	US26D	RO
1	Gasketing Sgl	S88BL		PE

Set: 29.0
Doors: 104, 107
Description: Sgl - Push/Pull - Closer - KP

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Push Plate	70F	US32D	RO
1	Straight Door Pull	RM3301-80 Mtg-Type 12XHD MP	US32D	RO
1	Surface Closer	351 O/P10	EN	SA
1	Kick Plate	K1050 10" 4BE CSK	US32D	RO
3	Silencer - Metal Frame	608		RO

Set: 30.0
Doors: 126D
Description: All Hardware by Dr provider

1	All Hardware by door manufacturer.			00

Set: 31.0
Doors: 126B
Description: Gate - Deadlock

2	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Deadlock	DG163 4877	US26D	SA
1	Finger Guard	MK-1B Fingersafe		00

END OF SECTION 08710

GLAZING SECTION 08800

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The required applications of glass and glazing include but are not necessarily limited to the following:

1. Glazing punched window units (Section 08900).

2. Glazing curtainwall construction (Section 08900).

3. Glazed exterior aluminum entrances (Section 08410 and 08900).

4. Glazing interior wood and metal doors.

5. Glazing interior partitions and miscellaneous interior glazing.

B. Generally glass types required are as follows unless otherwise indicated on the Drawings:

1. Exterior Vision Lites: Insulated units, Low-E coating on no.2 surface of 1/4" exterior HS lite, 1/2" air space and interior lite of 9/16" thick laminated unit of 1/4" clear HS glass, .09" PVB interlayer and 1/4" clear HS glass,. Tempered exterior lite where safety glazing is required

a. Entrances shall receive 9/16" thick laminated unit with same coating as the insulated units for visual continuity

b. Frosted Units (FG-1): matching the adjacent HS insulated vision glass units and a simulated acid etch treatment on the #3 surface of the unit

2. Glass and framing meeting missile impact criteria per requirements of SBCCI SSTD-12, and ASTM E1886 and E1996, meeting requirements of the Large Missile Test of ASTM E 1996 up to 30 foot of building height and meeting requirements of the Small Missile Test of ASTM E 1996 above 30 ft

3. Interior: 1/4" monolithic units or thicker where indicated on the drawings. clear; tempered where safety glazing is required; fire rated glass where indicated at fire rated construction..

1.02 RELATED SECTIONS

A. Section 07900 - Joint Sealers: Sealant and back-up material.

B. Section 08112 - Steel Doors.

C. Section 08211 - Wood Doors.

D. Section 08410– Interior storefront and Entrances

E. Section 08900 –Glazed Aluminum Curtainwall and Entrances .

1.03 REFERENCES

A. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

B. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.

C. ASTM C1036 - Flat Glass.

D. ASTM C1048 - Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.

E. ASTM E546 - Test Method For Frost Point of Sealed Insulating Glass Units.

F. ASTM E576 - Test Method For Dew/Frost Point of Sealed Insulating Glass Units in Vertical Position.

G. ASTM E773 - Test Method for Seal Durability of Sealed Insulating Glass Units.

H. ASTM E774 - Sealed Insulating Glass Units.

I. FGMA - Glazing Manual.

J. FGMA - Sealant Manual.

K. FS DD-G-45ID - Glass, Plate, Sheet, Figure (Flat, for Glazing, Mirrors and other Uses).

L. FS TT-C-00598 - Caulking Compound, Oil and Resin Base Type.

M. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type.

N. FS TT-S-00227 - Sealing Compound, Rubber Base, Two Component.

O. FS TT-S-00230 - Sealing Compounds, Synthetic-Rubber Base, Single Component, Chemically Curing.

P. FS TT-S-01543 - Sealing Compound, Silicone Rubber Base.

Q. FS TT-G-410 - Glazing Compound, Sash (Metal) for Back Bedding and Face Glazing (Not for Channel or Stop Glazing).

R. Laminators Safety Glass Association - Standards Manual.

S. SIGMA - Sealed Insulated Glass Manufacturers Association.

1.04 PERFORMANCE REQUIREMENTS

A. Provide glass and glazing that has been produced, fabricated and installed to withstand normal

thermal movement, wind loading and impact loading (where applicable), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials and other defects in the work.

B. Glass and glazing materials of this Section shall provide continuity of building enclosure.

1. To utilize the inner pane of multiple pane sealed units for the continuity of the air and vapor seal.

2. Maintain continuous air and vapor barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.

C. Provide thickness and/or heat treatment of glass as required to meet the wind loads (pounds/square foot) and large missile criteria specified in Division 8 glazing systems, required in sections specifying the systems in which glass is included, but not less than 1/4" thick; based on wind loading duration of 60 seconds, maximum allowable breakage probability at initial occurrence of design load of 8 lites/1000 (design safety factor of 2.5), and 1 lite/thousand and at overhead glazing.

D. Limit glass deflection to 1/200 or flexure limit of glass, with full recovery of glazing materials, whichever is less.

1.05 SUBMITTALS

A. Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

B. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

C. Product Data for Credit 5.C4(EQ 4.1): For sealants, including printed statement of VOC content and chemical components

D. Samples: Submit two (2) samples, 12 x 12 inch in size, illustrating glass units; also glass units incorporated in curtainwall sample.

E. Samples: Submit 12 inch long bead of glazing gaskets, color as selected.

F. Manufacturer's Installation Instructions: Indicate special precautions required.

G. Manufacturer's Certificate: Certify that sealed insulated glass, meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with FGMA Glazing Manual, FGMA Sealant Manual, SIGMA and Laminators Safety Glass Association - Standards Manual for glazing installation methods.

1. Maintain one copy of each document on site.

B. Safety Glazing Standards: Where safety glass is indicated or required by authorities having

jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials, dated January 6, 1977 (The Consumer Product Safety Commission), i.e. doors, sidelights, etc.

C Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component pane of units with appropriate certification label or inspecting and testing organization indicated below:

1. Insulating Glass Certification Council (IGCC).

D. Single Source Responsibility for Glass: To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type an class required.

1.07 PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this Section; see Section 01200.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not install glazing when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.09 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop Drawings and as instructed by the manufacturer.

1.10 COORDINATION

A. Coordinate the work with glazing frames.

1.11 WARRANTY

A. Manufacturer's Warranty on Insulating Glass Products: Provide written warranty signed by manufacturer of insulating glass agreeing to furnish f.o.b. point of manufacturer, freight allowed to project site, within specified warranty period indicated below, replacements for those insulating glass units which develop manufacturing defects. Manufacturing defects are defined as failure of hermetic seal of air space (beyond that due to glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging at temperature above 20°F (-29°C), and other visual indications of seal failure or performance.

1. Warranty Period: Manufacturer's standard but not less than 10 years after date of substantial completion.

B. Manufacturer's Warranty on Laminated Glass: Provide written warranty signed by manufacturer of laminated glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, laminated glass units

which develop manufacturing defects. Manufacturing defects are defined as edge separation or delamination which materially obstructs vision through glass.

1. Warranty Period: Manufacturer's standard but not less than 5 years after date of substantial completion.

PART 2 - PRODUCTS

2.01 GLASS PRODUCTS, GENERAL:

A. Primary Glass Standard: Provide primary glass which complies with ASTM C 1036 requirements, including those indicated by reference to type, class, quality, and, if applicable, form, finish, mesh and pattern.

B. Heat-Treated Glass Standard: Provide heat-treated glass which complies with ASTM C 1048 requirements, including those indicated by reference to kind, condition, type, quality, class, and, if applicable, form, finish, and pattern.

C. Sizes: Fabricate glass to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Provide thicknesses indicated or, if not otherwise indicated, as recommended by glass manufacturer for application and performance indicated.

2.03 PRIMARY GLASS PRODUCTS

A. Clear Float Glass: Type I, Class 1 (transparent), quality q3 (glazing select).

B. Mirror Glass: Clear float type with copper and silver coating, organic overcoating, square and lapped edges, 1/4 inch thick minimum with reinforced plastic safety backing sheet.

2.04 HEAT-TREATED PRODUCTS

A. Manufacturing Process: Manufacture heat-treated glass as follows:

1. Horizontal (roller hearth) process with minimal roll wave distortion parallel with bottom edge of glass as installed to eliminate tong marks.
2. Tempered glass shall be strengthened in bending to not less than 4.5 times annealed glass strength.
3. Heat-strengthened glass shall be strengthened in bending to not less than 2.0 times annealed glass strength.
4. For all fully tempered glass, provide heat soak testing conforming to EN14179 which includes a 2 hour dwell at 290°C±10°C.
5. Manufacturers: Fabrication processes, including low emissivity and reflective coatings, insulating, laminated, silk-screening and tempering shall be manufactured by a single manufacturer with a minimum of ten (10) years of fabrication experience and meet ANSI / ASQC 9002 1994.

B. Tolerances: Heat strengthened and tempered glass shall be examined by the glass manufacturer to detect and discard any lights which exceed the following tolerances Maximum peak to valley rollerwave 0.003” (0.08mm) in the central area and 0.008” (0.20mm) within 10.5” (267mm) of the leading and trailing edge. For clear or low-iron glass

1/4” to 3/8” thick without ceramic frit or ink, maximum + or – 100 mD (millidiopter) over 95% of the glass surface. Maximum bow and warp 1/32” per lineal foot (0.79mm). Where bow tolerance and wave tolerance differ, the stricter requirement shall govern.

C. Clear Tempered Float Glass: Grade B (fully tempered), style I (uncoated surfaces), type 1 (float), quality q3 (glazing quality), class 1 (transparent).

D. Clear Heat-Strengthened Float Glass: Grade A (heat strengthened), style I (uncoated surfaces), type 1 (float), quality q3 (glazing select), class 1 (transparent).

2.05 COATED (REFLECTIVE GLASS PRODUCTS

A. General: Performance characteristics designated for coated glass products below are based on manufacturer's published test data for 1/4" thick glass products, unless otherwise indicated. Refer to primary and heat-treated glass requirements relating to properties of glass products to which coatings are applied.

1. Provide heat-strengthened coated float glass except provide tempered units where coated safety glass is indicated or required for performance and loads.

B. Reflective coating shall be subject to the following criteria:

1. Pinholes with diameter greater than 1/16 inch are not permitted.
2. Individual pinholes with diameter 1/16 inch or less are permitted only within three (3) inches of an edge.
3. Cluster of pinholes (regardless of diameter or location) visible at 6 feet are not permitted.
4. Scratches, rub marks or other gaps in the coating are not permitted where any portion thereof could include a circle of diameter exceeding 1/16 inch. Where the included circle is 1/16 inch or less, scratches, rub marks or other gaps visible at 10 feet are permitted only within three (3) inches of an edge.
5. Streaks or splotches resulting from nonuniformity of the coating which are visible from the building interior or exterior are not permitted.
6. Color range must fall within the limits established by approved samples.

2.06 LAMINATED GLASS

A. Plastic Interlayer: Provide glass fabricator's standard clear polyvinyl butyral interlayer for laminating sheet of glass, with a proven record of showing no tendency to bubble, discolor or lose physical or mechanical properties after laminating and installation, in colors and of thickness indicated.

1. Product: Subject to compliance with requirements, provide "Saflex" by Monsanto Co. or equal.

B. Laminating Process: Fabricate laminated glass using laminator's standard heat-plus-pressure process to produce glass free from foreign substance and air/glass pockets.

C. Laminated Safety Glass: Two sheets of glass laminated together with a 0.060" thick plastic interlayer, heat treated if required for specified loads and large missile requirmenets, and complying with requirements indicated below:

1. Exterior Sheet: 1/4" HS clear glass, coated when not part of the insulated units. Verify the coating is compatible with interlayer material
2. Interior Sheet: 1/4" HS clear glass.
3. Overall Thickness: 9/16".

D. 9/16” thick clear laminated glass, with glass and framing meeting large missile impact criteria per requirements of SSTD-12, hurricane/impact resistance complying with 2006 IBC Code. Two sheets of glass laminated together with a minimum 0.090" thick plastic interlayer or thicker if required to meet SSTD-12 and ASTM E1886 and E1996.

2.07 SEALED INSULATING GLASS UNITS

A. Insulating Glass: Provide two (2) sheets of heat strengthened glass complying with ASTM E 774 as follows, and 1/2" dry air or gas-filled space with -20°F dew point, with Class A sealant-type edge construction to maintain a hermetic seal as certified by the Insulating Glass Certification Council (I.G.C.C.); fabricated to provide the following overall performance characteristics:

1. Exterior Sheet: Low –E Coated HS glass 1/4" thick, with coating placed on No. 2 surface.
2. Interior Sheet: 9/16” thick clear laminated clear HS glass with minimum. 09" PVB interlayer.
3. **Note: Heat strengthen each lite and tempered exterior lite where safety glass is required.**
4. Performance: As follows:
   a. Light transmission (visible): 42%
   b. Light reflectance (outdoor visible): 20%
   c. U-value (summer daytime): 0.24
   d. U-value (winter daytime): 0.29
   e. Solar Factor (SHGC): 0.26
   f. LSG: 1.62
   g. Approved: “Vitro Vistacool (2) Azxuria + Solarban 60 (3) Clear or equal

5. Edge Construction: Twin primary seals of polyisobutylene; tubular aluminum or galvanized steel spacer-bar frame with welded or soldered sealed corners, and filled with dessicant; and secondary seal outside of bar, bonded to both sheets of glass and bar, of polysulfide, silicone or hot-melt butyl elastomeric sealant (fabricator's option)..

6. Frosted Units: matching the adjacent HS insulated vision glass units and adding Guardian SatinDeco #3Simulated acid etch or equal on the #3 surface of the frosted unit.

2.08 GLAZING ACCESSORIES

A. General: All glazing accessories shall be compatible with all sealants within the system and with sealant at edge of insulated glass units.

B. Setting Blocks: Neoprene, EPDM or Silicone as recommended by the glazing manufacturer, 80 - 90 Shore A durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

C. Spacers: Neoprene, EPDM or Silicone 50 - 60 Shore A durometer hardness, minimum 3 inch long x one-half the height of the glazing stop x thickness to suit application.

D. Edge Blocks: Neoprene, EPDM or Silicone extruded shape of size and hardness required to limit lateral movement (side-walking) of glass.

E. Butyl Rubber Glazing Tape: Partly-vulcanized, self-adhesive, non-staining, elastomeric butyl rubber tape, 98% solids, intended for 35% compression, no appreciable deterioration for 3000 hour test in Atlas Weathermeter.

2.09 GLAZING GASKETS

A. See Sections 08900 for requirements for gaskets.

B. Dense Elastomeric Compression Seal Gaskets: Molded or extruded neoprene or EPDM gaskets of profile and hardness required to maintain watertight seal; complying with ASTM C 864, Option 1.

C. Cellular Elastomeric Preformed Gaskets: Extruded or molded closed cell, integral-skinned neoprene of profile and hardness required to maintain watertight seal; complying with ASTM C 509, Type II; black.

2.10 GLAZING SEALANT/COMPOUNDS

A. Provide exposed glazing materials of color selected by the Architect from manufacturer's standard colors. Provide hardness of materials as recommended by the manufacturer for the required application and condition of installation in each case. Provide only compounds which are proved to be fully compatible with surfaces contacted.

B. Silicone Rubber Glazing Sealant: Silicone rubber, one-part elastomeric sealant, complying with FS TT-S-001543, Class A, high modulus silicone glazing compound, acid curing. One of the following:

1. Dow Corning 999; Dow Corning Corp.
2. SCS 1200; General Electric Co.
3. Proglaze; Tremco

2.11 STRUCTURAL SILICONE SEALANT

A. Structural Silicone Sealant: Type recommended by sealant and system manufacturers that complies with ASTM C 1184 requirements, is compatible with system components with which it comes in contact, and is specifically formulated and tested for use as a structural and weatherseal sealant as follows:

1. "Ultraglaze SSG 4000" by G.E.
2. "983 SSG" by Dow.

B. Color: As selected by Architect from manufacturer's full range of colors.

C. Tensile Strength: 100 psi (689.5 kPa) minimum.

D. Provide sealant with high modulus of elasticity that will not allow movement of more than 25

percent of joint width, unless less movement is required by structural-sealant-glazed systems' design.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.02 PREPARATION

A. Pre-Installation Meeting: At Contractor's direction, Glazier, sealant and gasket manufacturers' technical representatives, glass framing erector and other trades whose work affects glass and glazing shall meet at project site to review procedures and time schedule proposed for glazing and coordination with other work.

B. Clean glazing channels and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

3.03 GLAZING

A. Watertight and airtight installation of each piece of glass is required. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors) without failure of any kind including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.

B. Comply with "Glazing Manual" by Flat Glass Marketing Association except as shown and specified otherwise, and except as specifically recommend otherwise by the manufacturers of the glass and glazing materials.

1. Provide a minimum nominal glass bite as required by ASTM F 2248.

C. Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

D. Glazing channel dimensions as indicated in details are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.

E. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed,

weakens glass and impairs performance and appearance.

F. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

G. Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but with edge nearest corner not closer than 6" from each corner, unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.

H. Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except sealant tape use thickness slightly less than final compressed thickness of tape.

I. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.

J. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.

K. Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.

L. Where wedge-shaped gaskets are driven into one side of the channel to pressurize the gasket on the opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when subjected to dynamic movement. Anchor gasket to stop with matching ribs, or by proven adhesives, including embedment of gasket tail in cured heel bead.

1. Miter cut and permanently bond gasket ends together by vulcanized process or silicone adhesive at corners so that gaskets will not pull away from the corners and result in voids or leaks in the glazing system.

3.04 MISCELLANEOUS INTERIOR GLAZING

A. Install glazing tape in accordance with manufacturer's instructions.

B. Cut glazing tape to length; install on glazing pane. Seal corners by butting spline and sealing junctions with manufacturer's recommended sealant.

C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

E. Install removable stops without displacing glazing tape. Exert pressure for full continuous contact.

3.05 MANUFACTURER'S FIELD SERVICES

A. Glass product manufacturers to provide field surveillance of the installation of their products.

B. Monitor and report installation procedures, and unacceptable conditions.

3.06 CLEANING

A. Clean work under provisions of 01700.

B. Remove glazing materials from finish surfaces.

C. Remove labels after work is complete.

D. Clean glass and mirrors.

3.07 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. After installation, mark pane with an 'X' by using removable plastic tape or paste.

END OF SECTION

GLAZED ALUMINUM CURTAINWALL SECTION 08900

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. All curtainwall work with the major components to include, but not necessarily limited to the following for single-source responsibility, with the extent indicated on the Drawings. Curtainwall glazing system shall be custom design with structural silicone vertical butt joints, complying with profiles indicated on the drawings and performance specified herein

1. Exterior aluminum wall framing systems, (not including the building structure) to receive glass and other components, and all concealed secondary structural framing required to meet specified loads independent of building structure. Framing shall be 2-1/2″ face pressure bar system, wet silicone and gasket glazing to meet specified performance and large missile requirements

2. Coping construction in conjunction with wall framing system. Flashing at parapet as an extension of the curtainwall system.

3. Glass (visions and spandrel) and glazing for each component.

4. Sealants, caulking, joint fillers, and gaskets in conjunction with each component.

5. Anchors, inserts, support brackets, expansion devices, fasteners, flashings, vents, weeps, insulation, and similar elements in conjunction with each of the components hereof; support items also include those require embedding in other work, i.e. structure, requires coordination with other work.

6. Sills and similar border and filler items that are integral with curtainwall system and extensions of the curtainwall system at the roof edges

6. Anodized finishes in conjunction with curtainwall work, also including separation of all dissimilar materials.

7. Glazed “medium stile” exterior aluminum entrances All hardware specified in Section 08710. Entrance finishes shall be same as curtainwall.

9. Exterior glass and framing of specified systems shall meet specified wind loads and also large missile impact criteria per requirements of ASTM E1886 and E1996.

10. Custom system incorporating aluminum insect screen at the north porch area, requiring the wrapping or attaching the end of the insect screen around or to a ¼” alum rod or tube that “mimics” the thickness of the glazing so it can fit in the Curtainwall system

1.02 RELATED SECTIONS

A. Section 05500 - Metal Fabrications: Metal fabricated attachment devices and framed openings.

B. Section 07900 - Joint Sealers: System perimeter sealant and back-up materials.

C. Section 08410 – Interior Aluminum Entrances and Storefront.

D. Section 08415 – Exterior Aluminum Entrances and Storefront.

E. Section 08800 - Glazing.

1.03 REFERENCES

A. AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. AAMA - Curtain Wall Manual #10 - Care and Handling of Architectural Aluminum From Shop to Site.

C. AAMA 501 - Methods of Test for Metal Curtain Walls.

D. AAMA 605.2 - Specifications for High Performance Organic Coating on Architectural Extrusions and Panels.

E. AAMA SFM-1 - Aluminum Storefront and Entrance Manual.

F. ANSI/ASTM A36 - Structural Steel.

G. ANSI/ASTM A386 - Zinc Coating (Hot Dip) on Assembled Steel Products.

H. ANSI/ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

I. ANSI/ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

J. ANSI/ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.

K. ANSI/ASTM E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.

L. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

M. ANSI/ASTM E331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

N. SSPC - Steel Structures Painting Council.

1.04 PERFORMANCE REQUIREMENTS

A. Structural: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as required by and calculated in accordance with the International Building Code 2021 and Supplements (local parish) and ASCE 7-10 latest edition, measured in accordance with ANSI/ASTM E330 and when tested

in accordance with ANSI/ASTM E330 as follows based on wind loads indicated on the S-series drawing and corners as defined in Code:.

1. Limit mullion deflection to flexure limit of glass or L/175, which ever is less, and in no case greater than 3/4".
2. No glass breakage, permanent damage to glazing, fasteners or anchors, and no permanent deformation to wall framing members shall occur at a structural test load equal to 1.5 times the specified positive and negative design wind pressure.
3. Deflection of members parallel to the plane of the wall, when carrying its full dead load, shall not exceed an amount that will reduce glass bite by less than 75 percent of the design dimension and shall not reduce edge clearance between itself and the panel, glass, or other fixed member immediately above or below to less than 1/8 inch.

B. Air Infiltration: Limit air leakage through assembly to 0.06 cfm/min/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with AAMA 501 or ANSI/ASTM E283.

C. Water Infiltration: No uncontrolled leakage when measured in accordance with AAMA 501 and ASTM E331 with a test pressure difference of 20% of design loads, but in no case less than 15 psf, with water rate of 5 gallons per hr. per sq. ft., nor any water leakage at a dynamic pressure at an air stream equivalent to the static pressure specified.

D. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than 68. Thermal Transmittance U Value: .40 BTU/HR/FT²/ºF or less

E. System shall accommodate, without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads and deflection of structural support framing.

F. System to provide for expansion and contraction within system components caused by a cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental affect to system components.

G. Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network within the framing system.

G. Design Requirements:

1. Metal stick framed systems.
2. System manufacturer shall provide curtain wall systems, including necessary modifications to meet specified requirements and maintaining visual design concepts.
3. Fabricate glazing systems for exterior glazing at vision areas and exterior glazing at spandrel areas.
4. Perimeter conditions shall allow for installation tolerances, expansion and contraction of adjacent materials, and sealant manufacturer's recommended joint design.
5. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage or moisture disposal.
6. Requirements shown by details are intended to establish basic dimension of unit, sight lines and profiles of members.

7. Do not assume glass, sealants and interior finishes contribute to framing member strength, stiffness or lateral stability.
8. Assemblies shall be free from rattles, wind whistles and noise due to thermal and structural movement and wind pressure.
9. Attachment considerations are to take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.
10. Anchors, fasteners and braces shall be structurally stressed not more than 50% of allowable stress when maximum loads are applied

1.05 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate elevations and details with system dimensions, framed requirements and tolerances, affected related work and expansion and contraction joint location and details. Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, and internal drainage details.

C. Product Data: Provide data for each component of the assembly, including coatings and glass.

D. Samples: Submit two (2) samples 2 x 8 inches in size illustrating pre-finished aluminum surfaces and gaskets.

1. Full size sample of typical framing complete with glass and gaskets illustrating a corner and intersection condition.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements prepared and sealed by a registered Structural Engineer licensed in the State of the project, verifying the ability of members, assemblies, and connections to support the loads specified.

F. Test Reports: Provide test reports from a qualified independent testing laboratory that show compliance of the manufacturer's glazed aluminum curtain wall system with performance requirements indicated based on comprehensive testing of the system by the laboratory within the last three (3) years current production of the system by the Manufacturer.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with AAMA SFM-1 and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. Conform to requirements of ANSI A117.1.

C. Responsibility: The Drawings, showing the details of all items indicated herein, are for the sole purpose of defining the design intent and are intended to emphasize the profiles for this project. To avoid any misunderstanding or lack of interpretation, the Contractor is hereby advised that the responsibility for the curtain wall system, including all items listed under "Description of Work" herein, is totally his for single source responsibility, including the design, structural calculations, shop drawings, material installation, warranties, and related documentation and certification required herein.

1.07 QUALIFICATIONS

A. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum five (5) years documented experience.

B. Approved: “ForceFront Storm Curtainwall” by Tubelite or equal systems by Kawneer and Old Castle

1.08 PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this Section; see Section 01200 - Project Meetings.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Handle work of this section in accordance with AAMA - Curtain Wall Manual #10.

C. Protect pre-finished aluminum surfaces with wrapping or stripable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1.11 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.12 WARRANTY

A. General: All work included in this section shall be fully guaranteed for performance, materials, and workmanship for a period of no less than five (5) years from the date of Substantial Completion. Guarantees and warranties shall be delivered to the Owner in duplicate, in an acceptable form, executed by an authorized officer or manufacturer of each material and shall be dated and notarized by a duly authorized Notary Public. Any failure in any of the curtainwall components shall result in an extension of the guarantee period until the deficiency is permanently repaired.

1. The warranty shall agree to repair or replace defective materials and workmanship of the wall work during the warranty period. Defective materials and workmanship include abnormal deterioration, aging or weathering of the work, leakage of water or air exceeding specified limits, structural failure of components resulting from exposure to pressures and forces up to and including specified limits, failure of operating parts to function normally, deterioration or discoloration of finishes in excess of normal weathering and aging, glass breakage, secondary glass damage or breakage, failure of sealants and failure of the work to fulfill specified performance requirements.

B. Coating shall be warranted for twenty (20) years against performance less than that specified herein.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Extruded Aluminum: ANSI/ASTM B221; 6063 alloy, T5 temper for extruded structural framing members.

B. Sheet Aluminum: ANSI/ASTM B209; alloy and temper suitable for use.

C. Fasteners: Non-magnetic stainless steel or aluminum or other materials warranted by manufacturer to be non-corrosive and compatible with aluminum components. Provide nuts or washers of design having means to prevent disengagement; deforming of fastener threads is unacceptable

1. Do not use exposed fasteners.
2. Where fasteners anchor into aluminum less than 0.125" thick, provide non-corrosive pressed-in splined nuts or other type reinforcement to receive fastener threads.

D. Internal Reinforcing:

1. ASTM A 36 for carbon steel; or ASTM B 308 for structural aluminum.
2. Shapes and sizes to suit installation.
3. Shop coat steel components after fabrication with alkyd type zinc chromate primer complying with FS T-F-P-645.

E. Inserts and Anchorage Devices:

1. Manufacturer’s standard formed or fabricated assemblies, steel or aluminum, of shapes, plates, bars or tubes.
2. Shop coat steel assemblies after fabrication with alkyd type zinc chromate primer complying with FS TT-P-645.

F. Provide nuts or washers of design having means to prevent disengagement; deforming of fastener threads is unacceptable.

G. Secondary steel supports shall be structural shapes with G90 hot-dip galvanized

2.02 COMPONENTS

A. Frames: Provide framing systems fabricated from extruded aluminum members of size and profile indicated.

1. Mullion Configurations: Provide pockets at the inside glazing face to receive resilient elastomeric glazing and silicone to meet large missile requirements. Mullions and horizontals shall be one piece. Make provisions to drain moisture accumulation to the exterior

B. Framing System Gaskets and Joint Fillers: Provide the wall manufacturer's standard permanent type framing system gaskets and joint fillers depending on joint movement and sealing requirements, such as sliding joints, compression joint translation, or non-moving joints.

C. Brackets and Reinforcements: Where feasible, provide the manufacturer's standard high-strength aluminum units; otherwise provide non-magnetic stainless steel. At the fabricator's option, brackets not exposed to weather or abrasion may be hot-dip galvanized steel complying with requirements of ASTM A 386. Provide non-staining, non-ferrous shims for installation and alignment of curtainwall work.

D. Concrete or Masonry Inserts: Provide cast iron, malleable iron or hot-dip galvanized steel inserts complying with requirements of ASTM A 386.

E. Entrance Door Frames: Provide tubular and channel frame entrance door frame assemblies, as indicated, with welded joints in accordance with manufacturer's standards. Reinforce as necessary to support required loads.

F. Stile-and-Rail Type Entrance Doors: Provide tubular frame members, fabricated with welded joints.

1. Glazing: Fabricate doors to facilitate replacement of glass or panels, without disassembly of stiles and rails. Provide snap-on extruded aluminum square glazing stops, with exterior stops anchored for nonremoval.

2. Design: Provide 1-3/4 inch thick doors of design indicated.

a. Medium stile (minimum 3-1/2 inch nominal width for top and vertical stiles and 10 inch wide bottom rail)..

G. Weatherstripping: Where exterior door stiles or head rails do not close against fixed stops equipped with compression weatherstripping, provide sliding weatherstripping, retained in an adjustable strip in a mortise centered in the edge of the door.

H. Flashings: 0.0625 inch thick aluminum, finish to match mullion sections where exposed

2.03 GLASS AND GLAZING MATERIALS

A. Glass and Glazing Materials: As specified in Section 08800 of types described below:

1. Glass: glass specified in Section 08800.

B. Glazing Gaskets: Provide manufacturer's standard vulcanized corner pressure-glazing or wedge-lock dry glazing system of black resilient elastomeric glazing gaskets, setting blocks and shims or spacers as required; hardness as selected by the wall manufacturer.

1. Sponge gaskets extruded black neoprene w/40±5 durometer Shore A (ASTM D-509-70). Design to provide 20% to 35% compression with vulcanized corners.
2. Dense gaskets, extruded black neoprene w/70±5 durometer Shore A for hollow

profiles and 60±5 for solid profiles (NAAMM SG-1=70) with vulcanized corners.

2.04 SEALANT MATERIALS

A. Sealant and Backing Materials: Comply with Section 07900 - Joint Sealers of Types described below.

1. Exterior Perimeter Sealant: Type A.
2. Interior Perimeter Sealant: Type B.
3. Sealant Used Within System (Not Used for Glazing): As recommended by curtainwall manufacturer equal to types recommended by sealant manufacturer to remain permanently elastic, tacky, non-drying, non-migrating and weathertight.

2.05 STRUCTURAL SILICONE SEALANT

B. Structural Silicone Sealant: Type recommended by sealant and system manufacturers that complies with ASTM C 1184 requirements, is compatible with system components with which it comes in contact, and is specifically formulated and tested for use as a structural and weatherseal sealant as follows:

4. "Ultraglaze SSG 4000" by G.E. for field applications
2. "795" by Dowsil for field application and “983” for application in the factory or unitized construction.

C. Color: As selected by Architect from manufacturer's full range of colors.

D. Tensile Strength: 100 psi (689.5 kPa) minimum.

E. Provide sealant with high modulus of elasticity that will not allow movement of more than 25 percent of joint width, unless less movement is required by structural-sealant-glazed systems' design

2.06 FABRICATION

A. Provide thickness of framing members as necessary to comply with the structural loading requirements, but not less than the following:

1. Principal Extrusions: 0.125" min. thickness.
2. Principal Formed Sheet Members: .1875: min. thickness.

B. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

C. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

D. Prepare components to receive anchor devices.

E. Arrange fasteners and attachments to conceal from view.

F. Prepare components with internal reinforcement for door hardware and door operator hinge hardware.

G. Reinforce framing members for imposed loads.

H. Where movement should be expected, provide slip-joint linings of sheets, pads, shims, or washers of fluorocarbon resin or a similar material recommended by the manufacturer.

I. Provide an individual-member erection system. Except for spandrel panels installed during erection, glazing shall be from inside.

2.07 FINISHES

A. Class I Clear Anodized Finish: AA-M12C22A41 (Mechanical Finish: as fabricated, nonspecular; Chemical Finish: etched, medium matte; Anodic Coating: Class I Architectural, clear film thicker than 0.7 mil) complying with AAMA 611.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify wall openings and adjoining materials are ready to receive work of this Section.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings at abutting construction; turn up flashing a minimum of 1/2" to form a concealed continuous pan with soldered/sealed watertight joints including rear and end dams.

G. Install glass in accordance with Section 08800, to glazing method required to achieve performance criteria.

H. Install perimeter sealant in accordance with Section 07900.

3.03 ERECTION TOLERANCES

A. Limit variations from plumb, level, or dimensioned angle to the following:

1. 1/8" maximum deviation in any 20' horizontal or vertical run.

2. 1/4" maximum deviation in any 40' run, any direction.

B. Limit variations from location (theoretical calculated positions in plan or elevation based on established floor lines and column lines), including variations from plumb and level, to the following:

1. 3/8" total maximum deviation from any member at any location.
2. 1/8" maximum change in deviation from any member for any 10' run, any direction.

C. Limit offset in the end-to-end and edge-to-edge alignments of adjoining and consecutive members, which form planes, continuous runs and profiles, to the following:

1. 1/16" maximum offset in any flush alignment, including any which are to be 1/2" or less out-of-flush, and including any which are separated 2" or less by reveal or protrusion in the plane of the wall.
2. 1/8" maximum offset in alignments which are to be out-of-flush by more than 1/2" or separated by a reveal or protrusion of more than 2" width.

D. 1/32" maximum offset between glass framing members at corners of glazing pockets.

3.07 ADJUSTING

A. Adjust work under provisions of Section 01700.

B. Adjust operating hardware and sash for smooth operation.

3.05 CLEANING

A. Clean work under provisions of 01700.

B. Remove protective material from pre-finished aluminum surfaces.

C. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

D. Remove excess sealant by method acceptable to sealant manufacturer.

3.06 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. Protect finished Work from damage.

3.07 FIELD TESTS

A. Contactor is responsible for and shall pay for field water tests by static test method at 15 psf (no reductions allowed) for 15 minutes in accordance with ASTM E1105-15 and with latest updates as required to test glazing system and surrounding construction, shall be performed by

the Contractor on completed portions of the curtainwall. In the event that such testing should result in any leakage, eliminate the causes of such leakage at no additional cost to the Owner. Remedial measures must maintain standards of quality and durability and are subject to review by the Architect. Provide powered scaffold, hose, and sufficient personnel to operate scaffold and hose.

1. Three (3) successful water tests shall be conducted at the Architect's direction and at his selected areas. Unsuccessful water tests will not be counted a fulfillment of this requirement.
2. Procedures for evaluating the performance for resistance to water and air shall comply with ASTM E1105-15..

B. Calibration of Equipment

1. All equipment used to provide testing shall be calibrated in the method and within the time periods recommend by the AAMA/ASTM International Specifications.

2. Documentation indicating proper calibration shall be provided to all interested parties.

C. Test Specimen Size and Location

1. Unless otherwise specified by the Architect the test specimen size and location shall be delegated to the third party testing agency.

2. As soon as practical after installation has began, and after the test specimens have been completely installed, adjusted, cleaned and perimeter sealed (including adequate time for sealant to cure) the specimens shall be tested for water penetration.

3. The area to be tested shall include, perimeter caulking, typical splices, frame intersections and, if applicable, at least two entire vision lites and two entire spandrel lites containing an intermediate vertical member and intermediate horizontal member.

D. Field Testing Procedure

1. Water penetration resistance performance shall be determined per ASTM E 1105 using procedure A “Uniform Static Air Pressure Difference”

2. Water penetration attributable to the product specimen shall be defined as penetration of uncontrolled water beyond a plane parallel to the innermost edges of the product.

3. Water contained within drained flashings, gutters and sills in not considered water leakage.

4. If the test specimen fails any part of the test, the responsible contractor shall remediate and the testing agency shall re-test the same test area until it passes. All remedial work must be documented and are subject to review by the architect.

5. All other areas of the test specimen that have the same defect shall as be remediated. Further, the architect has the option to have the testing agency re-test two additional test areas for each test area that subsequently fails.

6 The expense of all remediation and re-testing shall be borne by the Contractor.

END OF SECTION

EXTERIOR METAL WALL LOUVERS SECTION 08910

PART 1 - GENERAL

1. 01 SECTION INCLUDES

A. Fixed extruded aluminum wall louvers with factory paint finish specified herein and frames with bird screening and frames.

1. 02 REFERENCES

A. AMCA 500 (Air Movement Control Association) - Test Method for Louvers, Dampers, and Shutters.

1. 03 PERFORMANCE REQUIREMENTS

A. Louver performance based on AMCA Publication 511 based on 15 minute period test and as follows:

1. To permit passage of air at a velocity of 1,256 ft/min without blade vibration or noise, with maximum static pressure loss of .20 inches w.g. and water penetration of .01 oz. per sq. ft. of free area(AMCA Classification “A” for water rejection)..
2. Louver: To permit 58 percent free area based on a 48" x 48" unit.
3. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 8 inches (200 mm) per hour and a wind speed of 50 mph (22.4 m/s)] at a core-area intake velocity of 400 fpm

1. 04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate louver and grille layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.

C. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

1. 05 QUALITY ASSURANCE

A. Perform Work in accordance with AMCA Certification for louvers.

1. 06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum ten (10) years documented experience.

1. 07 REGULATORY REQUIREMENTS

A. Design and size components, connections, bracing, etc. to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as required by and calculated in accordance with the International Building Code 2021 and Supplements (Orleans Parish) and ASCE 7-10 latest edition, measured in accordance with ANSI/ASTM E330 and when tested in accordance with ANSI/ASTM E330, based on wind pressure indicated on the S-series drawings and corners as required by the codes.

1. 08 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1. 09 COORDINATION

A. Coordinate the Work with installation of exterior wall finish and flashings.

B. Coordinate the Work with installation of mechanical ductwork.

1. 10 WARRANTY

A. Provide ten (10) year warranty on finish.

PART 2 - PRODUCTS

2. 01 MANUFACTURERS

A. Louvers: American Warming and Ventilating, Model LE-31, K6776 by The Airolite Co. and 6097 Construction Specifications, Inc. and Cesco.

2. 02 MATERIALS

A. Extruded Aluminum: ASTM B221, Alloy 6063-T52

2. 03 SCREENS

A. Bird Screen: 1/2" square mesh, 0.063" anodized aluminum wire.

2. 04 ACCESSORIES

A. Fasteners and Anchors: Stainless Steel.

B. Flashings: Of same material as louver frame.

C. Sealants: See Section 079000.

2. 05 FABRICATION - GENERAL

A. Louver Panel Thickness: 6 inches deep, face measurements.

B. Louver Blade Design: Sloped at 35 degrees; integral and lateral rain water stops positioned on blade; drainable type blade design, material thickness of 0.08" or .125" as required for loading by local codes.

C. Louver Frame: Channel shape, welded corner joints, material thickness of 0.08" minimum, mullions shall be tubular shape.

D. Head and Sill Flashings: Extruded to required shape, single length in one piece per location.

E. Screens: Install screen mesh in shaped frame, reinforce corner construction, shop install to louver with fasteners.

2. 06 FINISHES

A. Fluorocarbon Coating: 3 coat system, high performance fluoropolymer color coating meeting AAMA 2605. and containing Kynar 500 polyvinylidene fluoride (70% of resin solids) supplied under license by Penwalt Corp., " with minimum rated service life of 20 years as published by the Manufacturer. Pre-treatment, epoxy primer, and finish coat(s) shall be factory baked-on of 1.5 dry mil thickness (minimum 0.2 dry mil primer and minimum 0.8 dry mil finish and clear cover coat). Color shall match clear anodized coatings.

PART 3 - EXECUTION

3. 01 EXAMINATION

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

3. 02 INSTALLATION

A. Install louver and grille assemblies in accordance with manufacturer's instructions.

B. Install louvers and grilles level and plumb.

C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.

D. Secure louvers and grilles in opening framing with fasteners.

E. Install screen and frame to interior of louver.

F. Install perimeter sealant and backing rod in accordance with Section 07900.

G. Clean all surfaces under provisions of Section 01700. Strip protective finish coverings, if any.

END OF SECTION

PORTLAND CEMENT PLASTER SECTION 09220

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Metal furring and lathing.

B. Portland cement plaster system for walls and soffits. Suspension system designed to resist wind loads specified including hanging wires, vertical galvanized steel struts, etc. to meet requirements of specified wind loads

C. Finish: Sand float finish as selected by architect.

D. Control joints must have solid backing (not sheathing) to receive the fasteners and must have a 4 inch blob of sealant applied under the joint intersections.

G. Provide formed zinc drip screed at base of plaster wall to allow for drainage of any water in the plaster system

1.02 RELATED SECTIONS

A. Section 07900 - Joint Sealers.

1.03 REFERENCES

A. ASTM C150 - Portland Cement.

B. ASTM C206 - Finishing Hydrated Lime.

C. ASTM C207 - Hydrated Lime for Masonry Purposes.

D. ASTM C897 - Aggregate for Job-Mixed Portland Cement Based Plasters.

E. ASTM C926 - Application of Portland Cement Based Plaster.

F. ASTM C1063 - Installation of Lathing and Furring for Portland Cement Based Plasters.

G. ASTM E119 - Methods for Fire Tests of Building Construction and Materials.

1.04 SYSTEM DESCRIPTION

A. Fabricate vertical elements to limit finish surface to 1/360 deflection under lateral point load of 100lbs in accordance to ASCE-7, current edition, based on 145 mph base wind load

B. Fabricate horizontal elements to limit finish surface to 1/360 deflection under superimposed dead load and wind uplift loads complying with International Building Code (2012) and ASCE-7-10, current edition, based on 145 mph base wind load

1.05 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data on plaster materials, characteristics and limitations of products specified.

C. Samples: Submit one sample, 12 x 12 inch in size illustrating finish color and texture.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C926.

B. Maintain one copy of document on site.

1.07 QUALIFICATIONS

A. Applicator: Company specializing in performing the work of this section with minimum five years documented experience.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not apply plaster when substrate or ambient air temperature is less than 50 degrees F nor more than 80 degrees F .

B. Maintain minimum ambient temperature of 50 degrees F. during installation of plaster and until cured.

PART 2 - PRODUCTS

2.01 PLASTER BASE MATERIALS

A. Cement: ASTM C150, Type I Portland.

B. Lime: ASTM C206, Type S; ASTM C207, Type S.

C. Aggregate: In accordance with ASTM C897.

D. Water: Clean, fresh, potable and free of mineral or organic matter which can affect plaster.

E. Plaster Mix Reinforcement: Glass fibers, chopped to 1/2 inch nominal length, alkali resistant.

2.02 PLASTER FINISH MATERIALS

A. Cement: As specified for plaster base coat, white color.

B. Lime: As specified for plaster base coat.

C. Water: Clean, fresh, potable and free of mineral or organic matter which can affect plaster.

2.03 FURRING AND SUSPENSION SYSTEM

A. Ceiling Hangers (Exterior): Size units in accordance with ASTM 1063.

B. Wire Ties: Soft galvanized steel wire. Either 16 gage or double 18 gage for support of furring and 18 gage for lathing and accessories.

C. Furring Brackets: One-piece metal assembly, with anchor plate and serrated bracket arm adjustable from 1/4" to 2-1/4", fabricated from 20 gage galvanized steel.

D. Rolled Steel Channels: Either hot-rolled or cold-rolled steel channels of the sizes indicated, with weights complying with ASTM 1063.

E. Screw-Type Furring Channels: Hat-shaped and special corner-shaped channels formed from 25 gage steel, with knurled faces to facilitate fastener penetration, complying with ASTM C645.

2.04 LATHING AND ACCESSORIES

A. Metal Lath: ASTM C847; G90 galvanized, 3.4 lb/sq yd.; self furring at solid substrates (if any).

B. Casing Bead: Formed zinc; minimum 26 gage thick; depth governed by plaster thickness; maximum possible lengths; expanded metal flanges, with square edges.

C. Corner Bead: Formed zinc; minimum 26 gage thick; depth governed by plaster thickness; maximum possible lengths; expanded metal flanges, with square edges.

D. Base Screed: Formed zinc; minimum 26 gage thick; depth governed by plaster thickness; maximum possible lengths; expanded metal flanges, with square edges.

E. Corner Mesh: Formed zinc, minimum 26 gage thick; expanded flanges shaped to permit complete embedding in plaster; minimum 2 inches wide.

F. Control Joint Accessories: Formed zinc, minimum 26 gage thick; accordion profile, 2 inch expanded metal flanges each side.

G. Two-Piece Expansion Joint (Used at double stud joints): Formed zinc,26 gage thick, two-piece male/female joint unit, adjustable from 1/4" to 5/8".

H. Anchorage Methods: Screws, or other approved metal supports, of type and size to suit application, hot-dip galvanized to rigidly secure lath and associated metal accessories in place with multiple threads into the metal.

I. Drip Screed: See Drawings for model numbers.

2.05 CEMENT PLASTER MIXES

A. General: Comply with ASTM C 926 for portland cement plaster base and finish coat mixes as applicable to plaster bases, materials, and other requirements indicated.

B. Portland Cement Plaster Base Coat Mixes and Compositions: Proportion materials and respective base coats in parts by volume for cementitious materials and in parts by volume per

sum of cementitious materials for aggregates to comply with the following requirements for each method of application and plaster base indicated. Adjust mix proportions below within limits specified to attain workability.

1. Fiber Content: Add fiber to following mixes after ingredients have mixed at least 2 minutes. Comply with fiber manufacturer's directions but do not to exceed 2 lbs. per cu. ft. of cementitious materials. Reduce aggregate quantities accordingly to maintain workability.

C. Three-Coat Work Over Metal Lath: Base coats as indicated below:

1. Scratch Coat: 1 part portland cement, 0 to 3/4 parts lime, 2-1/2 to 4 parts sand.
2. Brown Coat: 1 part portland cement, 0 to 3/4 parts lime, 3 to 5 parts sand (approximately 1 bag of cement, 1/2 bag of lime and 4 cu. ft of sand).

D. Job-Mixed Portland Cement Plaster Finish Coats: Proportion materials for finish coats in parts by volume for cementitious materials and parts by volume per sum of cementitious materials for aggregates to comply with the following requirements:

1. 1 part portland cement, 3/4 to 1-1/2 parts lime, 3 parts sand (approximately 1 bag of cement, 1/2 bag of lime and 3 cu. ft of sand).

E. Mechanically mix cementitious and aggregate materials for plasters to comply with the applicable referenced application standard and with recommendations of plaster manufacturer. Mix materials in approved mechanical mixers of the type in which the quantity of water can be controlled accurately and uniformly, except that finish coats containing lime may be hand mixed. While the mixer is in continuous operation, add approximately 90 percent of the estimated quantity of water, half of the sand, all of the cementitious materials, and the other one-half of the sand shall be introduced into the mixture in that sequence and mix thoroughly with the remainder of the water until the mixture is uniform in color and consistency. Avoid excessive mixing or agitation. Discard plaster which has begun to set before it is used; retempering will not be permitted. Do not use frozen, caked, or lumped materials. Empth mixers and mixing boxes completely after each batch is mixed, and deep free of old plaster.

F. Mix only as much plaster as can be used prior to initial set.

G. Mix materials dry, to uniform color and consistency, before adding water.

H. Protect mixtures from freezing, frost, contamination, and evaporation.

I. Do not retemper mixes after initial set has occurred.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify surfaces and site conditions.

3.02 INSTALLATION FURRING AND SUSPENSION SYSTEMS

A. Comply with ASTM 1063.

B. Isolation: Where metal furring and lathing abuts building structure horizontally or vertically, isolate the work to prevent the transfer of loading and structural movement into the furring and lathing, so that slip or cushion-type joints will absorb the deflections or movements.

C. Frame both sides of expansion and control joints with structural metal supports, and do not bridge the joint with runners, furring or lathing.

3.03 INSTALLATION - LATHING MATERIALS

A. Install 3/16 inch thick corrugated drainage mat on sheathing walls

B. Attach metal lath through gypsum sheathing into metal supports using screws at maximum 6 inches on center.

3.04 INSTALLATION - ACCESSORIES

A. Continuously reinforce internal angles with corner mesh, return metal lath 3 inches from corner to form the angle reinforcement; fasten at perimeter edges only.

B. Place corner bead at external wall corners; fasten at outer edges of lath only.

C. Place strip mesh diagonally at corners of lathed openings. Secure rigidly in place.

D. Place 4 inch wide strips of metal lath centered over junctions of dissimilar backing materials. Secure rigidly in place.

E. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.

F. Install frames plumb and level in opening. Secure rigidly in place.

G. Position to provide convenient access to concealed work requiring access.

H. Install zinc trim at locations to allow weeping of any entrapped moisture within the wall system.

3.05 CONTROL JOINTS

A. In addition to locations of joints indicated on the drawings for walls and soffits, or if not indicated, provide control joints and expansion joints at locations complying with the following criteria, approved by the Architect:

1. For exterior plaster, install control joints to create panels no larger than 144 square feet each panel, with no dimension exceeding 18 feet or exceeding a length-to-width ratio of 2 1/2 to 1, and above and below door and window openings. Provide two-piece expansion joints at all floor lines.

B. Establish control joints with specified joint device. **Install a blob of silicone sealant at all intersections of all control joints**

C. Coordinate joint placement with other related work.

D. Install backer rod and sealant at all joints in the field of the plaster and at joints at perimeter abutting other materials.

E. Seal the intersections of control joints with one or two part urethane sealant to provide watertight connections.

F. Vertical control joints shall be installed uninterrupted with horizontal joints abutting the verticals.

3.06 PLASTERING

A. Apply plaster in accordance with ASTM C926.

B. Apply scratch coat to a nominal thickness of 1/2 inch, brown coat to a nominal thickness of 3/8 inch, and a finish coat to a nominal thickness of 1/8 inch over self-furring reinforcement.

C. Moist cure scratch and brown coats by keeping moist for at least 48 hours by applying a very fine fog spray at least twice daily. Apply brown coat immediately following initial set of scratch coat.

D. After curing, dampen base coat prior to applying finish coat.

E. Apply finish coat and work to a smooth and consistent finish.

F. Avoid excessive working of surface. Delay troweling as long as possible to avoid drawing excess fines to surface.

G. Moist cure finish coat for minimum period of 48 hours.

3.07 TOLERANCES

A. Maximum Variation from True Flatness: 1/8 inch in 10 feet .

END OF SECTION

GYPSUM BOARD SYSTEMS SECTION 09260

PART 1 - GENERAL

1. 01 SECTIONINCLUDES

A. Metal stud wall framing. Interior studs requiring heavier than 20 gauge are specified in Section 05400. See drawings for studs requiring heavier than 20 gauge. Provide type and gauge of framing to limit deflection to L/360 at 5 psf interior load with no change of indicated stud depth or spacing and height indicated on the Drawings.

B. Metal channel ceiling framing.

C. Gypsum board and joint treatment, type X everywhere.

D. Acoustical treatment where sound blankets and/or STC rating are indicated on the drawings.

E. Tile backer units installed with gypsum board assemblies at all walls as base for tile application, 20 gauge studs at theselocations.

F. Taped and sanded joint treatment; level 5 finish where wallcovering is indicated on the drawings.

G. Exterior wall sheathing with taped joints for membrane vapor barrier applied over entire exterior wall area. Stagger joints at least one stud on multilayer installations. Joints are taped with 20 mil membrane under Section 07130.

H. Fire wallidentification.

1. 02 RELATEDSECTIONS

A. Section 05400-Metal framing 18 gauge and heavier, exterior walls.

B. Section 06100 - Carpentry: Woodblocking.

C. Section 09900 - Painting: Surfacefinish.

1. 03 REFERENCES

A. AISI S220 - North American Specification for the Design of Cold-Formed Steel Framing - Nonstructural Members.

B. ASTM A1003 – Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.

C. ASTM C475 – Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

D. ASTM C514 – Standard Specification for Nails for the Application of Gypsum Board.

E. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.

F. ASTM C754 –Standard Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products.

G. ASTM C840 - Application and Finishing of GypsumBoard.

H. ASTMC1002–Standard Specification for SteelSelf-Piercing Tapping ScrewsforApplicationofGypsumPanel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

I. ASTM C1047 – Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

J. ASTM C1177 – Standard Specification for Glass Mat Gypsum Substrate for Use as Sheating.

K. ASTM C1178 – Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.

L. ASTM C1280 – Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.

M. ASTM C1396 – Standard Specification for Gypsum Board.

N. ASTM D3273 – Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

O. ASTM E90 – Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

P. ASTM E136 – Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C.

Q. ASTM E1190 – Standard Test Methods for Strength of Power-Actuated Fastners Installed in Structural Members.

R. ASTM E413 – Classification for Rating Sound Insulation.

S. GA-216 - Recommended Specifications for the Application and Finishing of GypsumBoard.

T. GA – 253 – Application of Gypsum Sheathing.

U. SFIA – Steel Framing Industry Association.

1. 04 SUBMITTALS

A. Submit under provisions of Section01300.

B. Product Data: Provide data on metal framing, gypsum board, profiled trim, and joint tape and compound.

1. 05 QUALITYASSURANCE

A. PerformWorkinaccordancewithGA-216andGA-600.

B. Maintainonecopyofeachdocumentonsite.

C. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a singlemanufacturer.

D. Single-Source Responsibility for Panel and Finishing Products: Obtain each type of gypsum board and finishing panel products from a singlemanufacturer.

E. Provide type and gauge of framing to limit deflection to L/360 at 5 psf interior load with no changeofindicatedstuddepthorspacingandheightindicatedontheDrawings.

F. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Steel Framing Industry Association (SFIA) or be a part of a similar organization that provides verifiable code compliance program.

1. 06 QUALIFICATIONS

A. Applicator: Company specializing in performing the work of this section with minimum five (5) years documented experience.

1. 07 REGULATORYREQUIREMENTS

A. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

B. Design framing systems in accordance with American Iron and Steel Institute Publication "S220 –"North American Specification for the Design of Cold-Formed Steel Framing - Nonstructural Members", except as otherwise shown or specified.

1. 08 DELIVERY, STORAGE, ANDHANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer orsupplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to preventsagging.

C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads andtrim.

D. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI's "Code of Standard Practice".

1. 09 PROJECTCONDITIONS

A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C840 and with gypsum board manufacturer'srecommendations.

B. Room Temperatures: For nonadhesive attachment of gypsum board to framing, maintain not less than 40°F (4°C). For adhesive attachment and finishing of gypsum board, maintain not less than 50°F (10°C) for 48 hours prior to application and continuously after until dry. Do not exceed 95°F (35°C) when using temporary heatsources.

C. Ventilation: Ventilate building spaces, as required, for drying joint treatment materials. Avoid drafts during hot dry weather to prevent finishing materials from drying toorapidly.

PART 2 - PRODUCTS

2. 01 PARTITION AND WALL FRAMINGMATERIALS

A. Framing Members, General: Comply with ASTM C 645 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.

2. Protective Coating: Comply with ASTM C 645; ASTM A 653/A 653M G40 (Z120), Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40 (Z120) or DiamondPlus® coating; roll-formed from steel meeting mechanical and chemical requirements of ASTM A 1003 with a zinc-based coating. Galvannealed products are not acceptable.

a. Coatings shall demonstrate equivalent corrosion resistance with an evaluation report acceptable to the authorities having jurisdiction.

B. Steel Studs and Runners: ASTM C645 with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch-wide minimum lip (return) and complying with the following requirements for minimum thickness of base steel and for depth:

1. Thickness: 25 gauge except 20 gauge at door jambs and at tile backing board applications.
2. Depth: Asindicated.
3. Manufacturer: Member of the Steel Framing Industry Association (SFIA) or the Steel Stud ManufacturersAssociation.

C. Steel Rigid Furring Channels: ASTM C645, hat-shaped, depth and minimum thickness of base steel asfollows:

1. Depth: 7/8 inch unless otherwiseindicated.
2. Thickness: 25gauge.

D. Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum board manufacturers for applications indicated and ASTM C514, C1002, andGA-216.

2. 02 SUSPENDED AND FURRED CEILINGS FRAMINGMATERIALS

A. General: Provide components complying with ASTM C645 for materials and sizes unless otherwiseindicated.

B. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E1190 conducted by a qualified testingagency.

C. Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft temper.

D. Grid Suspension System for Interior Ceilings: ASTM C645, manufacturer's standard direct-hung grid suspension system composed of main beams and cross furring members that interlock to form a modular supportingnetwork.

2. 03 GYPSUM BOARDMATERIALS

A. Gypsum Board: ASTM C1396; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges; Type X all locations.

1. Products manufactured in China are not permitted

B. Tile Backer Units: Comply with ASTM C1178 Type X, of thickness and width indicated below, and in maximum lengths available to minimize end-to-end buttjoints.

1. Thickness: 5/8 inch, unless otherwiseindicated.
2. Width: Manufacturer's standard width but not less than 32inches.
3. Manufacturer: Dense-Shield Fireguard Tile Backer by G-P GypsumCo. , eXP Tile Backer by Gold Bond/National Gypsum
4. Joint Tape for Backer Units: Material recommended by backer unitmanufacturer.
5. Joint Compound for Backer Unit: Material recommended by backer unitmanufacturer.

2. 04 SHEATHING

A. Sheathing board for exterior walls shall be "DENS-GLASS GOLD" as manufactured by the Georgia-Pacific Corp., “SECUROCK” by USG, or “eXP” Sheathing by National Gypsum. Performance characteristics asfollows:

1. Size: 5/8" thick by 4'-0" by 9'-0" to 10'-0". 8'-0" boards are acceptable if that doesn’t create an additional joint compared to sizes specified.
2. Composition: Gypsum sheathing board core in accordance with ASTM C1177 with fiberglass mattes bothsides.
3. Fire resistance: non combustible when tested in accordance with ASTM E136; when tested in accordance with ASTME119.

B. Screws, metal framing: No. 6 Type S or S-12, bugle head, self-tapping, rustresistant.

C. Materials Warranty: Provide sheathing manufacturer's standard warranty covering sheathing materials for five years commencing on Date of SubstantialCompletion.

D. Weathering Warranty: Provide sheathing manufacturer's standard warranty covering in place exposure damage to sheathing for twelve months commencing on date of purchase by Contractor.

E. Joint Tape: See Section 07130

2. 05 ACCESSORIES

A. Accessories for Interior Installation: Corner beads, edge trim and control joints complying with ASTM C1047 and shall be sheet steel coated with zinc by hot-dip or electrolytic processes.

B. Shapes indicated below by reference to Fig.1designationsin ASTM C1047:

1. Cornerbead on outside corners, unless otherwiseindicated.
   1) Product: ClarkDietrich Building Systems; 103 Deluxe Cornerbead, or comparable product.
2. LC-bead with both face and back flanges; face flange formed to receive joint compound. Use LC-beads for edge trim unless otherwiseindicated.
   1) Product: ClarkDietrich Building Systems; Metal U-Trim M20A, or comparable product.
3. L-bead with face flange only; face flange formed to receive joint compound. Use L-bead whereindicated.
   1) Product: ClarkDietrich Building Systems; Metal L-Trim M20B, or comparable product.
4. One-piece control joint formed with V-shaped slot, with removable strip covering slot opening.
   1) Product: ClarkDietrich Building Systems; #093 Control Joint, or comparable product.

C. Joint Materials: ASTM C475 and GA 216; reinforcing tape, mold resistant joint compound, adhesive andwater.

D. Fasteners: ASTM C1002, Type S12, W and GA-216.

E. Sound Attenuation Blankets: Comply with ASTM C 665, Type 1and ASTM E 136; .70 pcf density, semi-rigid mineral glass blanket without membrane, Class 25 flame-spread, thickness indicated but not less than 3" for friction fit.

F. Acoustical Sealant: Manufacturer's standard complying with ASTM C834, non staining latex sealant

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that site conditions are ready to receive work and opening dimensions are as instructed by themanufacturer.

3.2 METAL WALL FRAMINGINSTALLATION

A. Install framing in accordance with ASTM C754 and C840, GA-216, andGA-600.

B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with "Gypsum Construction Handbook" published by United States Gypsum Co.. Screw attach blocking between studs for support of surface mounted items.
1. Plumbing fixtures.
2. Toilet partitions.
3. Wall cabinets.
4. Toilet accessories
5. Hardware.
6. Architectural woodwork.
7. Grab bars.
8. Handrails and railings.
9. Signage.
10. Other items requiring backing for attachment

C. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut otherconstruction.

1. Where studs are installed directly against exterior walls, install asphalt felt strips between studs andwall.

D. Installation Tolerances: Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch from the plane formed by the faces of adjacent framing.

E. Install steel studs and furring in sizes and at spacings indicated, but not less than that required by the referenced steel framing installation standard, to comply with maximum deflection and minimum loading requirementsspecified.

F. Install steel studs so that flanges point in the same direction and so that leading edges or ends of each gypsum board can be attached to open (unsupported) edges of stud flanges first.

G. Frame door openings to comply with details indicated, with GA-219, and with applicable published recommendations of gypsum board manufacturer. Attached vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs. Use 20 gauge studs at openings.

H. Extend stud framing of partitions through the ceiling to the structure above where shown or indicated. Maintain clearance under structural building members to avoid deflection transfer tostuds.

I. Blocking: Nail wood blocking to studs. Bolt or screw steel channels to studs. Install blocking for support of casework andcountertops.

J. Sound Insulation: Install sound attenuation blankets, in partitions where indicated. Completely blanket space between studs to full height of partitions. Fit carefully behind electrical outlets and other work which penetrate partitions for tight fit. Attach to back faceofgypsum board in accordance with manufacturer's instructions.

3.3 CEILING FRAMINGINSTALLATION

C. Install in accordance with ASTM C754 andGA216.

D. Coordinate location of hangers with otherwork.

E. Install ceiling framing independent of walls, columns and above ceiling work. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effectivemeans.

1. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
2. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise faildue to age, corrosion, or elevatedtemperatures.

3. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend throughforms.
4. Donotconnectorsuspendsteelframingfromducts,pipesorconduit.

F. Install suspended steel framing components in sizes and at spacings indicated but not less than that required by the referenced steel framing installation standard.

1. Wire Hangers: 0.1620 inch (8-gage) diameter, 4 feeto.c.
2. Main Runners: 1-1/2 inch, 4 feet o.c. with furring members at 16"o.c.

G. Installation Tolerances: Install steel framing components for suspended ceilings so that cross-furring members or grid suspension members are level to within 1/8 inch in 12 feet as measured both lengthwise on each member and transversely between parallelmembers.

H. Grid Suspension System: Attach perimeter wall track or angle where grid suspension systemmeets vertical surfaces. Mechanically join main beam and cross-furring members to each otherandbutt-cuttofitintowalltrack.

I. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24 inches past each end ofopenings.

J. Laterally brace entire suspensionsystem.

3.4 GYPSUM BOARD INSTALLATION

C. Install gypsum board in accordance with ASTM C840, GA-216 andGA-600.

D. Install wall/partition board panels to minimize the number of abutting end joints or avoid them entirely. Stagger abutting end joints not less than one framing member in alternate courses of board. At stairwells and other high walls, install panels horizontally with end abutting joints over studs andstaggered.

E. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place. Gypsum board (when installed) shall not sit directly on the floor so not to allow any water to contact the bottom of the gypsum board panel

F. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position adjoining panels so that tapered edges abut tapered edges, and field-cut edges abut field-cut edges and ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions. Avoid joints at corners of framed openings wherepossible.

G. Spot grout hollow metal door frames for solid core wood doors, hollow metal doors, and doors over 32 inches wide. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels intoframes.

H. Double Layer Application: Secure both layers with screws. Place second layer perpendicular tofirstlayerwithjointsoffsetfromjointsoffirstlayer.

I. Usescrewswhenfasteninggypsumboardtometalfurringorframing.

J. Install edge trim where edge of gypsum panels would otherwise be exposed or semi-exposed. Provide edge trim type with face flange formed to receive joint compound except where other types areindicated.

1. Install LC-bead where gypsum panels are tightly abutted to other construction and backflangecanbeattachedtoframingorsupportingsubstrate.
2. InstallL-beadwhereedgetrimscanonlybeinstalledaftergypsumpanelsareinstalled.

K. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilarmaterials.

L. Install control joints according to ASTM C840 and manufacturers recommendations, and in specific locations approved by the Architect for visualeffect.

M. Ceramic Tile Base: At areas indicated for ceramic tile finish, install the following backing board. Apply horizontally with uncut edge at bottom or work, 1/4 inch above fixture lip. Seal cut edges of each piece with water resistant sealant before installation and seal around pipe penetrations and similar cut-outs in eachsheet.

1. Tile backer units complying with manufacturer’s instructions and ANSIA108.11.
2. Cement board complying with ANSI A118.9 at showers.

3.06 ACOUSTICAL TREATMENT

A. Provide acoustical treatment where indicated on the drawings

B. Provide the following as required and indicated at acoustically treated walls, i.e. sound blankets indicated, etc. Comply with ASTM C 919 and manufacturer's recommendations for locations of beads.

C. Seal perimeter of sound-rated work as follows:

1. At partitions, provide continuous beads of acoustical sealant at juncture of both faces of runners of plates with floor and ceiling construction, and wherever work abuts dissimilar materials. Seal prior to installation of gypsum boards. Fill voids with 1/4" minimum to 3/8" maximum round bead of sealant.
2. At ceilings, provide continuous beads of acoustical sealant wherever work abuts dissimilar materials or gypsum board partitions where indicated on the Drawings.

D. At control joints, provide continuous bead of sealant between edges of wall construction. Seal

prior to installation of surface-applied control joint accessories and locate at proper depth in joint to allow for inserting of expansion portion of control joint accessory.

E. Provide double seal of multi-layer partition faces. Install face layer with 1/4" edge clearance at terminations of work, and install continuous bead of acoustical sealant all around.

F. At openings and cutouts, fill open spaces between edges of wall construction and fixtures, cabinets, ducts, and other flush or penetrating items and fill pack tightly with glass or mineral fiber insulation and seal with continuous bead of acoustical sealant.

G. Seal sides and backs of electrical boxes to completely close up openings and joints with a bead of acoustical sealant with maximum joint of 1/4" between drywall edge and box.

H. Sound Flanking Paths: Where sound-rated partitions intersect non-rated partitions and other rated partitions, extend sound-rated construction to completely close sound flanking paths through non-rated construction. Seal joints between face layers at vertical interior angles of intersecting partitions.

I. Ceiling Plenums: Where sound-rated partitions extend through non-sound rated ceilings to structural substrates above, extend the same treatment to that portion of the partition above the ceiling as specified for portion below the ceiling.

J. Partition Insulation: Install sound attenuation blankets, in partitions where indicated. Completely blanket space between studs to full height of partitions and friction fit snug against the wallboard with no gaps between blankets. Butt ends of blanket together. Fit carefully behind electrical outlets and other work which penetrate partitions for tight fit. Attach to back face of gypsum board in accordance with manufacturer's instructions.

K. Safing Insulation: Pack voids created by wall intersections at beams. Also use to seal the gap between the top of a partition and the slab to increase the sound transmission loss properties of partitions that are not constructed full height from floor to slab.

3.7 JOINT TREATMENTS

A. Tape, fill and sand joints, edges, and corners to produce specified surface finish, ready to receive finishes where indicated on the drawings, and as follows in accordance with ASTM C840 and GA-214:

1. Level 1: At ceiling plenum areas and concealed areas, embed tape at joints, unless a higher level finish is required for fire-resistant rated assemblies and sound-rated assemblies.
2. Level2:At panels that are substrates for tile finish and acoustical tiles,embed tape and apply separate first coat of joint compound to tape, fasteners and trim flanges.
3. Level 3: Where indicated or required by indicated assembly, embed tape and apply separate first and fill coats of joint compound to tape, fasteners and trim flanges.
4. Level 4: Where panels are exposed to view including panels to receive wallcovering, embed tape and apply separate first, fill and finish coats of joint compound to tape, fasteners, accessories and trim flanges. Touchup and sand between coats and after last coat as needed to produce a continuous smooth surface free of visual defects and ready to receive indicated finish.

5. Level 5: Where indicated on the drawings and/or specified herein, embed tape and apply separate first fill and finish coats of joint compound to tape, fasteners, accessories and trim flanges. Additionally, apply a thin, uniform skim coat of joint compound over entire surface. For skim coat, use finish coat joint compound orTuff-Hide by U.S. Gypsum spray applied, for smooth finish with no evidence of substrate joints. Touch up and sand between coats and after last coat as needed to produce a continuous smooth surface free of visual defects and ready to receive indicated finish
6. At partition indicated with sound blankets and/or STC rating, tape and float all joints full height ofpartitions.
7. At exterior walls, tape and float all joints full height of wall whether receiving finishes ornot.

B. Feather coats on to adjoining surfaces so that camber is maximum1/32inch.

3.8 SHEATHING INSTALLATION

A. Install sheathing, where indicated on the drawings, in accordance with manufacturer's instructions and applicable instructions in GA-253 and ASTMC1280

B. Install sheathing with gold sideout.

C. Use maximum lengths possible to minimize number and of joints. Locate edge joints parallel to and located on framing. Stagger intermediate end joints of adjacent lengths ofsheathing.

D. Metal Framing: Attach to metal framing with screws spaced 8" o.c. at perimeter and 8" o.c. along intermediate framing infield

1. Drive fasteners to bear tight against and flush with surface of sheathing. Do. not countersink.
2. Locate fasteners minimum 3/8" from edges and ends of sheathing panels or as otherwise recommended by the manufacturer. Seal fasteners with Dow Corning 795 or equal.

E. Secure through sheathing and into metal studs with metal self tapping screws at 32 inches o.c. horizontally and vertically where 6 inch lapsoccur.

1. Seal fasteners with Dow Corning 795 or equal. This includes sheathing and building paperfasteners.

F. Caution: The exterior sheathing contains continuous filament fiberglass which can release during normal handling. Take precautions as recommended by the sheathingmanufacturer.

3.9 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in anydirection.

END OF SECTION

TILE WORK SECTION 09300

PART 1 - GENERAL

1. 01 SECTION INCLUDES

A. Tile floor, walls and base; tiles as indicated on the drawings.

B. Thin set applications at floors and walls with epoxy grout,

1. Tile less than one square meter in size shall be installed per ANSI A108.5, the standard for thin setting. New, “reduced thickness porcelain tile panel/slabs” larger than one square meter, meeting ANSI A137.3 product standard, shall be installed per the new installation standard for these new products, ANSI A108.19

C. Provide crack isolation membrane at all cracks in the floors in accordance with TCA F125 and A108.17.

D. Thresholds at door openings.

E. Apply grout release product, equal to “Aqua Mix Grout Release” by Custom Building Products, on all tile surfaces before grouting to eliminate grout sticking and staining tile faces

.

1.02 RELATED SECTIONS

A. Section 09260 - Gypsum Board Systems: Backer boards.

B. Division 15: Floor drains.

1. 03 REFERENCES

A. ANSI/TCA A108.1 - Glazed Wall Tile, Ceramic Mosaic Tile, Quarry Tile and Paver Tile installed in Portland Cement Mortar.

B. ANSI/TCA A108.4 - Installation of Ceramic Tile with Water Resistant Organic Adhesive.

C. ANSI/TCA A108.5 - Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.

D. ANSI/TCA A108.6 - Ceramic Tile Installed with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy.

E. ANSI/TCA A108.10 - Installation of Grout in Tilework.

F. ANSI/TCA A118.3 - Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy.

G. ANSI/TCA A118.4 - Latex Portland Cement Mortar.

H. ANSI/TCA A118.7 – Polymer Modified Grouts

I. ANSI/TCA A137.1 - Specifications for Ceramic Tile.

J. ANSI/TCA A137.2 - Specifications for Glass Tile

K. TCNA (Tile Council of North America) - Handbook for Ceramic, Glass and Stone Tile Installation.

1. 04 SUBMITTALS

A. Submit product data indicating material specifications, characteristics, and instructions for using mortars and grouts.

1. Data shall also contain and be noted that the mortar and grout materials are recommended for the particular tile specified.

B. Submit samples under provisions of Section 01300.

C. Submit manufacturer's installation instructions under provisions of Section 01300.

D. Submit maintenance data under provisions of Section 01700.

E. Include recommended cleaning and stain removal methods, cleaning materials.

1. 05 QUALITY ASSURANCE

A. Conform to ANSI/TCNA A137.1 and A137.2 for glass tile

B. Conform to TCNA Handbook for Ceramic, Glass and Stone Tile Installation.

C. Setting materials and grouts are based on products of Laticrete International, Inc., and establish the performance standards for the work of this section.

1. Products by W. R. Bonsal Co., Hydroment from Bostik, Custom Building Products and Mapei meeting the performance requirements are acceptable.

D. Comply with requirements of the American with Disabilities Act of 1990, Title III (Accessibility Regulations for Private Entities) and latest amendments (if any), where detectable warning surfaces are indicated on the Drawings.

E. Warranty: Provide to the owner a Full System Warranty from the installation materials manufacturer for a period of not less than 10 Years from the Date of Substantial Completion

1. 06 QUALIFICATIONS

A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum five years documented experience.

B. Installer: Company specializing in applying the work of this Section with minimum five years documented experience.
   1. **Note:** At large format tile, recognizing the need for special suction cups, cutting tools, etc, engage an experience installer with successful installations of this scope

C. All installation materials shall be by the same manufacturer for single source responsibility to assure compatibility and compliance with specified requirements for manufacturers full system warranty

1. 07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Section 01600.

B. Store and protect products under provisions of Section 01600.

C. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1. 08 ENVIRONMENTAL REQUIREMENTS

A. Do not install adhesives in a closed, unventilated environment.

B. Maintain 50 degrees F (10 degrees C) to 90 degrees F during installation of mortar materials.

1.09 OWNERS EXTRA STOCK

A. Provide 5% of total area of specified tile and base in original cartons delivered to Owner for attic stock.

B. Deliver unused tile and base to Owner's attic stock, as directed by the Owner

PART 2 - PRODUCTS

2. 01 TILE MATERIAL

A. Ceramic Tile: ANSI/TCA A137.1, conforming to the following:

Size	See drawings
Surface Finish	See drawings
Dynamic Coefficient of Friction	0.42 DCOF rating or greater (wet) per ANSI A137.1
Color	See drawings

B. Base: Match above tile for moisture absorption, surface finish, and color and coved foot and coved internal vertical corners.

C. Accessories and Base : tile with bull-nosed top edge (where tile is not the wall finish) and coved foot and coved internal vertical corners.

D. Colors: See drawings.

2. 02 MORTAR MATERIALS

A. Mortar Bond Coat Materials: ANSI/TCA A118.15; portland cement/sand or dry set mortar and latex additive equal 254 Platinum by Laticrete International, Inc. and Prolite® Thin Set mortar by Custom Building Products

1. At large format tiles, provide Prolite® Tile and Stone mortar by Custom Building Products or equal by Laticrete International, Inc and Mapei, specifically recommended for setting large format tiles and for the setting bed thickness indicated, exceeding ANSI A118.4TE, A118.15TE and A118.11

B. Epoxy Mortar Bond Coat: 100 percent solids, chemical resistant water cleanable epoxy mortar complying with ANSI A118.3; Mapei "Kerapoxy" , Latapoxy 300 by Laticrete International, Inc. and EBM-Epoxy Bonding Mortar by Custom Building Products.

2. 03 GROUT MATERIALS

A. Epoxy Grout: Chemical resistant type, consisting of epoxy resin and hardener; “Spectralock” Epoxy Grout, CEG Lite-Commercial Epoxy Grout by Custom Building Products or Mapei "Kerapoxy".of color selected by the Architect, complying with ANSI A118.3

1. Epoxy Grout shall be stainproof, chemical resistant 100% solids epoxy with high temperature resistance and shall meet the following minimum physical requirements:

Compressive Strength	4500 psi Min.
Shear Bond Strength	1000 psi Min.
Water Absorption	1/2% Max.
Service Temperature	up to 230°F (110°C)

2, The finished Epoxy grout shall be chemically and stain resistant to ketchup, mustard, tea, coffee, milk, soda, beer, wine, bleach (5% solution), ammonia, juices, vegetable oil, detergents, brine, sugar, cosmetics and blood. It shall also be chemically resistant to dilute acids and alkalis, gasoline, turpentine and mineral spirits

C. Sealant for Expansion Joints: Silicone sealant, moisture and bacteria resistant type, as specified in Section 07900 and 100% silicone Caulk by Custom Building Products

2.05 ACCESSORIES

A. Thresholds: Marble type, color selected by the Architect, polished finish, full width of wall or frame opening, beveled one side, radiused edges from bevel to vertical face, Group "A" hardness greater than 10.

B. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints that does not change color or appearance of grout.

C. Reinforcign Mesh: 2 x 2 inch size weave fo 16/16 gauge wire welded galvanized fabric.

2.07 CRACK ISOLATION MEMBRANE

A. Comply with ANSI A118.12 High Perforamance-latest edition for crack isolation membranes. Manufacturer's standard factory prepackaged, job-mixed, proprietary formulation consisting of liquid self-curing rubber polymer for cold application with an integral glass fiber reinforcing or fabric reinforced. Asphaltic peel & stick memebrane used over primer. Crack isolation membranes equal to “Crackbuster Pro Crack Isolation Membrane” by Custom Building Products and “ECB” membrane by NAC.

1. Use over concrete where cracks exists and at control joints for reloacating soft joints/movement joints, complying with TCNA F125

2.08 MORTAR MIX AND GROUT MIX

A. Mix and proportion pre-mix setting bed and grout materials in accordance with manufacturer's printed instructions and indicated ANSI standards.

B. Machine Mixing: Mixer shall be a rotating blade type mortar mixer. Place liquid in mixer, start machine and add dry material. Mix only long enough to wet out the batch. DO NOT OVERMIX. Stop mixer and dump mortar from mixer promptly. Clean out mixer promptly with water.

C. Hand Mixing: In strict accordance with manufacturers printed instructions,.

PART 3 - EXECUTION

3. 01 EXAMINATION

A. Verify that surfaces are ready to receive work. Examine substrates where tile will be installed for compliance with requirements for installation tolerances and other conditions effecting performance of installed tile.

B. Do not proceed with installation until unsatisfactory conditions have been corrected. Commencement of work signifies acceptance of substrate and installation conditions.

3. 02 PREPARATION

A. Protect surrounding work from damage or disfiguration.

B. Vacuum clean existing substrate and damp clean.

C. Remove protrusions, bumps and ridges by grinding or chipping.

D. Repair, fill, and level cracks, holes, depressions and rough or chipped areas in substrate using patching material recommended by setting materials manufacturer. Level existing substrate surfaces to acceptable flatness tolerances.

E. Field-Applied Temporary Protective Coating: precoat tiles with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces. Apply a coat of Grout Release, ensuring 100% surface coverage using a sponge applicator, heavy-textured paint roller or brush. Allow a minimum of 30 minutes drying time before grouting. Follow grout manufacturer's instructions for grouting process. Grout Release residue should be removed through normal grout cleanup processaces

3. 03 CRACK ISOLATION INSTALLATION

A. Apply the system uniformly with application in strict accordance with manufacturer's printed instructions ANSI A108.17

3. 04 INSTALLATION

A. Install mortar, tile, threshold and grout to comply with TCNA Handbook for Ceramic Tile Installation Handbook Numbers as follows:

1. Tile Floors (thinset with epoxy grout): TCNA method F113 on ground, latex-portland cement bond coat or epoxy bond coat, and epoxy grout; ANSI A108.5 (tile) and ANSI A108.6 (grout), to achieve bond to full bearing surface of units. Over saw-cut control joints, follow TCNA Method F125 Partial with crack isolation membrane

2. Tile Walls (thinset): TCNA method W245 (at backing board) with latex portland cement bond coat or epoxy bond coat, and epoxy grout; ANSI A108.5 (tile) and ANSI A108.6 (grout).

4. Expansion Joints: TCNA method EJ171, Joint Design with two part urethane sealant and closed cell backing rod.

B. The setting bond coat mortar shall be applied with a notched trowel using a scraping motion to work the material into good contact with the surface to be covered.

C. Only as much mortar shall be applied as can be covered within 10-20 minutes, or while surface is still tacky and wet. If "skinning" occurs, remove mortar and spread fresh material. Spread mortar with notches running in one direction that shall be perpendicular to the pressing, pushing and pulling of tile during placement When installing paver, a small quantity of the mortar shall be troweled or scraped onto the back of each piece. Pavers shall then be set in place and rapped or beaten with a small beating block to insure 100% full bedding and a true surface. Pavers shall be aligned to show uniform joints and then allowed to set until firm.

D. Excess mortar shall be cleaned from the surface of the pavers with a wet cloth or sponge while the mortar is fresh.

E. Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment Place thresholds at exposed floor tile edges.

F. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly. Align floor

and base.

G. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints solid without voids, cracks, excess mortar, or excess grout.

H. Sound tile after setting. Replace hollow sounding units.

I. Keep expansion joints free of mortar or grout. Apply backer rods and sealant to joints in accordance with Section 07900.

J. Allow tile to set for a minimum of 48 hours prior to grouting.

K. Grout tile joints, packed full and free of all voids and pits. Apply grout to produce full, smooth grout joints of uniform width, and free of voids and gaps Clean excess mortar as works progresses

L. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

M. Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth

3. 05 CLEANING

A. Clean work under provisions of 01700.

B. Clean tile surfaces. If one has been used, remove grout release and clean tile surfaces so they are free of grout residue and foreign matter, in accordance with manufacturer's instructions. If a grout haze or residue remains, use a suitable grout haze remover or cleaner and contact grout manufacturer for recommendations. Flush surface with clean water before and after cleaning. Do not use harsh hydrochloric, muriatic or sulfuric acid or acid-based cleaners to clean glazed tiles or tiles grouted with latex modified grout

3. 06 PROTECTION

A. Protect finished installation under provisions of Section 01500.

B. After cleaning, provide protective covering and maintain conditions to protect tile work from damage or deterioration. Where tiled surfaces will be subject to equipment or wheel traffic or heavy construction traffic, and during move-in of furniture and equipment, cover protective covering with 1/4" hardboard, plywood or similar material.

C. Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work

END OF SECTION

SUSPENDED ACOUSTICAL CEILINGS SECTION 09511

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system and perimeter trim. Coordinate grid system required for baffles specified in Section 09840

B. Acoustical panels as follows:

1. **C-2**: 24″ x 24″ x 3/4″ thick, reveal edge panel in 9/16″ exposed grid and perimeter edge trim.
2. **C-3**: 24″ x 24″ x 5/8 ″ thick, reveal edge panel in 15/16″ exposed grid and perimeter edge trim

1.02 RELATED SECTIONS

A. Division 15 : Air diffusion devices in ceiling system.

B. Division 16: Light fixtures in ceiling system.

1.03 REFERENCES

A. ASTM C635 - Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

B. ASTM C636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.

C. ASTM E1264 - Classification of Acoustical Ceiling Products.

D. Ceilings and Interior Systems Contractors Association CISCA - Acoustical Ceilings: Use and Practice.

1.04 SYSTEM DESCRIPTION

A. Suspension system to rigidly secure acoustical ceiling system including integral mechanical and electrical components with maximum deflection of 1/360.

1.05 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system.

C. Product Data: Provide data on metal grid system components and acoustical units.

D. Samples: Submit two samples full size illustrating material and finish of acoustical units.

E. Samples: Submit two samples each, 12 inches long, of suspension system main runner, cross runner and edge trim.

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.06 QUALIFICATIONS

A. Grid Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

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

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated assembly and combustibility requirements for materials.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Maintain uniform temperature of minimum 60 degrees F, 16 degrees C, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.09 SEQUENCING

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install acoustical units after interior wet work is dry.

1.10 EXTRA MATERIALS

A. Furnish under provisions of Section 01700.

B. Provide 5 percent of total acoustical unit area of extra panels to Owner.

PART 2 - PRODUCTS

2.01 METAL SUSPENSION SYSTEM MATERIALS

A. Metal Suspension System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.

B. Finishes and Colors: Provide manufacturer's standard factory-applied finish for type of system indicated.

C. Attachment Devices: Size for 5 times the design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

1. Corrosion Protection: Carbon steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC service condition (mild).

D. Wire Hangers, Braces and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated Carbon Steel Wire: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so that its stress at 3 times the hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than the yield stress of wire, but provide not less than 0.106 inch (2.69 mm) diameter wire.

E. Sheet Metal Edge Moldings and Trim: Type and profile indicated, or if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.

F. Steel Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from prepainted or electrolytic zinc-coated, cold-rolled steel sheet, with prefinished metal caps on flanges; other characteristics as follows:

1. Structural Classification: Intermediate-duty system, except Heavy-duty at baffles specified in Section 09840.
2. End Condition of Cross Runners: Override (stepped) type.
3. Cap Material and Finish: Steel sheet painted white.
4. Face Width: 9/16″ and 15/16″ as indicated

G. Accessories: Stabilizer bars, clips, splices, edge moldings, hold down clips as required for suspended grid system.

H. Support Channels and Hangers: Galvanized steel; size and type to suit application, and ceiling system flatness requirement specified.

2.01 ACOUSTICAL UNITS

A. **C-2** Acoustical Panels: ASTM E1264, Type IV, Form 2, Pattern E, Class 25 conforming to ` the following:

1. Size: 24 x 24 inches.
2. Thickness: 3/4 inches.
3. Composition: Wet formed mineral fiber with transparent membrane with factory-applied acrylic latex paint.
4. Light Reflectance: .90 percent.
5. NRC Range: .75
6. CAC Range: 35
7. Surface Burning Characteristics: Class A.
8. Edge: Beveled Tegular for 9/16" grid
9. Surface Color: White, unless otherwise indicated on the drawings.
10. Surface Finish: Smooth non- directional face equal to " Ultima High NRC, Humiguard Plus" by Armstrong and "Mars ClimaPlus" by U.S.G.
11. Warranty: 30 years with no visible sag at 104 degrees F/95% relative humidity and growth of mildew, mold and bacteria

12. 9/16" factory finished grid

B. **C-3** Acoustical Panels: ASTM E1264, Type III, Form 2, Class 25 conforming to the following:

1. Size: 24 x 24 inches.
2. Thickness: 5/8 inches.
3. Composition: Mineral.
4. Light Reflectance: .85 percent.
5. NRC Range: .55
6. CAC Range: 35.
7. Surface Burring Characteristics: Class A.
8. Edge: Reveal
9. Surface Color: White.
10. Surface Finish: Non-directional fine fissured pattern equal to “Fine Fissure, HumiguardPlus” by Armstrong and approved “ClimaPlus series” by US Gypsum.
11. Warranty: 30 years with no visible sag at 104 degrees F/95% relative humidity
12. 15/16" factory finished grid

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - LAY-IN GRID SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636 Intermediate Duty, manufacturer's instructions and as supplemented in this section.

B. Install system capable of supporting imposed loads to a deflection of 1/360 maximum.

1. Space hangers not more than 16" at end and 48" between each runner.

C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.

D. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.

E. Supply hangers or inserts for installation to Section with instructions for their correct placement.

F. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of the supporting structure or of the ceiling suspension system.

G. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

H. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three (3) tight turns. Connect hangers either directly to structures or to inserts, eye screws, or other devices that are secure, that are appropriate for substrate, and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

I. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

J. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

K. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.

L. Do not eccentrically load system, or produce rotation of runners.

M. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions.

1. Screw attach moldings to substrate at intervals not over 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.18 mm in 3.66 m). Miter corners accurately and connect securely.
2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

N. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
3. Make field cut edges of same profile as factory edges. Panel edges at all walls and other vertical abutments and ceiling details shall provide a reveal edge on the perimeter ceiling panel/trim

C. Install units after above ceiling work is complete.

D. Install acoustical units level, in uniform plane, and free from twist, warp and dents.

E. Cut panels to fit irregular grid and perimeter edge trim.

G. Coordinate insulation and other components as part of fire rated assembly.

3.04 ERECTION TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

WOOD GRILLE ACOUSTICAL WALL UNITS SECTION 09545

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Wood grille acoustical wall units **(WP-1)** with slat height and size indicated on the drawings and Black acoustic infill panel fire retardant treated for Class A flame spread rating, factory finished complete with all trim, attachment devices and accessories, installed with screws through panel backer to wood furring strips; paint furring strip flat Black

1.02 RELATED SECTIONS

A. Division 15: Air diffusion devices in ceiling system.

B. Division 16: Light fixtures in ceiling system.

1.03 REFERENCES

A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2009a.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.

C. ASTM E795 - Standard Practices for Mounting Test Specimens During Sound Absorption Tests; 2016

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1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system.

C. Product Data: Provide data on metal grid system components and acoustical units.

D. Samples: Submit two samples full size illustrating material and finish of units.

E. Samples: Submit two samples each, 12 inches long, of suspension system main runner, cross runner and edge trim.

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.05 QUALIFICATIONS

A. Grid Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

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

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated assembly and combustibility requirements for materials.

1.08 SEQUENCING

A. Sequence work to ensure ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install units after interior wet work is dry.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Protect acoustical units from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until units are needed for installation. Ensure all supplied hardware, material, and components are maintained until product is fully installed.

B. Store units flat, in dry, well-ventilated space; do not stand on end

.

C. Protect edges from damage.

D. Acclimatize product for minimum 24 hours at temperature and humidity approximately that of occupancy prior to installation.

1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install materials until spaces are enclosed from the exterior environment, wet work in spaces is complete and dry, and HVAC system is maintaining an ambient temperature at occupancy levels during the remainder of the construction period

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B. Field Measurements: Installer to verify field measurements and dimensions as indicated in Design Submittal. 1. Coordinate location of other product and trades with product layout.

C. Ensure that Design Submittal signoffs and other required information are supplied in time to prevent interruption of construction process. Ensure that products of this section are supplied to affected trades in time to prevent interruptions.

1.11 EXTRA MATERIALS

A. Furnish under provisions of Section 01700.

B. Provide 5 percent of total unit area of extra panels to Owner.

PART 2 - PRODUCTS

2.01 UNITS

A. **WP-1 Wall** Wood Grille Wall Panels: Class A rated per ASTM E-84, conforming to the following:

1. Panel Thickness: 9mm PET felt substrate
2. Edges: Exposed felt, machined edge.
3. Corners: Square, exposed felt, machined edge.
4. Material: Polyester (PET) felt, 55% pre-consumer recycled
5. Color: See drawings.
6. Patterns: As selected by Architect from manufacturer's full range and outlined in Submittal Drawings.
7. Mounting Method: a. direct adhered or fastened to substrate
8. Approved: Equal to “Stratawood with black wood backer “ by Frasch

B. Material Minimum Performance Attributes:
1. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
2. UL Tested ASTM E-84: Class A
3. Noise Reduction Coefficient (NRC): Avg. apparent NRC > .75, Tested in accordance with ASTM C423 for mounting, per ASTM E795.

2.02 FABRICATION

A. General: CNC fabricate panels to sizes, configurations, and patterns on 9 mm PET felt, fold edges and create air cavity with secret trap doors.

B. Tolerances: Fabricate to finished tolerance of plus or minus 1/16 inch for thickness, overall length and width, and square-ness from corner to corner.

2.04 ACCESSORIES

A. Wall Mounting Accessories: Manufacturer's standard accessories at locations indicated on each acoustical unit, sized appropriately for weight of acoustical unit.
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PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION –

A. Install acoustical units in locations indicated, following manufacturer's installation instructions and in accordance with local jurisdiction authorities.

B. Wall surface to be smooth, cleaned, and dry prior to installation of the product.

C. Using the tabs, open secret trap doors, fasten to substrate, and close doors.

D. Align panels accurately, with edges plumb and edges level. Scribe to fit accurately at adjoining work and penetrations.

E. Install acoustical units to construction tolerances of plus or minus 1/16 inch for the following:
1. Plumb and level. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet
2.. Flatness.
3. Width of joints.

3.03 CLEANING

A. Clean felt facing upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

B. Lightly vacuum occasionally to remove any particulate matter and air-borne debris or dust. Compressed air can be used to dust the material in difficult to reach areas or for large assemblies.

3.04 PROTECTION

A. Provide protection of installed acoustical panels until completion of the work.

B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect

END OF SECTION

RESILIENT TILE FLOORING SECTION 09660

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring; luxury vinyl as indicated on the drawings.

B. Resilient base.

C. See drawings for product selections and colors.

1.02 REFERENCES

A. ASTM E84 - Surface Burning Characteristics of Building Materials.

B. ASTM F 1066- Tile, Floor: Asphalt, Rubber, Vinyl, Vinyl Composition.

1.03 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame/fuel/smoke rating requirements and as follows:

1. Flame Spread: 25 or less per ASTM E89
2. Smoke Developed: 450 or less per ASTM E84
3. Smoke Density: 450 or less per ASTM E662

1.04 SUBMITTALS

A. Submit shop drawings, product data and samples under provisions of Section 01300.

B. Provide product data on specified products, describing physical and performance characteristics, sizes, patterns and colors available.

C. Submit samples under provisions of Section 01300.

D. Submit two (2) tiles full size, illustrating color and pattern for each floor material specified.

E. Submit two (2) 3 inch long samples of base material for each color specified.

F. Submit manufacturer's installation instructions under provisions of Section 01300.

1.05 OWNERS EXTRA STOCK

A. Provide 5% of total area of specified tile, stair sytem and base in original cartons delivered to Owner for attic stock.

B. Deliver unused tile and base to Owner's attic stock, as directed by the Owner.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit cleaning and maintenance data under provisions of Section 01700.

B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

PART 2 - PRODUCTS

2.01 TILE FLOORING MATERIALS

A. Luxury Vinyl: : ASTM F 1700 Class I, Type B (solid vinyl floor), with color and pattern throughout full thickness of tile

1. See drawings for product selections and colors.
2. Dynamic Coefficient of Friction: >.42 (wet) per ASTM A137.1
3. Total Thickness: 0.120 inches.
4. 20 year Commercial Wear Warranty

2.02 BASE MATERIALS

A. Base: ASTM F 1861, Type TS, Group 1(solid), Thermoset vulcanized 100% vulcanized homogenous synthetic rubber compound synthetic rubber, 4 inch; full 1/8 inch thick; top set cove unless otherwise indicated on the drawings; ribbed back; matte finish of color selected by Architect.

1. 120' coiled lengths for field formed corners.
2. See drawings for product selections and colors.

B. Base Accessories: Same material, size, and color as base.

C. Manufacturers: Johnsonite, Roppe Corp., Flexco, Allstate by Stoler Industries and Burke Industries.

2.03 ACCESSORIES

A. Subfloor Filler: White premix cementitious type recommended by flooring materials manufacturer.

B. Primers and Adhesives: Waterproof; types recommended not affected by slab moisture, rated 98% RH by flooring manufacturer.

C. Resilient Edge Strips: 1/8" thick, homogeneous vinyl or rubber composition, tapered or bullnose edge, color to match flooring, or as selected by Architect from standard colors available; not less than 1" wide.

D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify concrete floors are dry to a maximum moisture content of 7 percent, and exhibit negative alkalinity, carbonization, or dusting. The concrete slab must be dry, clean, smooth, structurally sound andfree of foreign materials that might prevent adhesive bond as describedin ASTM F-710, “Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring”.

B. Beginning of installation means acceptance of existing substrate and site conditions.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler. Apply latex filler (flash-patch) at gouges in the concrete slab and at all changes in flooring from carpet to any other finishes so as to bring the top of the carpet up to the top of the other finish. Slope shall be feathered out as much as possible. Fill, level and make smooth cracks 1/16 inch or more, holes, unevenness, and roughness with compatible latex floor patching compounds. Feather floor filling or leveling compound a minimum of four (4) ft. Sweep floor of loose granular debris prior to filling. After filling, allow filler to dry. Damp mop floor with warm water and allow to dry. Vacuum after mopping to ensure that loose granular debris is removed and to provide a proper substrate to install Modular carpet. Prohibit traffic until filler is cured.

B. Apply, trowel, and float filler to leave a smooth, flat, hard surface.

C. Prohibit traffic from area until filler is cured.

D. Vacuum clean substrate.

E. Apply primer if recommended by adhesive manufacturer.

3.03 INSTALLATION - TILE MATERIAL

A. Install in accordance with manufacturers printed instructions.

B. Mix tile from container to ensure shade variations are consistent.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Set flooring in place, press with heavy roller to attain full adhesion.

E. Lay flooring with joints and seams parallel to building lines to produce minimum number of seams.

F. Install tile to square grid pattern with all joints aligned. Allow minimum 1/2 full size tile width at room or area perimeter.

G. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.

H. Install edge strips at unprotected or exposed edges, and where flooring terminates. Fit joints tightly.

I. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - BASE MATERIAL

A. Apply resilient base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is indicated.

B. Install base in as long lengths as practicable. Tightly bond base to backing throughout the length of each piece, with continuous contact at horizontal and vertical surfaces.

C. Install inside and exterior preformed corners before installing straight pieces.

D. Form inside corners on job from straight pieces of maximum lengths possible by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce snug fit to substrate.

E. Field form all external corners by wrapping in strict accordance with manufacturer's printed instructions with minimum of 12" returns.

1. Form outside corners on job from straight pieces of maximum lengths possible by shaving or scoring the back of base at point where bending will occur. Remove a strip perpendicular to length of base and score only deep enough to produce a snug fit without removal of more than half the thickness of wall base.

F. Fit joints tight.

G. Install base on solid backing.

H. Scribe and fit to door frames and other interruptions.

I. Cut wallcovering as required to prevent base adherence to wallcovering surface.

J. Prohibit traffic on floor finish for 48 hours after installation.

3.05 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean, seal, and wax floor (2 coats) and base surfaces in accordance with manufacturer's instructions.

END OF SECTION

CARPET SECTION 09688

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Carpet tiles installed with glue-down installation method complete with all accessories. **Note: All carpet shall be laid out off-site for the required time to off-gas the carpet product prior to delivery to the site and installation.**

1.02 SUBMITTALS

A. Submit manufacturer's installation instructions under provisions of Section 01300.

B. Submit seaming plan, method of joining seams, direction of carpet with the following criteria:

1. All carpet shall be laid in the same direction unless specifically shown otherwise.
2. Seams which occur at doorways and entries shall not be perpendicular to doors or entries. Seams occurring at doors and parallel to doors shall be centered directly under the door.
3. Seams occurring at corridor change of direction shall follow wall line parallel to carpet direction.

C. Provide product data on specified products, describing physical characteristics; sizes, patterns, colors available, adhesive with written recommendation from the carpet manufacturer, MSDS sheets on adhesive, and method of installation.

D. Submit two (2) samples 24 x 24 inch in size illustrating color and pattern for each carpet material specified.

E. Submit manufacturer's installation instructions under provisions of Section 01300.

1.03 OPERATION AND MAINTENANCE MANUAL

A. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning and shampooing.

1.04 EXTRA MATERIALS

A. Overrun Stock: Deliver overrun stock and scraps of unused carpet to Owner's attic stock, as directed by the Owner, in accordance with specified requirements.

1. Provide 5% of total area of each type of uncut carpet delivered to Owner for attic stock.

1.05 QUALITY ASSURANCE

A. Warranty: Submit manufacturer's 10 yearwarranty to provide replacement of carpet.

B. Installer: Company with five years minimum documented successful experience.

C, Mockups: Before installing carpet, install mockups for each type of carpet installation required to demonstrate aesthetic effects and qualities of materials and execution. Install mockups to comply with the following requirements, using materials indicated for the completed Work:

1. Install mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be installed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting work.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Remove mockups when directed.
7. Approved mockups may become part of the completed Work if undamaged at time of Substantial Completion

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for carpet flammability requirements.

B. Conform to ANSI/ASTM E648.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain minimum 70 degrees F ambient temperature three days prior to, during, and 24 hours after installation of materials.

PART 2 - PRODUCTS

2.01 MATERIALS

A. **Carpet Tiles:** See Drawings and as follows:

Flammability: Passes
DOC-FF-1-70 Pill Test:

NBS Smoke Chamber NFPA-258:Less than 450 Flaming Mode

2.02 ACCESSORIES

A. Sub-Floor Filler: premix cementitious equal to Dependable Chemical Company, Inc.

B. Primers and Adhesives: Waterproof "premium quality" type recommended in writing by carpet manufacturer.

1. Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, rated at 98% RH that complies with flammability requirements for installed carpet tile and is recommended by carpet tile

manufacturer for releasable installation, . environmental standards for VOC content and fume emission with strength and performance equal to "premium" solvent based adhesives

C. Edge Strips: Roppe Rubber Model 38, rubber, color as selected.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft. and are ready to receive work.

B. Beginning of installation means acceptance of existing substrate and site conditions.

C. Verify that sub-floor surfaces are ready for flooring installation by testing moisture emission rate and alkalinity, in accordance with ASTM F 710; obtain instructions if test results are not within limits recommended by the flooring manufacturer and adhesive materials manufacturer. Reference ASTM F 710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring. If test indicated slab is not in conformance provide moisture mitigating coating as required not to affect warranty. Test slab using ASTM F1869 when carpet has breathable backing, and ASTM F2170 fro carpet with non-breathable backing.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.

B. Apply, trowel, and float filler to leave smooth, flat, hard surface at unusual depressions and at edges of marble flooring where feathering is required.

C. Prohibit traffic until filler is cured.

D. Vacuum floor surface.

E. Apply cementitious filler (flash-patch) at gouges in the concrete slab and at all changes in flooring from carpet to any other finishes so as to bring the top of the carpet up to the top of the other finish. Fill, level and make smooth cracks 1/16 inch or more, holes, unevenness, and roughness with compatible latex floor patching compounds. Feather floor filling or leveling compound a minimum of four (4) ft. Sweep floor of loose granular debris prior to filling. After filling, allow filler to dry. Damp mop floor with warm water and allow to dry. Vacuum after mopping to ensure that loose granular debris is removed and to provide a proper substrate to install carpet. Prohibit traffic until filler is cured.

F. Remove sealers, grease, loose particles, dirt and all other foreign substances. Subfloor shall be level and smooth. Concrete floors shall have dust thoroughly removed by sweeping and wet mopping

3.03 INSTALLATION

A. Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions Install carpet over entire area to be carpeted.

B. Apply carpet and adhesive in accordance with manufacturer's printed instructions using the glue down method. Carpet seams and edges shall be tightly attached, eliminate air pockets, and roll to ensure uniform bond everywhere.

1. Installed carpet tiles shall not set in adhesive to cause a permanent bond
2. Blend carpet tiles from different cartons to ensure minimal variation in color match.
3. Lay out each room or area to minimize tiles less than one half size

C. Lay out rolls of carpet. Conceal cut edges with protective edge guards or flanges. Install edging guards at openings and doors wherever modular carpet terminates, unless indicated otherwise

D. Verify carpet match before cutting to ensure minimal variation between dye lots.

E. Double cut carpet, to allow intended seam and pattern match. Make cuts straight, true and unfrayed.

F. Locate seams to minimize the number of seams and in area of least traffic; individual offices shall not have seams.

G. Fit seams straight, not crowded or peaked, free of gaps.

H. Lay carpet on floors with run of pile in same direction as anticipated traffic.

I. Do not change run of pile in any room where carpet is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.

J. Cut and fit carpet around interruptions.

K. Fit carpet tight to intersection with vertical surfaces without gaps.

3.04 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Remove any spots or smears of adhesive from carpet and other surfaces with an approved cleaning agent.

C. Vacuum carpet surfaces several times using a commercial beater-bar-type vacuum cleaner or equivalent machine.

D. Remove any protruding face yarns with a sharp scissors.

3.05 PROTECTION

A. Prohibit traffic from carpet areas 24 hours after installation.

B. Deliver specified attic stock and overrun and usable scraps of carpet to Owner's designated

storage space, properly packaged and identified

END OF SECTION

ELASTOMERIC COATINGS SECTION 09800

PART 1 - GENERAL

1.01 SUMMARY

A. Application of special c exterior coating system to all new plaster surfaces, including preparation of the surface, prime coats and topcoats of all surfaces.

1. The coating manufacturer's representative must submit written verification on manufacturers letterhead that after the cleaning the substrate was inspected and found acceptable for the coating application, consistent with requirements for the specified warranty. The aforementioned verification must be received before starting the coating application

B. Types of special coating systems required for the project include:

1. Pigmented, emulsion type, flexible, breathable, elastomeric, high build, waterproof acrylic coating. Priming system designed for compatibility with substrates indicated.

C. General painting is specified in Section 09900.

1.02 SUBMITTALS

A. Product Date: Submit manufacturer's technical information including basic materials analysis and application instructions for coating material specified.

1. List each material and cross-reference the specific coating and finish system and application. Identify each material by the manufacturer's catalog number and general classification.

B. Samples: Submit samples for review of colors and texture only. Provide a list of material and application for each coat of finish sample.

1. Provide samples of material to be applied, with colors and texture to simulate samples as requested until the required sheen, color and texture is achieved to match existing concrete building.

1.03 QUALITY ASSURANCE

A. Single Source Responsibility: Provide primers produced by the same manufacturer as the finish coats. Use only thinners recommended by the manufacturer, and only within recommended limits.

B. Applicator: A firm with not less than 10 years of successful experience in application of special coating types required on substrates similar to those of this project.

C. Coordination of Work: Ensure compatibility of the total systems for various substrates. Upon request, furnish information on characteristics of specified finish materials, to ensure that compatible prime coats are used.

1. Solvent strength shall not effect bond.
2. Notify the Architect of problems anticipated using the coatings systems specified.

D. Field Samples: On actual surfaces using the same equipment for general application duplicate coating finishes of prepared samples. Sample surfaces shall be cleaned of dirt, grease, rust, concrete dust or other foreign material that will interfere with optimum bond. Provide full-coat finish samples on at lest 100 sq. ft. of surface, until required sheen, color, and texture are obtained.

1. Final acceptance of colors will be from job applied samples.

2. The Architect will select surface to represent surfaces and conditions for each type of coating and substrate to be coated. Apply coatings on this surface as specified. After finishes are accepted, this surface will be used for evaluation of coating systems of a similar nature.

E. Material Quality: Provide the best quality grade of the coating as regularly manufactured by acceptable coating manufacturer. Materials not displaying manufacturer's identification as a best-grade product will not be acceptable.

F. Warranty: Provide a manufacturer five (5) year written limited warranty for Special Coatings to protect against water penetration, blistering and peeling and to maintain vapor permeability signed by both the coating manufacturer and the applicator.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the job site in the manufacturer's original, new, unopened packages and containers bearing manufacturer's name and label and the following information.

B. Name or title of material.

1. Manufacturer's name, stock number and date of manufacture.
2. Contents by volume, for major pigment and vehicle constituents.
3. Thinning instructions.
4. Application instructions.
5. Color name and number.
6. Handling instructions and precautions.

C. Store materials not in actual use in tightly covered containers above ground at a minimum ambient temperature of 45 deg. F., in a well ventilated area. Maintain containers used in storage of coatings in a clean condition, free of foreign materials and residue.

1. Protect from extreme heat and freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary precautionary measures to ensure that workmen and work ares are adequately protected from fire hazards and health

hazards resulting from handling, mixing and application of coatings.

2. Do not store or use materials that are over six (6) months old.

1.05 PROJECT CONDITIONS

A. Apply coatings only when the temperature of surfaces to be coated and surrounding air temperatures are above 40 deg. F. or below 95 deg. F., unless otherwise permitted by manufacturer's printed instructions.

B. Do not apply coatings in snow, rain, fog or mist,or when there is a chance of rain within 24 hours after application, or at temperatures less than 40 deg. F. or to damp or wet surface unless otherwise permitted by manufacturer's printed instructions. Allow wet surfaces to dry thoroughly and attain the temperature and conditions specified before proceeding with or continuing the coating operation. Protect surfaces from rain for 48 hours after application.

1. Test surfaces with moisture meter prior to application of coatings and only proceed with application if readings are within limits of coating manufacturer requirements.

C. Apply coatings in areas away from sparks or spark producing equipment. Do not use near fire, flame or heat; primer material is combustible. Avoid breathing.

PART 2 - PRODUCTS

2. 01 EXTERIOR COATING MATERIALS

A. Exterior Primers: Provide factory pigmented formulated prime coat material compatible with the substrate and finish coats indicated.

B. Finish Coats: Provide factory formulated, finish coat material compatible with the substrate and primer. Pigmented, emulsion type, flexible, elastomeric, high-build, waterproof acrylic coating for application over all specified and primed surfaces:

1. Sto Stolit 1.0 with stolit freeform overcoat
2. Texture: Limestone
3. Colors: equal to Benjamin Moore OC-48 Hazy Skies.

C. Miscellaneous Materials: Provide materials not specifically described, but required for complete and proper performance of the work and as recommended by the manufacturer of the special coatings. All materials must be compatible with the products in this specification section.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions under which coating will be performed for compliance

with requirements for application of coatings. Do not proceed with application until unsatisfactory conditions have been corrected.

1. Start of coating work will be construed as the Applicator's acceptance of surfaces within particular area.

3.02 PREPARATION

A. General: Water blast existing surfaces to remove all flaking coatings and tp provide acceptable surface for new coating. Remove hardware, plates, machined surfaces, light fixtures, and similar items which are not to be coated, or provide surface-applied protection prior to surface preparation and coating. Following completion of coating operations in each space or area, reinstall items removed, using workmen skilled in the trades involved.

1. Clean surfaces of dirt, grease, rust, concrete dust and other foreign material before applying coatings or surface treatments. Schedule cleaning and coating application so dust and other contaminants will not fall on wet, newly coated surfaces.
2. Mask all surfaces not to receive elastomeric coating.

B. Surface Preparation: Perform surface preparation repairs and cleaning in compliance with the manufacturer's instructions for the particular substrate conditions, and as specified in another section of these specifications prior to applying special coatings.

1. All caulking and sealants shall be thoroughly cured prior to application of special coatings. Surfaces to receive special coatings shall be dry. Notify the Architect in writing of anticipated problems using coatings specified with substrates primed or furnished by others.

C. Material Preparation: Carefully mix and prepare materials in compliance with the coating manufacturer's directions.

1. Mix materials before application to produce a mixture of uniform density, and as required during application. Do not stir film, which may form on surfaces, into the material. Remove film and, if necessary, strain the coating material before using.

3.03 APPLICATION

A. Test Application: Prior to general application of special coatings prepare a small application in an unobtrusive location for the purpose of demonstrating final effect of installation. Proceed with work only after Architect's acceptance of test application.

B. Apply special coatings by brush and roller applicators in accordance with manufacturer's directions. Use brushes best suited for the material being applied. Use rollers as recommended by the manufacturer for the material and texture required.

1. Provide finish coats compatible with the primers used.
2. The number of coats and film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer.

C. Minimum Coating Thickness: Apply each material at not thinner than the manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by the manufacturer but not less than 8 dry mils per coat.

D. Primer: See precautions at beginning of this section regarding combustibility.

1. Apply product as packaged - do not dilute or alter the material.
2. Apply sufficient material, to thoroughly wet the masonry surface. Avoid heavy streaks and runs. Brush out drips and runs that do not penetrate.
3. Allow surface to dry twenty-four (24) hours prior to application of pigmented elastomeric acrylic polymer masonry coating.
4. Protect treated surface from rain for a period of at least twenty-four (24) hours after application.

E. Pigmented Elastomeric Acrylic Polymer Finish Coating (Two Coats):

1. Apply product in its concentrated form and dry mil thicknesses in accordance with manufacturer's written instructions to obtain uniform pinhole free surface.
2. Apply first coat to primed surface with roller. Use sufficient material to thoroughly cover surfaces with continuous coating.
   a. Back-brush to ensure complete coverage.
   b. Work coating into surface.
3. Allow first coat to dry twenty-four (24) hours prior to application of second coat.
4. Apply second coat over first coat following same application procedure as first coat (roller and back-brush) to provide a uniform, monolithic appearance with no ridges, brush strokes, runs, etc.
5. Allow second coat to dry forty-eight (48) hours before proceeding with additional work, if required, on surface.
6. Protect freshly coated surface from rain for a period of at least three (3) hours after application.

F. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or recoat work not in compliance with specified requirements.

3.04 CLEANING

A. Clean-Up: At the end of each work day, remove rubbish, empty cans, rags and other discarded materials from the site.

3.05 PROTECTION

A. Protect work of other trades, whether to be coated or not, against damage from coatings. Correct damage by cleaning, repairing, replacing, and recoating as acceptable to the

Architect. Leave in an undamaged condition.

1. Protect surfaces from splash and overspray of primer.
2. Remove inadvertent primer splashes immediately according to manufacturer's written instructions.
3. Cover live plant materials with drop cloths.

B. Provide "Wet Paint" signs to protect newly-coated finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of coating operations.

1. At completion of construction activities of other trades, touch-up and restore damaged or defaced coated surfaces.

END OF SECTION

SOUND-ABSORBING CEILING BAFFLES AND LIGHT FIXTURE UNITS SECTION 09840

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Acoustic ceiling baffles, grid and light fixtures, and support systems, i.e. suspended T-bar grid and Unistrut, fully threaded rods, etc., as follows

BF-1: Felt baffles nested into “nested” pattern installed with suspended cable system including cable and threaded rods.
BF-2 & 3: Felt ceiling baffles of lengths indicated on the drawings installed with aircraft cables
BF-4: “Wood Look” felt open ended ceiling panels installed with hanger bracket clips in suspended “Heavy- Duty” rated 15/16" metal grid ceiling system. (specified in Section 09511)
BF-5: Acoustic Pendant Light Fixture, round shape, with LED lights installed with suspended cable system
BF-6: Acoustic Pendant Light Fixture, circular shape, 34″ Diam. x 26″H with LED lights installed with suspended cable system
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1.02 RELATED SECTIONS

A. Section 09511 - Suspended Acoustical Ceilings: Conventional grid-supported acoustic ceilings.
B. Section 09900 - Paints and Coatings

1.03 REFERENCES

A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2009a.
B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.
C. ASTM E795 - Standard Practices for Mounting Test Specimens During Sound Absorption Tests; 2016.

1.04 SUBMITTALS

A. General: Submit manufactures documentation for each type of product under provisions of Section 01300 - Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's printed data sheets for products specified.
C. Shop Drawings: Fabrication and installation details, panel layout.
D. Selection Samples: Manufacturer's color charts for applicable material, indicating full range of material, colors, and patterns available.
E. Verification Samples: Fabricated samples of each type of product specified; 6” minimum length and width, showing construction, edge details.
F. Test Reports: Certified test data from an independent test agency verifying that panels meet specified requirements for acoustical and fire performance.
G. Maintenance Materials: Furnish maintenance information and recommendations for Owners use.

1.05 QUALITY ASSURANCE

A. Source Limitations: All similar products to be obtained from a single manufacturer through one source providing a comprehensive material and installation package.

B. Installer Qualifications: Utilization of an installer with three (3) years minimum experience with specified manufacturer. Installation team has demonstrated experience and quality in projects of similar size and complexity.
C. The baffle subcontractor designs the Unistrut attachment and suspension system

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect acoustical units from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until units are needed for installation. Ensure all supplied hardware, material, and components are maintained until product is fully installed.
B. Store units flat, in dry, well-ventilated space; do not stand on end.
C. Acclimatize product for minimum 24 hours at temperature and humidity approximately that of occupancy prior to installation

1.07 PERFORMANCE RATINGS

A. Fire Performance: The composite panel shall have a flame spread rating of 25 or less and a smoke developed rating of 75 or less with manufacturers' standard facing. Panels shall be rated Class A as defined by ASTM E84.

B. Acoustical Performance: Acoustical Wall Panels (not cement fiber panels) shall have a minimum Noise Reduction Coefficient (N.R.C.) in accordance with ASTM C423-Latest edition. Tests performed by a recognized independent acoustical testing laboratory indicating that a laboratory installation of the panels with an “A” mounting has meet or exceeded the sound absorption values listed.

	Frequency (Hz)				
Panel/Fixture	**250**	**500**	**1000**	**2000**	**NRC**
Light Fixtures	0.74	0.06	1.54	1.77	1.30
SkinnyBaffles	0.35	0.54	0.85	1.22	0.75
Liyfelt	0.74	1,02	1.38	1.87	0.95
Wood Look baffle	0.16	0.43	0.76	1.05	0.60
Acoustic Pandant	0.16	0.06	1.54	1.77	1.30

1.08 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install materials until spaces are enclosed from the exterior environment, wet work in spaces is complete and dry, and HVAC system is maintaining an ambient temperature at occupancy levels during the remainder of the construction period.
B. Field Measurements: Installer to verify field measurements and dimensions as indicated in Design Submittal.
    1. Coordinate location of other product and trades with product layout.
C. Ensure that Design Submittal signoffs and other required information are supplied in time to prevent interruption of construction process. Ensure that products of this section are supplied to affected trades in time to prevent interruptions.

1.09 WARRANTY

A. Special Warranty: Manufacturers standard warranty for specific products, terms, and limitations.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Basis of Design: Fräsch as specified or equal BUZZI series by Turf Design

2.02 **BF-1** SOUND-ABSORBING PANELS NESTED

A. Basis of Design: "Nested" Acoustic Pendant
B. Material minimum Performance Attributes:
   1. Surface Burning Characteristics: Flame spread index of 25 or less and smoke development index of 450 or less, when tested in accordance with ASTM E84.
   2. UL Tested ASTM E84: Class A
C. Product Attributes:
   1. Blade Size: See drawings, felt baffles nested in to nested pattern
   3. Edges: Exposed felt, machined edge.
   4. Corners: Square exposed felt, machined edge.
   5. Material: 9mm Polyester (PET) felt, 55% pre-consumer recycled.
   6. Color: As selected by architect from manufacturer's full range.
   7. Patterns: As selected by Architect from manufacturer's full range and outlined in Submittal Drawings.
   8. Mounting Method: suspended cable system including air craft cable and threaded rods

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2.03 **BF-2** and **BF-3** SOUND-ABSORBING BAFFLE PANELS

B. Basis of Design:"Skinny Baffle" acoustic ceiling baffle
C. Material Minimum Performance Attributes:
   1. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
   2. UL Tested ASTM E-84: Class A
D. Product Attributes:
   1. Baffle Size: 9mm felt ceiling baffles
   2. Edges: Exposed felt, machined edge.
   3. Corners: Square, exposed felt, machined edge.
   4. Material: 9mm Polyester (PET) felt, 55% pre-consumer recycled.
   5. Color: As selected by Architect from manufacturer's full range.
   6. Patterns: As selected by Architect from manufacturer's full range and outlined in Submittal Drawings.
   7. Mounting Method: suspended aircraft cable

2.04 **BF-4** SOUND-ABSORBING WOOD LOOK PANELS

A. Basis of Design:
   1. "Linyfelt 8L" acouystic open ended ceiling hangers
B. Material Minimum Performance Attributes:
   1. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
   2. UL Tested ASTM E-84: Class A
C. Product Attributes:
   1. Baffle Size: see drawings "Wood Look" felt ceiling panels
   2. Edges: Exposed felt, machined edge.
   3. Material: 9mm Polyester (PET) felt. 55% pre-consumer recycled
   4. Color: As selected by Architect from manufacturer's full range.
   5. Patterns: As selected by Architect from manufacturer's full range and outlined in Submittal Drawings.
   6. Mounting Method: with backer clips in suspended "Heavy- Duty" rated 15/16" metal grid ceiling system

2.05 **BF-5** SOUND-ABSORBING LIGHT FIXTURES

A. Basis of Design: “LIT cloud pendant

B. Material minimum Performance Attributes:

1. Surface Burning Characteristics: Flame spread index of 25 or less and smoke development index of 450 or less, when tested in accordance with ASTM E84.
2. UL Tested ASTM E84: Class A

C. Product Attributes:

1. Shade Size:.see drawings, Round shape.
2. LED light Source
3. Material: 9mm Polyester (PET) felt. 55% pre-consumer recycled.
4. Color: As selected by architect from manufacturer’s full range.
5. Mounting Method: Suspended with 1/16” steel aircraft cable, with ceiling fasteners, supplied by manufacturer.

2.06 **BF-6** SOUND-ABSORBING LIGHT FIXTURES

A. Basis of Design: “Spoke Light”

B. Material minimum Performance Attributes:

1. Surface Burning Characteristics: Flame spread index of 25 or less and smoke development index of 450 or less, when tested in accordance with ASTM E84.
2. UL Tested ASTM E84: Class A

C. Product Attributes:

1. Shade Size:. See drawings , Circular shape.
2. LED light Source
3. Material: 9mm Polyester (PET) felt. 55% pre-consumer recycled.
4. Color: As selected by architect from manufacturer’s full range.
5. Mounting Method: Suspended with 1/16” steel aircraft cable with ceiling fasteners, supplied by manufacturer.

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2.07 FABRICATION

A. General: CNC fabricate panels to sizes, configurations and patterns on 9 mm PET felt. Factory installed hardware.

B. Tolerances: Fabricate to finished tolerance of plus or minus 1/16 inch for thickness, overall length and width, and square-ness from corner to corner.

2.08 ACCESSORIES

A. Ceiling-Suspended Accessories: Manufacturer's standard accessories at locations indicated on each acoustical unit, sized appropriately for weight of acoustical unit.

1. Contractor to provide and install Unistrut as required for baffle installation.
   a. Suspend Unistrut and cables where required at elevations indicated by the Architects drawings and Submittals.
   b. Install Unistrut at lengths indicated on drawings
2. Contractor to provide and install T-Grid as required for baffle installation.
   a. Verify grid dimensions in field.
   b. Ensure grid is flat and level.
   c. Ferrous grid required for magnetic connections.
3. Contractor to select and provide all anchors to building for mounting based on site requirements, conditions, and as appropriate for application.
4. Provide ceiling mounting points for cable suspension from ceilings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates for conditions detrimental to installation of acoustical units. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install acoustical units in locations indicated, following manufacturer's installation instructions and in accordance with local jurisdiction authorities.
B. Align panels accurately, with edges plumb and top edges level.
C. Install acoustical units to construction tolerances of plus or minus 1/16 inch for the following:
    1. Plumb and level.
    2. Flatness.
    3. Width of joints.

3.03 CLEANING

A. Clean felt facing upon completion of installation from dust and other foreign materials, following manufacturer's instructions.
B. Vacuum occasionally to remove any particulate matter and air-borne debris or dust. Compressed air can be used to dust the material in difficult to reach areas or for large assemblies.

3.04 PROTECTION

A. Provide protection of installed acoustical panels until completion of the work.
B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION

PAINTING **SECTION 09900**

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Surface preparation and field application of paints and coatings.

B. Paint all exposed surfaces not prefinished under other sections of the specification and whether or not colors are designated in schedules, except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. Without restricting the extent of the work to be performed the work shall include, but not limited to, finishing of the all interior exposed surfaces within the limits of work and all exterior exposed new surfaces:

1. Gypsum Drywall: All exposed surfaces, walls and ceilings; provide. Eg-Shell gloss level, except semi-gloss at storage and utility rooms

2. Mechanical and Electrical Items: All exposed duct work, equipment, conduit, etc.

3. Metals: hollow metal doors and frames, railings, fire extinguisher cabinets and miscellaneous unfinished interior and exterior metals, exposed overhead structure and Unistrut suspension system at felt baffles

4. Wood: Paint wood furring strips at wood grille walls panels flat Black. Paint wood doors and frames semi-gloss

C. **All products used for interior field painting shall be "low odor/low emissions" type, premium grade,**

1.02 RELATED SECTIONS

A. Section 09260 - Gypsum Board Systems: Drywall finishing.

1.03 REFERENCES

A. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. ASTM D2016 - Test Method for Moisture Content of Wood.

C. NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.

D. PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.

E. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.

1.04 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this Section.

1.05 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data on all products specified including MSDS sheets..

C. Samples: Submit two samples, 12 x 12 inch in size illustrating selected colors for each color selected. On drywall sample provide surface texture selected by Architect.

D. Manufacturer's Instructions: Indicate special surface preparation procedures, substrate conditions requiring special attention.

1.06 QUALIFICATIONS

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

B. Applicator: Company specializing in performing the work of this section with minimum five years documented experience.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke rating requirements for finishes.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

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

C. Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

D. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.09 ENVIRONMENTAL REQUIREMENTS

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

B. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; unless required otherwise by manufacturer's instructions.

C. Minimum Application Temperature for Varnish Finishes: 65 degrees F , unless required otherwise by manufacturer's instructions.

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

1.10 MOCK-UP

A. Before proceeding with painting, finish one complete space or item of each color scheme required. This shall include selected colors, finished texture, materials, and workmanship. After approval, three (3) sample spaces or items shall serve as a quality control sample for similar work throughout the Project.

1.11 EXTRA MATERIALS

A. Furnish under provisions of Section 01700.

B. Provide 1 gallon of each color and type to Owner.

C. Label each container with color, type, and room locations in addition to the manufacturer's label.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Standard: For purposes of designating type and quality for the work of this section, Drawings and Specifications are based on products manufactured or furnished by **The Sherwin Williams Company** except as noted specifically otherwise.

B. Manufacturers: Products of the following manufacturers having equal quality to those specified herein will be acceptable.

Benjamin Moore.
Devoe Reynolds
The Glidden Company
Fuller O'Brien
PPG Industries

2.02 MATERIALS

A. A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.

1. **NOTE:** All coatings, except alkyd based systems, shall be 100% acrylic and shall be so indicated in the submittal Product Data.

B. Material Compatibility: Provide block fillers, primers, finish coat materials, and related materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by the manufacturer based on testing and field experience.

C. Material Quality: Provide the manufacturer's best-quality trade sale paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.

D. Colors: Provide color selections made by the Architect from the manufacturer's full range of

colors and custom colors where required to match Architect's samples or paint colors from a manufacturer not selected to provide the products.

E. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

F. Patching Materials: Latex filler.

G. Fastener Head Cover Materials: Latex filler.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that substrate conditions are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop applied primer for compatibility with subsequent cover materials.

3.02 PREPARATION

A. Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

B. Correct defects and clean surfaces which affect work of this section.

C. Seal with shellac and seal marks which may bleed through surface finishes.

D. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.

1. Provide texture selected by the Architect.

E. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces with same primer as the shop coat.

F. Ferrous Metals: Clean ungalvanized ferrous metal surfaces that have not been shop-coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council (SSPC).

1. Blast steel surfaces clean as recommended by the paint system manufacturer and according to requirements of SSPC specification SSPC-SP 10.
2. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.

G. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so that the surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet

metal fabricated from coil stock by mechanical methods.

3.03 APPLICATION

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

B. Do not apply finishes to surfaces that are not dry.

C. Apply each coat to uniform finish.

D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

E. Sand metal lightly between coats to achieve required finish.

F. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.

G. Allow applied coat to dry before next coat is applied.

3.04 WORKMANSHIP

A. Coverage and hide shall be complete. When color, stain, dirt, or undercoats show through final coat of paint, the surface shall be covered by additional coats until the paint film is of uniform finish, color, appearance, thickness, and coverage, at no additional cost to the Owner.

B. Give special attention to insure that edges, corners, crevices, welds and rivets receive a film thickness equivalent to that of adjacent painted surfaces.

C. Rate of application shall not exceed average rate of coverage recommended by manufacturer for the type of surface involved less ten (-10%) percent allowance for losses, unless manufacturer’s printed recommended specifications state that the recommended rate included normal expected losses.

D. Minimum dry film thickness per coat shall not be less than thickness recommended by the manufacturer.

E. Surface shall be free of skips in any coat, voids, pinholes, etc.

F. Make edges of paint adjoining other materials or colors sharp and clean, and without overlapping.

G. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks; and free from variations in color, texture, and finish.

3.05 CLEANING

A. Clean work under provisions of 01700.

B. Collect waste material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.06 INTERIOR PAINT SCHEDULE

B. Gypsum Board (Eg-Shell-low luster and semi-gloss):

1. One coat Pro Mar 200 Zero VOC Interior Latex Primer
2. Two coats Pro Mar 200 Zero VOC Interior Latex Eg-Shell Series and semi-gloss series

C. Wood :

1. One coat PrepRite® ProBlock® Latex Primer/Sealer, B51 Series
2. Two coats ProClassic® Waterborne Interior Acrylic

C. Metals

1. One coat ProMar 200 Zero VOC Primer
2. Two coats Pro Industrial Waterbased Alkyd Urethane Semi-Gloss, B53-1150 Series, low odor and less that 50 g/L to meet all VOC requirements
3. Exposed Overhead : below may be used for overhead painting:
   Primer: S-W Pro Industrial Pro-Cryl Universal Acrylic Primer, B66-1300 Series
   2 Coats of Dryfall Finish: S-W Pro Industrial Waterborne Acrylic Dryfall, Flat Finish (B42W181)

3.07 EXTERIOR PAINT SCHEDULE

A. Metals: Exterior ferrous metal shall be given:

1. One coat Pro-Cryl Universal Metal Primer B66-310 Series
2. Two coats Industrial Enamel B54 Series

B. Galvanized Metal: Exterior galvanized metal shall be given:

1. One coat Pro-Cryl Universal Metal Primer B66-310 Series
2. Two coats Industrial Enamel B54 Series

END OF SECTION

WALL COVERING SECTION 09955

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Surface preparation and prime painting.

B. Wallcovering; custom graphics and tackable type with products are indicated on the drawings.

1.02 RELATED SECTIONS

A. Section 09260 - Gypsum Wallboard Systems: Wall substrate.

B. Section 09900 - Painting: Preparation and priming of substrate surfaces.

1.03 REFERENCES

A. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

B. ASTM F793 - Classification of Wallcovering by Durability Characteristics.

C. NFPA 255 - Test of Surface Burning Characteristics of Building Materials.

D. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data on wall covering and adhesive.

C. Samples: Submit one sample of wall covering, 36 inch long by full width illustrating color, finish, and texture.

1.05 QUALIFICATIONS

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

B. Applicator: Company specializing in performing the work of this section with minimum three years documented experience.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke ratings of maximum 25/450 respectively.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Inspect roll materials on site to verify acceptance.

C. Protect packaged adhesive from temperature cycling.

D. Do not store roll goods on end.

1.08 ENVIRONMENTAL REQUIREMENTS

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

B. Maintain conditions 24 hours before, during, and after installation of adhesive wall covering.

C. Provide lighting level of 80 foot candles measured mid-height at substrate surface

1.09 EXTRA MATERIALS

A. Furnish under provisions of Section 01700.

B Provide 5 percent of each type and color of wallcovering in original roll to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Wall Coverings: See drawings

B. Graphic Wallcovering: Graphic type II smooth canvas Low VOC 20 oz./lyd. fabric backed wallcovering, 54” wide print, digitally printed graphics. Class A fire rated and meets NFPA ratings for smoke development and as follows, equal to MDC Studio systems

C. Adhesive: "Premium" release type recommended by wall covering manufacturer to suit application to substrate.

D. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.

E. Substrate Primer and Sealer: White pigmented acrylic / latex base primer specifically formulated for use with vinyl wallcoverings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site conditions under provisions of Section 01039.

B. Verify that substrate surfaces are prime painted and ready to receive work, and conform to requirements of the wall covering manufacturer.

C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply coverings unless moisture content of surfaces are below 12 percent on gypsum board walls.

D. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch/foot,

.

3.02 PREPARATION

A. Fill cracks and smooth irregularities with filler; sand smooth.

B. Wash impervious surfaces with trisodium phosphate, rinse and neutralize; wipe dry.

C. Sand glossy surfaces; seal marks which may bleed with shellac.

D. Remove electrical, telephone, and wall plates and covers.

E. Apply one coat of primer sealer to substrate surfaces. Allow to dry. Lightly sand smooth.

3.03 INSTALLATION

A. Apply adhesive and wall covering in accordance with manufacturer's instructions.

B. Razor trim edges. **One (1) "true" blade per 10 foot cut on textile wall covering. Break off blades are not acceptable.**

C. Apply wall covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface. Butt edges tight.

D. Horizontal seams are not acceptable, except as otherwise indicated.

E. Do not seam within 2 inches of internal corners or within 6 inches of external corners.

F. Install wall covering before installation of bases, cabinets, hardware, or items attached to or spaced slightly from wall surface. Do not install wall covering more than 1/4 inch below top of resilient base.

G. Where wall covering stops at the edge of reveals, apply covering with contact adhesive within 6 inches of wall covering termination. Ensure full contact bond.

H. Remove excess wet adhesive from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.

3.04 CLEANING

A. Clean work under provisions of Section 01700.

B. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.

C. Reinstall wall plates and accessories removed prior to work of this Section.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. Do not permit work at or near finished wall covered areas.

END OF SECTION

TOILET PARTITIONS SECTION 10165

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Overhead braced solid plastic toilet partitions.

B. Stainless steel or solid plastic vandal-resistant brackets and attachment hardware.

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Section 06100 or 09260: Wall reinforcement for concealed in-wall construction.

1.03 RELATED SECTIONS

A. Section 092900 - Gypsum Wallboard Systems: Wall reinforcement for concealed in-wall construction.

B. Section 108000 - Toilet Accessories.

1.04 REFERENCES

A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by the Physically Handicapped.

B. ADA - Accessibility Guidelines for Buildings and Facilities. Federal Register Volume 56, Number 144, Rules and Regulations.

C. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

1.05 SUBMITTALS

A. Submittals under provisions of Section 01300.

B. Submit shop drawings indicating partition layout and dimensions, panel and door sizes, door swings, elevations, anchorage and mounting details, and finishes.

C. Submit two standard samples illustrating panel colors.

D. Submit manufacturer's installation instructions under provisions of Section 01300.

1.06 REGULATORY REQUIREMENTS

A. Conform to ANSI A117.1 and ADA for provisions for the physically handicapped.

1.07 FIELD MEASUREMENTS

A. Verify field measurements are as shown on shop drawings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Approved Manufacturers: Capitol Partitions, Inc., Legacy Polymer Products, Ampco, Comtec Industries, Scranton Products and American Sanitary Partition Corporation.

2.02 MATERIALS

A. Solid Plastic Panel Material: High density solid polymer resin polyethelene (HDPE) formed under high pressure into a single component section which is Class A fire rated, waterproof, nonabsorbant and self lubricating properties to resist marking of pens and pencils and other writing instruments and complying with performance criteria of Fed. Spec. RR-P-10160.

1. Color: As selected by the Architect.

B. Stainless Steel Hardware: 18-8, type 304 stainless steel with satin finish.

1. Chrome plates “Zamac” is not permitted.

2.03 ACCESSORIES

A. Pilaster Shoe: ASTM A167, Type 304 stainless steel, 22 gauge or solid phenolic, 4 inches high with adjustable screw jack.

B. Screws and Bolts: Stainless steel.

C. Mounting brackets shall be 18 gauge stainless steel or continuous solid plastic. U-channels shall be provided for panel to stile mounting. Angle brackets shall be provided for panel to wall mounting.

1. Provide for continuous stainless steel or solid plastic panel-to-pilaster and panel-to-wall connections. At urinal screens brackets shall be continuous stainless steel or solid plastic full length of screen.

D. Through Bolts and Nuts: Stainless steel.

E. Leveling Device: 3/8" x 1" steel bar welded to 11 gauge steel reinforcing core. Leveling device shall be chromate treated and double zinc plate.

2.04 HARDWARE

A. Hinges: 16 gauge stainless steel continuous piano hinge or integral cam action type, adjustable for door close positioning.

1. Out swinging door shall be equipped with self-closing hinge.
2. Continuous piano hinge shall be attached to door and stile by theft-resistant, one-way, stainless steel machine screws into threaded metal inserts.

3. The door hardware shall be through-bolted with stainless steel, one-way, machine screws from inside and outside of compartments. Threaded metal inserts shall be furnished for mounting.
4. Door shall be furnished with two 11 gauge PVC coated door stops to resist door from being kicked out of compartment.
5. Provide above or manufacturer's standard integral hinges with no exposed metal parts, pivots with opposing cams of nylon 6/6 with reinforced stainless steel pin.

B. Latch and Keeper: Thumb turn or sliding door latch, door strike and keeper with rubber bumper; stainless steel or clear anodized cast aluminum.

1. Latch track shall be attached to door by theft resistant one-way stainless steel machine screws into factory installed metal inserts.
2. Metal to metal connection shall withstand a direct pull of over 940 lbs. per screw.

C. Coat Hook: Stainless steel coat hook shall project no more than 1-1/8" from face of door and shall be secured by theft resistant one-way stainless steel screws.

2.05 FABRICATION

A. Fabricate partitions with all edges machined to a radius of .25" and all exposed surfaces free of saw marks.

1. Splices or joints in faces or edges are not permitted.

B. Thickness of Partition Panels, Pilasters and Doors: 1 inch.

C. Doors: 24" wide except 34" wide swing out doors (to provide 32" clear opening) at stalls for use by the handicapped.

D. Fabricate overhead brace of a continuous extruded aluminum tube.

2.06 FINISHES

A. Stainless Steel Surfaces: No. 4 finish.

B. Aluminum: Clear anodized.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that openings are ready to receive work.

B. Verify field measurements are as shown on shop drawings.

C. Verify correct location of built-in framing, anchorage, bracing, and plumbing fixtures.

D. Beginning of installation means installer accepts existing conditions.

3.02 ERECTION

A. Erect in accordance with manufacturer's instructions.

B. Install partition components secure, plumb and level.

C. Attach panel brackets securely to walls and floors using appropriate anchor devices.

D. Attach panels and pilasters to brackets with through bolts and nuts. Locate headrail joints at pilaster center line.

E. Anchor urinal screen panels to walls with continuous stainless steel brackets with flanges for wall attachment.

F. Provide 1/2 inch space between wall surface and panels or pilasters.

G. Provide for adjustment of floor variations with screw jack through steel saddles integral with pilaster. Conceal floor fastenings with pilaster shoes.

H. Equip each toilet stall door with top and bottom hinges, and door latch.

I. Install door strike keeper on each pilaster in alignment with door latch.

J. Equip each toilet stall door with one coat hook and bumper.

3.03 ERECTION TOLERANCES

A. Maximum Variation From Plumb or Level: 1/8 inch .

B. Maximum Misplacement From Intended Position: 1/8 inch

3.04 ADJUSTING

A. Adjust and align door hardware to uniform clearance at vertical edges of doors. Clearance space not to exceed 3/16 inch.

B. Adjust door hinges so that free movement is attained and will locate in-swinging doors in partial open position when unlatched, out-swinging doors shall return to fully closed position.

3.05 CLEANING

A. Clean work under provisions of Section 01700.

B. Remove protective coverings, if any.

C. Clean surfaces and hardware.

3.06 PROTECTION OF FINISHED WORK

A. Protect finished installation under provisions of Section 01500.

B. Field touch-up of finished surfaces will not be permitted. Replace damaged components.

END OF SECTION

SIGNAGE **SECTION 10400**

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Raised panel (ADA compliant) signs for toilet rooms, exits, and signs with changeable message strip at all room identification (name and number indicated on the drawings),at all rooms shown on the drawings, with extent and text/numbers contained in schedule herein.

B. Attachment devices and accessories as required for a complete installation including factory mounted double-sided foam tape and field applied adhesive at interior ADA signs. Contractor shall verify the particular substrates for compatibility.

C. Cast (Dedication) Plaque.

D. Exterior post mounted H.C. parking signs. Factory painted galvanized steel signs as indicated on the drawings.

1.02 REFERENCES

A. ADAAG - Americans with Disabilities Act Accessibility Guidelines.

B. ANSI A117.1 - American National Standard for Buildings and Facilities - Providing Accessible and Usable Buildings and Facilities.

1.03 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's literature for standard components.

C. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, reinforcement, accessories, layout, and installation details.

D. Shop Drawings: Show each sign type, style, colors and method of attachment. For each sign, show type, lettering, location, and dimensions. Show anchors, grounds, reinforcement, accessories, layout, and installation details.

1. Provide message list for each sign required, including large-scale details of wording and layout of lettering.
2. For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for installation of anchor bolts and other anchors to be installed as a unit of Work in other Sections.
3. Furnish full-size rubbings for metal plaques

E. Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.

1. Initial Selection: Manufacturer's color charts consisting of actual selections of material

including the full range of colors available for each material required.

2. Samples: Provide a sample panel not less than 8-1/2 inches by 11 inches for each material indicated. Include a panel for each color, texture, and pattern required. On each panel include a representative sample of the graphic image process required, showing graphic style, and colors and finishes of letters, numbers, and other graphic devices.

3. Cast Plaque and Room Sign: 4" x 4" sample of material

1.04 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with requirements for assuring access for persons with disabilities in accordance with federal and local regulations, including:

3. Americans with Disabilities Act Accessibility Guidelines (ADAAG).
4. ANSI A117.1.

B. Single Source Responsibility: For each separate type of sign required from a single manufacturer.

C. The specifications are basic minimum requirements and if more stringent requirements are needed to comply with ADA, those must be provided.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package signs separately or in like groups of names, labeled as to names enclosed. Include installation template, attachment system, and installation instructions.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not install signs until ambient temperature has reached that recommended by sign manufacturer and will be maintained at that temperature during and after installation of signs.

PART 2 - PRODUCTS

2.01 INTERIOR ADA SIGN TYPES

A. Tactile Letters, Symbols, and Pictograms (ADA Compliant Provisions); based on Interior Unframed Signs – Photopolymer Bonded To Acrylic; Intouch™ with changeable message strip by ASI or equal

1. Material: Photo polymer with a minimum durometer reading of 70 percent in a Shore D configuration, 1/8 inch thick.
2. Raised Letters: Laser or machine-cut precise characters with square cut edges free from irregularities raising 1/32 inch and accompany with corresponding Grade II braille.
3. Apply graphic color to the raised characters using a hot stamp process.
4. Apply a clear protective coating.
5. Comply with ADAAG Section 4.30.4 for raised characters, symbols, and pictograms.
6. Provide font and contrasting colors selected by the architect.

A. Braille: Computer-generated precision embossed Grade 2 Braille conforming to ADAAG Section 4.30.4.

B. Flush Mounting Method: Factory mounted double-sided foam tape, with permanent adhesive silicone adhesive for field application as recommended by sign manufacturer for applicable substrates.

C. Accessories: Manufacturer's standard accessories for types of signs required.

D. Sizes of letters and numbers shall be as follows, unless otherwise indicated on the Drawings.

1. Lettering for restroom identification shall be 1" high, corresponding symbols shall be 3" high.

E. Letters and numbers shall be centered on sign.

F. Grade 2 braille shall be placed directly below last line of letters or numbers.

G. Sign Size: As follows unless otherwise indicated on the Drawings:

1. Restroom signs shall be 6" x 9-3/4".
2. Radius corners: 1/2".

2.02 CAST PLAQUES

A. Fabricate cast metal plaques of the size, shape and thickness shown. Provide units free of pits, scale, and sand holes or other defects, with the required raised letters, numbers, and characters. Hand tool and buff to provide clean, sharp figures with bright finish. Provide background texture and finish as indicated, or if not indicated, as selected by the Architect from manufacturer's standards. Protect the exposed surfaces with 2 coats of clear, non-yellowing lacquer.

1. Bronze: Casting of copper alloy UNS C83600 complying with ASTM B 584.
2. 24”w x 36” h
3. Graphics: Image of the seal of St. Bernard Parish Government and the St. Bernard Parish Library
   Text:
   Name of Project
   Year facility was completed
   Name of the current Parish President
   Name of the Chief Administrative Officer
   Name of the Capital Projects Supervisor
   Names of Parish Council
   Names of Library Board
   Name of the Architects
   Name of the Contractor
   Name of the Program Manager (if applicable)
4. Finishes:
   Background: Painted, color to be selected.
   Borders, letters, and raised artwork: Satin.
   Texture: Leatherette

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site conditions are acceptable and substrates are ready to receive signs.

3.02 PREPARATION

A. Protect adjacent areas during sign installation; take special precautions as necessary to prevent adhesives from coming into contact with finished surfaces.

B. Surface Preparation: Clean surfaces and prepare as recommended by sign manufacturer for proper attachment of signs.

3.03 INSTALLATION

A. Install signs in accordance with manufacturer's recommendations and installation instructions. Install level, plumb, true to line, and with sign surfaces free from distortions and defects.

1. Use factory double-sided tape in addition to field applied adhesive for interior ADA signs.

B. Install signs after surfaces to which they are to be mounted have been completely finished.

C. Install in locations indicated on drawings and in conformance to applicable regulatory requirements.

1. Mount at 60 inches above finish floor in location where a person can approach within 3 inches of sign without entering a door swing area. Generally, signs shall be installed on the wall adjacent to the latch side of the door and 12" from the door frame. If there is no space on the latch side of the door, including double leaf doors, signs shall be placed on the nearest adjacent wall.

D. Cast Metal Plaques: Mount plaques using the standard method recommended by the manufacturer for the type of wall surface indicated.

1. Surface Mounting: Mount with bronze exposed fasteners with bronze rosettes attached through the face of the plaque and secured into the wall substrate.

E. Install exterior plastic signs to match existing.

3.04 CLEANING AND PROTECTION

A. Clean sign surfaces in accordance with manufacturer recommendations.

B. Protect signs from damage until substantial completion.

3.05 INTERIOR SIGN SCHEDULE

A. Signs shall comply with the ADA compliant visual character and physical tactile requirements of ICC/ANSI A117.1 American National Standard for Accessible and Usable Buildings and Facilities.

1. Provide adjacent to each door at the entrance of each toilet room a sign with pictogram and text description including braille corresponding for each gender complying with A117.1.
2. Provide at each exit door to the outside a low level tactile sign with text "EXIT"complying with A117.1
3. Provide sign with name and number for each room, with name and number indicated for each room indicated on the drawings

END OF SECTION

EXTERIOR BUILDING SIGNAGE SECTION 10410

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Laser/water jet cut aluminum plate characters, factory finished individual exterior letters for projected mounting, of text and size herein and indicated on the Drawings

1.02 SUBMITTALS

A. Product Data: Include manufacturer's construction details relative to materials, dimensions of individual components, profiles, and finishes for each type of sign required.

B. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, reinforcement, accessories, layout, and installation details.

1. Provide message list for each sign required, including large-scale details of wording and layout of lettering.
2. For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for installation of anchor bolts and other anchors to be installed as a unit of Work in other Sections.

C. Samples: Provide the samples of each sign component for review of color, pattern and surface texture as required and for verification of compliance with requirements indicated.

1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site.

B. Store and protect products.

PART 2 - PRODUCTS

2.01 FABRICATED LETTERS

A. Laser/water jet cut characters from solid plate of thickness and aluminum. Produce precisely cut characters with square cut, smooth, eased edges. Comply with requirements indicated for finish, style, and size. Fabricate metal letters of materials and thicknesses required, of the size and style indicted on the drawings. Form units with smooth flat faces, sharp corners, true lines and accurate profiles, and free from distortion and warp. Include reinforcing for stability and attachment for mounting accessories.

B, Material: 1/2″ thick aluminum plate

C. Exterior grade polyurethane base color coat/clear coat paint system. 10 year warranty on paint

D. Size: The “St. Bernard Parish” letters are 1′ in height and the “LIBRARY” is 2′-4″ in height.

Font to be selected, unless indicated otherwise on the Drawings

PART 3 - EXECUTION

3.08 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means installer accepts existing surfaces.

3.09 INSTALLATION

A. Install sign units and components located as follows, securely mounted. Attach signs to substrates in accordance with the manufacturer's printed instructions.

B. Letters: Projected mounting held off the face of the building with stainless steel pins.

C. 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 Architect.

D. Clean and polish.

END OF SECTION

LOCKERS **SECTION 10500**

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Plastic wardrobe lockers

1. Triple-tier lockers; three (3) 3 wide, 15″ wide, 6′ high and 18″ deep

B. Bases, trim, and filler panels.

C. Accessories and hardware.

1.02 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's printed data including materials, accessories, construction, finishes, assembly, and installation instructions for lockers and benches.

C. Shop Drawings: Layout and dimensions of lockers. Indicate relationship of adjoining surfaces. Show locker elevations and details, fillers, trim, base, tops, and accessories. Include locker numbering sequence. Indicate installation and anchorage requirements.

D. Samples for Initial Color Selection: Manufacturer's color charts showing a full range of available colors.

E. Samples for Color Verification: Samples showing actual colors prepared on same material to be used for the work.

F. Maintenance Instructions: Instructions for cleaning lockers and for adjusting, repairing and replacing locker doors and latching mechanisms.

1.03 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain locker units and accessories from one manufacturer.

B. Warranty: Manufacturer's standard warranty to repair or replace components of locker products that fail in materials or workmanship within 3 years from date of Substantial Completion

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Protect locker finish and adjacent surfaces from damage.

1.05 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

PART 2 - PRODUCTS

2. 01 MANUFACTURERS

A. Locker Manufacturer: Equal to Salsbury 15-4000 series Heavy Duty Plastic Lockers
.

2. 02 LOCKER MATERIALS

A High Density Polyethylene (HDPE): 30 percent pre-consumer recycled content polyethylene thermoplastic formed under high pressure into solid plastic components.

B. Stainless-Steel Sheet: ASTM A 666, Type 304.

C. Fasteners: Tamper-Resistant Fasteners: Stainless steel torx-head screws.
1. Locker Connectors: No. 10-24 sex bolt.
2. Anchors: Type and size required for secure anchorage.
3. Drilled-in-place Masonry Anchors: Minimum 1/4 by 1-3/4 inch (6 by 44 mm) screws.

2.03CONSTRUCTION

A. Locker Doors: Constructed of high density polyethylene (HDPE) with homogeneous color and a matte finish texture.
1. Door:
a.1/2 inch (12.7 mm) thick HPDE.
b.Holes provided for attaching number plates.
2. Ventilation: Ventilation slots provided in standard pattern. Three 5-3/4 inch (146 mm) louvers top and bottom.

B. Locker Body: Constructed of HDPE. Frames are welded to locker box to provide a secure, rigid assembly.

C. Hinges: Heavy duty full-length piano hinge constructed of 18 gauge stainless steel. Hinge is secured with stainless steel security torx-head screws and powder coated to match locker finish.

2.04LOCKER FABRICATION

A. Fabricate locker box from a single sheet of HDPE solid plastic with corners fused together. Weld frames and shelves to box assembly. Provide all welded construction of locker parts without dovetail slots or metal fasteners. Add welded gussets in single tier full height lockers.

B. Center Dividers: Full-depth, vertical partitions between bottom and shelf; finished to match lockers.

C. Hardware Attachment: All hinges, handles, stainless steel hasps for padlock, hooks, latch bars, and locks attached with tamper-resistant screws.

D. Provide ventilated panels.

E. Continuous Base: Set toe clearance 3 inch (76 mm) from locker front. Notch end caps for ease of installation.

F. Continuous Sloping Tops: Fabricated in lengths indicated, without visible fasteners at splice locations; and finished to match lockers.

G. Filler Panels: Fabricated in unequal leg angle shape; finished to match lockers.

H. Finished End Panels: Fabricated with 1/2 inch (13 mm) wide edge dimension, configured to conceal fasteners and holes at exposed ends of plastic lockers.

I. Three single wall hooks.

2. 05 LOCKER ACCESSORIES

A. Locking: Fabricate lockers to receive the following locking devices:

1. Padlock: Fabricated to receive padlock with padlock being provided by Owner.

B. Number Plates: Manufacturer's standard etched, embossed, or stamped, non-ferrous metal number plates with numerals not less than 3/8" high. Number lockers in sequence as directed by Architect. Attach plates to each locker door, near top, centered, with at least two (2) fasteners of same finish as number plate.

C. Continuous Metal Base: Minimum 20 gage cold-rolled steel, fabricated in lengths as long as practicable to enclose base of lockers without additional fastening devices. Flange bottoms inward 3/4" for stiffening. Factory-finish metal base to match lockers.

.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that prepared bases are in correct position and configuration.

B. Verify bases and embedded anchors are properly sized.

3.02 INSTALLATION

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

B. Install lockers plumb and square.

C. Place and secure on prepared base.

D. Secure lockers with anchor devices minimum 48" o.c. to suit substrate materials with minimum pullout force of 100 lbs.

E. Bolt adjoining locker units together to provide rigid installation.

F. Install end panels, filler panels, trim, and bases as shown.

G. Install accessories.

3.03 ADJUSTING AND CLEANING

A. Clean work under provisions of 01700.

B. Clean locker interiors and exterior surfaces.

C. Adjust doors and latches to operate easily without binding. Verify that integral locking devices are operating properly.

D. Touch-up marred finishes, but replace units which cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION

FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES SECTION 10522

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers. ABC rated at all locations with cabinets, except wall bracket mounted CO2 unit at mechanical rooms, and bracket mounted 5 lb. capacity Halon unit at the IT Data room.

B. Fully recessed steel cabinets, solid door with graphics applied.

C. Accessories.

D. Provide initial inspection tag for each extinguisher with date not being earlier than the date of substantial completion

1.02 RELATED SECTIONS

A. Section 09260 - Gypsum Board Systems: Roughed-in wall openings.

B. Section 09900 - Painting: Field paint finish of doors.

1.03 REFERENCES

A. ANSI/NFPA 10 - Portable Fire Extinguishers.

B. ANSI/UL 92 - Fire Extinguisher and Booster Hose.

C. ANSI/UL 711 - Rating and Fire Testing of Fire Extinguishers.

D. UL 299 - Dry Chemical Fire Extinguishers.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, wall bracket mounted measurements and location.

C. Product Data: Provide extinguisher operational features, color and finish and anchorage details.

D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01700.

B. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.06 QUALITY ASSURANCE

A. Provide units conforming with ANSI/UL 711 or ANSI/UL 92

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for requirements for extinguishers.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. 0-2409 Occult Series by Larsen's Manufacturing Co. and 5614 Embassy Series by J. L. Industries

2.02 EXTINGUISHERS

A. Multi-Purpose Dry Chemical Type: UL 299, Cast steel tank, with pressure gage; U.L. rating 2A-10B:C, 5 lb. capacity for Class A, B and C fires. These units shall contain specially fluidized and siliconized mono ammonium phosphate powder which smothers and breaks the chain reaction on Class B fires, fuses and insulates Class A fires, and as a non-conductor of electricity, is effective on Class C fires.

1. Halon System: Halotron I EPA approved clean agent which discharges as a rapidly evaporating liquid, leaving no residue, effectively extinguishing Class A, B and C fires equal to Halotron I by Larsens

2.03 CABINETS

A. Metal: Formed sheet steel, primed; 18 gage thick base metal.

A. Configuration: Cabinet box fully recessed in walls for trimless appearance with concealed hinges for 180° opening.

B. Door: 18 gage thick, reinforced for flatness and rigidity, 3/4" thick, solid face.

C. Cabinet Mounting Hardware: Appropriate to cabinet.

2.04 ACCESSORIES

A. Extinguisher Brackets: Prefinished steel, white enamel finish.

B. Cabinet Signage: Die-cut letters

2.05 FABRICATION

A. Form cabinet enclosure with right angle inside corners and seams with 3/4" flanges flush with wall.

B. Hinge doors for 180 degree opening with concealed or continuous piano hinge. Provide nylon roller type catch. Door shall have handle and shall completely cover cabinet and flanges when in closed position.

C. Weld, fill, and grind exposed components smooth.

D. Pre-drill for anchors.

2.06 FINISHES

A. Extinguisher: Steel, enamel to red color.

B. Cabinet Exterior Trim and Door: Steel, factory prime painted on all exposed surfaces.

C. Cabinet Interior: White enamel.

D. Lettering: Die cut Black lettering "Fire Extinguisher" for vertical application

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's printed instructions. Each cabinet shall have a fire extinguisher as specified.

1. Location: As indicated on the Drawings and if not indicated, provide units and install at location directed by the Architect as required by NFPA 10.
2. Mount extinguishers less than 40 lbs. at 5 feet above floor and units more than 40 lbs. shall be mounted at 3-1/2 feet above the floor.

B. Install cabinets plumb and level in wall openings. Secure rigidly in place

C. Place extinguishers and accessories in cabinets.

END OF SECTION

METAL CANOPIES SECTION 10530

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Extent of the protective covers required is shown on the drawings and includes roll-formed aluminum overhead hanger rod style canopies for thru-bolt and compression sleeves, fascia, and concealed drainage system.

1.02 MEASUREMENTS:

A. Verify all dimensions shown on drawings by taking field measurements to insure proper fit and attachment of all component parts.

1.03 SUBMITTALS:

A. Provide manufacturer's shop drawings, including fabrication and installation details. Also, submit all relevant product data on materials and finishes.

1.04 COORDINATION:

A. Provide necessary anchors, block outs, flashing and other items required to be built-in in ample time to avoid delays to the job.

1.05 DELIVERY AND STORAGE:

A. Deliver and store all items in protected areas. Keep free of any damage. Replace any damaged items or parts at no cost to the Owner.

1.06 DESIGN PARAMETERS:

A. Structural: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as required by and calculated in accordance with the international Building Code 2015 and any local supplements, and ASCE 7-05, measured in accordance with ANSI/ASTM E330 and when tested in accordance with ANSI/ASTM E330 based on wind speed indicayed on S-series drawingsand corners as defined in Code

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER:

A. Specifications are based on the following products as a quality standard: “Super Lumideck Hanger Rod” overhead hanger type canopies manufactured by Mapes Industries or equal by Rusco and -CEAS+, a division of PorterCorp.

2.02 PRODUCTS AND MATERIALS:

A. Decking: Decking panels shall be extruded aluminum. The extruded aluminum deck shall have clear anodized finish. Decking at canopies shall be interlocking roll formed flat soffit.

B. Fascia: Full perimeter extruded aluminum fascia. Fascia with gutter shall be clear anodized finish.

D. Hanger rods with threaded rod adjustment in bell reducer and attachment hardware shall be galvanized/zinc plated.

E. All connections shall be mechanically assembled with galvanized compnents utilizing 1/2" closed eye galvanized thru bolts with sleeves, washers and nuts with a minimum shear stress of 350 lbs. Welded connections are not acceptable.

PART 3 - ERECTION:

3.01 INSTALLATION:

A. Canopies shall be installed according to approved plans and shop drawings and the entire structure shall be erected straight, true and plumb in accordance with standard construction procedures. All joints and connections will be tight and clean and all surfaces of work left in a clean condition.

END OF SECTION

VERTICAL LIFT OPERABLE PARTITIONS SECTION 10650

PART 1 - GENERAL

1.01 DESCRIPTION

A. General
   1. Furnish and install retractable vertical lift partitions that stack above the ceiling and suspension system complete for a 51 acoustical rating, complete with wall switch motion controls with key access for security. Provide all labor, materials, tools, equipment, and services for operable walls in accordance with provisions of contract documents.
   2. Factory applied fabric indicated as WC-3 in the Finish Legend on the drawings.

1.02 RELATED WORK BY OTHERS

A. Preparation of opening will be by General Contractor. Any deviation of site conditions contrary to approved shop drawings must be called to the attention of the architect.
B. All header, blocking, support structures, jambs, enclosures, surrounding insulation, and sound baffles as required in Quality Assurance.
C. Prepunching of support structure in accordance with approved shop drawings.
D. Paint or otherwise finishing all trim and other materials adjoining head and jamb of operable partitions.

1.03 SUBMITTALS

A. Complete shop drawings are to be provided prior to fabrication indicating construction and installation details. Shop drawings must be submitted within 60 days after receipt of signed contract.

1.04 QUALITY ASSURANCE

A. Preparation of the opening shall conform to the criteria set forth per ASTM E557 Standard Practice for Architectural Application and Installation of Operable Partitions
B. The partition STC (Sound Transmission Classification) shall be achieved per the standard test methods ASTM E90.
C. Noise isolation classifications shall be achieved per the standard test methods ASTM E336 and ASTM E413.
D. Noise Reduction Coefficient (NRC) ratings shall be per ASTM C423.
E. Rack testing for 10 years. (tensional strength stress test)
F. The manufacturer shall have a quality system that is registered to the ISO 9001 standards.
G. Operable partition shall withstand the effects of earthquake motions determined according to SEI/ASCI. Withstand means, “the panels will remain in place without separation of any parts from the system when subjected to the seismic forces specified”.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Proper storage of partitions before installation and continued protection during and after installation will be the responsibility of the General Contractor.

1.06 WARRANTY

A. Partition system shall be guaranteed for a period of two years against defects in material and workmanship, excluding abuse.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Basis of Design: "Summit® Series 645V" electrically operated, vertical lift panels as manufactured by Hufcor Inc. or equal by Skyfold with any modifications to the supports indicated on the drawings being the responsibility of the Contractor.

2.02 MATERIALS

A. Product to be electrically operated, vertical lift panels with interlocking panel edges and track seals as follows
    1. Intermediate panels shall be nominally 4" thick and to 30" in height. Lead panel to be nominal 27", 30" or 33" in height as required to fit opening.
    2. Panel faces shall be steel laminated to appropriate substrate to meet the STC requirement in Acoustical Performance.
    3. Frames shall be of min. 16 gauge painted steel.
    4. Sound seals shall be of tongue and groove configuration, ensure panel-to-panel alignment and prevent sound leaks between panels.
    5. Horizontal panel edges shall be of a minimum groove appearance.
    6. The first panel in the opening shall have a bottom retractable safety sensor seal providing a minimum of 2" floor adjustability to accommodate out-of-level floors.
    7. Motor and drive shall automatically extend/retract the panels into the opening.
    8. Guide rails shall be nominally 6" wide and 6" deep and shall be architectural grade precision extruded aluminum to provide stability and constant acoustical contact with partition panels during operation.
        a. Guide rails shall be adjustable up to 1/4" to compensate for out-of-plumb walls.
        b. Guide rails to provide constant power to safety limit switches
    9. Each panel shall have two guide rollers that are sealed hardened ball bearing steel for smooth operation. Each guide roller should provide adjustments to ensure panels can compensate for building movements over time. Each guide roller must contain a minimum 1" dia. carrier bolt to withstand panel load.
B. Weight of the panels shall be 10.9 lbs. per sq. ft., not including the lifting equipment.
C. Suspension system
    1. Drive Box
        a. Panels shall stack on steel drive box and be lowered into opening via gravity feed operation.
        b. Each panel shall be laterally supported by two hardened ball bearing steel pick up rollers.
        c. System must contain drive box stack made from hardened steel and capable of supporting the weight of all panels in the stacked position.
    2. Power unit and controls shall be UL listed.
    3. Motor shall be 60 Hz and 200-240 volt single phase for 2 HP motor

4. Drive system shall include drive shafts, couplers, torque limiter, key pressure actuation control station wired in series, dual drive emergency operation and all necessary equipment for electric operation.
5. Operation chain drive shall attach to dual direction lead panel.

D. Safety Requirements:
1. System shall have primary and secondary safety systems in the event a single safety system would fail.
2. System must contain a certified load arrestor to stop a free fall occurrence. Motor brakes that simply reduce the downward fall speed are unacceptable.
3. System must contain an entrapment backup system on the lead edge of the panel that automatically reverses downward movement when lead edge makes contact with an obstruction within the path of the system.
4. System must contain certified Type B2 safety monitoring relay switches that can sense any failures between each limit switch and the control box as the partition is operated during every cycle. The safety monitor switches must automatically shut off power to the motor drives if a failure occurs.
5. System must contain a constant contact finger switch as the lead panel operates within the guide rail and immediately shut off the motor drive power in the event of a free fall detection or an obstruction on the lead edge.
6. Single key station with continuous pressure actuation
7. Non-contact optical beams must be installed to detect objects that may inadvertently move under the partition during operation.

E. Finishes

:

1. Finishes shall be applied IN A HORIZONTAL DIRECTION. The finishes provided on most selectors or samples are shown in a vertical position and may look different when applied horizontally.
   a. Face finish shall be factory applied fabric indicated as WC-3 in the Finish Legend on the drawings.
2. Exposed metal trim and seal color shall be selected from manufacturers Standard Trim selector

2.03 OPERATION

A. Partition shall be key switch controlled, requiring constant contact to activate the motor.
B. Motor drive shall automatically seal the partition in the opening.
C. The panels shall open and close at a constant nominal speed of approximately 5 to 10 vertical feet per minute.
D. Stack/Store Panels
1. Panels are retracted above the ceiling and stored by activating the key-switch control.
E. Extend Partition
When the operable wall is being lowered (closed), the panels shall stop and retract if the leading (bottom) edge comes in contact with any object between it and the floor. The operation of the wall may resume once the key switch has been reset and the obstruction cleared.

2.04 ACOUSTICAL PERFORMANCE

A. The partition has been tested at a laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) and in accordance with ASTM E90 Test Standards and has obtained a minimum STC rating of 51.

PART 3 – EXECUTION

A. Installation. The complete installation of the operable wall system shall be by a certified factory-trained installer and be in strict accordance with the approved shop drawings and manufacturer's standard printed specifications, instructions, and recommendations.

B. Cleaning
   1. All panel surfaces and system components shall be wiped clean and be free of handprints, grease, and soil.
   2. Cartoning and other installation debris shall be removed to onsite waste collection area, provided by others.

C. Training
   1. Installer shall demonstrate proper operation and maintenance procedures to Owner's representative.
   2. Operating keys and Owner's manuals shall be provided to Owner's representative.

END OF SECTION

TOILET ACCESSORIES SECTION 10800

PART 1 - GENERAL

1. 01 SECTION INCLUDES

A. Toilet accessories.

B. Attachment hardware.

1. 02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Section 06100 - Carpentry or 09260 Gypsum Board Systems: Installation of concealed anchor devices and backing plate reinforcement.

1. 03 RELATED SECTIONS

A. Section 09260 Gypsum Board Systems: In wall framing and plates for support of accessories.

B. Section 08800 - Glazing: Frameless wall mirrors.

C. Section 10165 - Toilet Compartments: Toilet compartments.

1. 04 REFERENCES

A. ADA - American with Disabilities Act of 1990, Title III (Accessibility Regulations for Private Entities) and latest amendments (if any).

B. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible To and Usable by Physically Handicapped People.

C. ANSI/ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strips.

D. ANSI/ASTM A366 - Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.

E. ANSI/ASTM B456 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

F. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

G. ASTM A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

1. 05 SUBMITTALS

A. Submit product data under provisions of Section 01300.

B. Provide product data on accessories describing size, finish, details of function, attachment methods. Include schedule showing proposed model numbers and mounting heights.

1. 06 KEYING

A. Supply two keys for each accessory to Owner.

B. Master key all accessories.

1. 07 REGULATORY REQUIREMENTS

A. Conform to applicable code for installing work in conformance with ANSI A117.1.

B. Comply with requirements of the American with Disabilities Act of 1990, Title III (Accessibility Regulations for Private Entities) and latest amendments (if any).

1. 08 SEQUENCING AND SCHEDULING

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

PART 2 - PRODUCTS

2. 01 MANUFACTURERS

A. The Drawings and Specifications are based on products manufactured by Bobrick Washroom Equipment, Inc., unless otherwise indicated in the Accessory Schedule, to establish standards of quality and design. The following manufacturers are acceptable to provide products equal to those specified:

1. Bradley Corporation
2. The Charles Parker Company
3. American Specialties, Inc.
4. American Dispenser Company

2. 02 MATERIALS

A. Sheet Steel: ANSI/ASTM A366.

B. Stainless Steel Sheet: ASTM A167, Type 304.

C. Tubing: ASTM A269, stainless steel.

D. Fasteners, Screws, and Bolts: Hot dip galvanized.

E. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2. 03 FABRICATION

A. Weld and grind smooth joints of fabricated components.

B. Form exposed surfaces from single sheet of stock, free of joints.

C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

D. Back paint components where contact is made with building finishes to prevent electrolysis.

E. Shop assemble components and package complete with anchors and fittings.

F. Provide stainless steel anchor plates, adapters, and anchor components for installation.

G. Hot dip galvanize exposed, painted ferrous metal and fastening devices.

H. Comply with fabrication standards indicated by the established quality standard with attention brought to the following requirements:

1. Grab Bars: Minimum 13 gauge stainless steel tenon plates, bar return of 90 degrees, shot and concealed mounting to withstand loads specified herein and required by ADA.
   a. Provide 16 gauge stainless steel back plate anchor at toilet partitions.
2. Pulls: Stainless steel pulls; applied plastic pulls are not acceptable.
3. Waste Receptacles: Removable from frame and all edges hemmed, full backs of stainless steel.
4. Towel Dispensers: All exposed edges hemmed, full backs of stainless steel.
5. Trim Flanges: One-piece seamless construction without mitered corners.
6. Hinges: Stainless steel full length piano hinges at all doors and lids.

2. 04 GRAB BARS PERFORMANCE REQUIREMENTS

A. Size and Spacing of Grab Bars: The diameter or width of the gripping surfaces of a grab bar shall be 1-1/4 inch to 1-1/2 inch or the shape shall provide an equivalent gripping surface. If grab bars are mounted adjacent to a wall, the space between the wall and the grab bar shall be 1-1/2 inch.

B. Structural Strength: The structural strength of grab bars, fasteners, and mounting devices shall meet the following specifications:

1. Bending stress in a grab bar induced by the maximum bending moment from the application of 250 lbf shall be less than the allowable stress for the material of the grab bar.
2. Shear stress induced in a grab bar by the application of 250 lbf shall be less than the allowable shear stress for the material of the grab bar. If the connection between the grab bar and its mounting bracket or other support is considered to be fully restrained, then direct and torsional shear stresses shall be totaled for the combined shear stress, which shall not exceed the allowable shear stress.
3. Shear force induced in a fastener or mounting device from the application of 250 lbf shall be less than the allowable lateral load of either the fastener or mounting device or the supporting structure, whichever is the smaller allowable load.
4. Tensile force induced in a fastener by a direct tension force of 250 lbf plus the maximum moment from the application of 250 lbf shall be less than the allowable withdrawal load between the fastener and the supporting structure.
5. Grab bars shall not rotate within their fittings.

2. 05 FACTORY FINISHING

A. Galvanizing: ANSI/ASTM A123 to 1.25 oz/sq yd.

B. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

C. Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats electrostatic baked enamel.

D. Chrome/Nickel Plating: ANSI/ASTM B456, Type SC 2 satin finish.

E. Stainless Steel: No. 4 satin luster finish.

PART 3 - EXECUTION

3. 01 EXAMINATION

A. Verify that site conditions are ready to receive work and dimensions are as indicated on shop drawings or as instructed by the manufacturer.

B. Beginning of installation means acceptance of existing conditions.

3. 02 PREPARATION

A. Deliver inserts and rough-in frames to site at appropriate time for building-in.

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

C. Verify exact location of accessories for installation.

3. 03 INSTALLATION

A. Install fixtures, accessories and items in accordance with manufacturers' printed instructions.

B. Install plumb and level, securely and rigidly anchored to substrate with concealed fastening system.

C. Install concealed mounting devices and fasteners fabricated of the same material as the accessories.

D. Install exposed mounting devices and fasteners finished to match the accessories.

E. Provide theft-resistant fasteners for all accessory mountings.

F. Secure toilet room accessories in accordance with the manufacturer's instructions for each item and each type of substrate construction.

1. Where no mounting height is indicated on the Drawings, install accessories at heights recommended by the manufacturers to comply with ADA requirements which shall be verified with the Architect.

3. 04 CLEANING

A. Remove soil, stain, and extraneous materials caused by accessory installation.

B. Remove and replace items and materials that cannot be satisfactorily cleaned.

3. 05 SCHEDULE

A. Refer to Schedule on Drawings.

END OF SECTION

LIBRARY EQUIPMENT SECTION 11050

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Book depository units (double drop for Books and Media).

1.02 SUBMITTALS

A. Product Data: For each type of library equipment specified, including details of the construction-relative materials, dimensions, profiles, component parts, accessories and finishes.

B. Shop Drawings: From manufacturer for each type of library equipment assembly, indicating layout, details, individual unit dimensions, required clearances, component parts, method of field assembly, and anchorage to surrounding construction.

C. Samples: 6 inch by 6 inch samples of each exposed finish required.

PART 2 - PRODUCTS

2.01 BOOLK RETURNS

A. Model “HCU Double Drop for Books and Media” by American Book Returns or equal

1. Stainless Steel Head is 33.75" x 14" tall and has a weatherized rainshield and one-hand liftplates to stop energy loss.
2. Book Chute Opening is 13.5" x 4.5" tall.
3. Media Chute Opening is 10" x 4.5" tall.
4. (7) threaded studs are welded on back to fasten securely to delivery chute flange.
5. Delivery Chute is powder coated steel and secured with lags driven through pre-drilled holes on each side of the chute. A hinged, weatherized baffle is installed near the base of each chute to prevent phishing and stop energy loss.
6. Signs: (3) Black signs: "LIBRARY RETURN", "BOOKS" and "MEDIA"

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PART 3 - EXECUTION

3.03 INSTALLATION

A. Install book depository unit in wall construction at location indicated, complying with manufacturer's recommended procedures and approved shop drawings. Set units plumb and level; use noncorrosive metal shims as required.

3.024 ADJUST AND CLEAN

A. Adjust units after installation to ensure that units are level and that moving parts operate freely and in manner intended. Clean exposed surfaces and touch-up or replace damaged marred finishes.

END OF SECTION

PROJECTION SCREENS SECTION 11130

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Electrically operated, remote controlled units, recessed ceiling mounted units (94").

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Electrical wiring, connections, and installation of remote control switches for electrically operated projection screens are included in Division 16.

1.03 SUBMITTALS

A. Product Data and Shop Drawings: Submit manufacturer's technical data and installation instructions for each type of specialty required.

B. Samples: Submit two (2) samples of each color and finish of exposed materials and accessories required. Architect's review of samples will be for color and texture only.

1.04 FIELD MEASUREMENTS AND COORDINATION

A. Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting of the work. Coordinate items to be built-in other work specified in other Sections.

PART 2 - PRODUCTS

2.01 PROJECTION SCREEN SURFACES, GENERAL

A. Measurement of Gain of Screen Viewing Surface: Measure gain of screen viewing surface against that of a magnesium carbonate surface by means of a photogoniometer using test methods and test apparatus per FS GG-S-00172D(1) for determining effect of reflected light at various viewing angles on screen surfaces. Ratings of 1.0 refer to those viewing surfaces having a reflectivity equal to the magnesium carbonate surface.

B. Material and Viewing Surface of Front Projection Screens: Obtain screens manufactured from mildew and flame-resistant fabric of type indicated for each type of screen specified and complying with the following requirements:

1. Matte white viewing surface with minimum gain characteristics complying with FS GG-S-00172D(1) for Type A screen surface.
2. Seamless Construction: Provide screens in sizes indicated without seams.
3. Mildew Resistance: Provide mildew-resistant screen fabrics as determined by Federal Standard 191A/5760.
4. Fire Performance Characteristics: Provide projection screen fabrics identical to those materials that have undergone testing and passed requirements for flame resistance as indicated below as standard with manufacturer.

a. NFPA 701 per small-scale test.
b. Federal Standard 191A/5903 for test method. FS GG-S-00172D(1) for flame resistance.

2.02 ELECTRICALLY OPERATED, AUTOMATIC RECESS CLOSURE SCREENS

A. Provide screen units completely housed in a metal-lined wood case, listed by UL and bearing re-examination markers of UL. Mount top of screen fabric to metal roller, with roller supported on brackets with self-aligning bearings and mounted on vibration and noise absorbing supports.

B. Case: Metal- motor compartment, with hinged or removable access panel to motor compartment, electrical outlet box and finished with manufacturer's standard prime coat. Equip case with continuous hinged bottom (2 panels) connected to drive mechanism for automatic opening and closing with raising and lowering of screen surface. Mount hinges to allow alignment of bottom panel to adjacent ceiling surface, as indicated. Top of case shall have rods for connecting to overhead structure.

1. Case dimensions are 5-11/16” high x 6-7/16” deep (14 cm x 16 cm), includes trim flange.
2. Bottom closure panel detachable or hangs in place with “T” bracket to provide accessibility for service or maintenance.

C. Motor Unit: Size and capacity recommended by the screen manufacturer. Use instant reversing, gear drive motor with permanently lubricated ball bearings, automatic thermal overload protection, and present limit switches to automatically stop screen in "up" and "down" position. Provide a 3-button remote control switch ("up", "down", and "stop") in a box with cover plate for flush wall-mounting. Stop action to be positive to prevent coasting.

D. RF welded tabs eliminate stickiness and tab separation. Tabs warranted against separation for five years.

E. Screen Fabric: Manufacturer's standard, flame and mildew-resistant, non-gloss, mat white; image area fully framed with black. With 12" (30 cm) black drop at top of viewing area.

F. Manufacturer: “Access FIT V 94” “ by Draper Shade and Screen Co. or equal by Da-Lite Screen Co.

PART 3 - EXECUTION

3.05 JOB CONDITIONING

A. Examination of substrates: The Installer must examine the substrate and the conditions under which the work is to be performed, 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.

3.06 INSTALLATION

A. Comply with manufacturer's printed instructions for the particular conditions of installation in each case. If printed instructions are not available, consult the manufacturer's technical representative for specific recommendations before proceeding with the work.

B. Install level, plumb, and at proper height. Cooperate with other trades for installation to adjacent finish surfaces. Repair or replace damaged units as directed by Architect.

C. Hang ceiling mounted screen unit plumb and rigid; coordinate with finish ceiling alignment.

D. Connect to electrical wiring for fully operational unit; install remote control unit on wall where indicated and if not indicated, as directed by the Architect.

E. Clean screens as recommended by the manufacturer.

END OF SECTION

WINDOW SHADES SECTION 12550

PART 1 GENERAL

1.1 SECTION INCLUDES

A. New manual double-roller room-darkening shades (Black out and sun shade) at Meeting Room 109 and Computer Lab 141, and single roller sun shades at the Study rooms (134, 135, 136 & 137) as indicated on the drawings; narrow style housing assembly with factory finished concealed fastener extruded aluminum fascia.

B. Provide between mullions installation as indicated on the drawings.

1.2 REFERENCES

ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
NFPA 70 - National Electrical Code.
NFPA 701-99 - Fire Tests for Flame-Resistant Textiles and Films.

1.3 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
3. Storage and handling requirements and recommendations.
4. Mounting details and installation methods.
1.

C. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, and relationship to adjacent work.
1. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.

D. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shadecloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.

F. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.

B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

C. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

D. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

F. Mock-Up: Provide a mock-up (manual shades and fixed blackout shades) of one roller shade assembly for evaluation of mounting, appearance and accessories.
1. Locate mock-up in window designated by Architect.
2. Do not proceed with remaining work until, mock-up is accepted by Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7 WARRANTY

A. Roller Shade Hardware Warranty: Manufacturer's standard non-depreciating twenty-five year limited warranty.

B. Standard Shadecloth: Manufacturer's standard twenty-five year warranty.

C. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Equal to narrow configuration by MechoShade Systems, Inc.; 42-03 35th Street, Long Island City, NY 11101. ASD. Tel: (718) 729-2020. Fax: (718) 729-2941. Email: info@mechoshade.com, www.mechoshade.com.or equal by Draper

2.2 SHADE CLOTH

A. Single-Fabric Shadecloth: Shadecloth shall meet requirements of Fed. Spec. CCC-C-521 E for fire retardancy, NFPA-701 Small-Scale and/or NFPA-701 Large-Scale requirements. Anti-microbial without topical treatment. NY State Fire-Gas Toxicity Text: LC50 22.5 g. ASTM E-84-90: Flame Spread 17, Smoke Density Index 118 Shadecloth seconds or shadecloth manufactured using reprocessed materials are not acceptable; composed of 100% thermoplastic olefin (TPO)

1. Fabric: Extra Dense Twill Weave; 0.010 diameter (0.254 mm), Opaque, non-raveling vinyl/polyester yarn, fabric thickness 0.025 inches (0.635 mm).
2. Fabric certifications: Fire classifications: NFPA 701-10 TM#1, California U.S. Title 19, ASTM G21 Fungal Resistance and ASTM E2180 Bacteria Resistance rated
3. Openness Factor: 3%
4. Color: As selected by the Architect

B. Room Darkening Shadecloth (Single-Fabric): blackout material, washable and colorfast laminated and embossed vinyl coated fabric, 0.012 inches thick (0.30 mm) blackout material and weighing 0.81 lbs. per square yard, with a minimum of 62 threads per square inch in colors selected from manufacturer's available range, 73% acrylic (coating), 27% polyester (yarn. NFPA 701-2004: pass

1. Openness Factor: 0%
2. Color: charcoal

2.3 SHADE BAND

A. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.

1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.
2. Shade band and Shade Roller Attachment:
   a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less than 1.55 inch (39.37 mm) in diameter for manual shades, and less than 2.55 inches (64.77 mm) for motorize shades are not acceptable.
   b. Provide for positive mechanical engagement with drive / brake mechanism.

c. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.
d. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
e. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets are not acceptable.

2.4 SHADE FABRICATION

A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.

B. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design. Fabricate hem as follows:
1. Bottom concealed hem weights.

C. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.

D. Blackout shadebands, when used in side channels, shall have horizontally mounted, roll-formed stainless steel or tempered-steel battens not more than 3 feet (115 mm) on center extending fully into the side channels. Battens shall be concealed in a integrally-colored fabric to match the inside and outside colors of the shadeband, in accordance with manufacturer's published standards for spacing and requirements.
1. Battens shall be roll formed of stainless steel or tempered steel and concave to match the contour of the roller tube.
2. Batten pockets shall be self-colored fabric front and back RF welded into the shadecloth. A self-color opaque liner shall be provided front and back to eliminate any see through of the batten pocket that shall not exceed 1-1/2 inches (38.1 mm) high and be totally opaque. A see-through moiré effect, which occurs with multiple layers of transparent fabrics, shall not be acceptable

2.5 COMPONENTS

A. Access and Material Requirements:
1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.

3. Use only Delrin engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester will not be acceptable.

B. Manual Operated Chain Drive Hardware and Brackets:
   1. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
   2. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
   3. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
   4. Provide shade hardware system that allows for operation of multiple shade bands (multi-banded shades) by a single chain operator, subject to manufacturer's design criteria. Connectors shall be offset to assure alignment from the first to the last shade band.
   5. Provide shade hardware system that allows multi-banded manually operated shades to be capable of smooth operation when the axis is offset a maximum of 6 degrees on each side of the plane perpendicular to the radial line of the curve, for a 12 degrees total offset.
   6. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable
   7. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
   8. Drive Bracket / Brake Assembly:
      a. Drive Bracket model M5 shall be fully integrated with all MechoShade accessories, including, but not limited to: SnapLoc fascia, room darkening side / sill channels, center supports and connectors for multi-banded shades.
      b. M5 drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.
      c. The brake shall be an over -running clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.
      d. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
      e. The entire M5 assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.
      f. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.

2.6 ACCESSORIES

A. Roller Shade fascia as indicated on the Drawings
   1. Provide extruded aluminum shade fascia, sized to accommodate roller shades, with exposed extruded aluminum closure mount.
   2. Color: to be selected to match glazed frames

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

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

3.3 INSTALLATION

A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow proper clearances for window operation hardware.

B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

C. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

D. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.4 PROTECTION

A. Protect installed products until completion of project.

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

END OF SECTION

ENTRANCE MATS SECTION 12670

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Set-in frames to receive removable recessed mats as indicated on the Drawings. Frame shall be extruded aluminum with carpet abrasive treads and extruded rubber fillers with non-slip surface at perimeter.

1.02 QUALITY ASSURANCE

A. Manufacturer: Except as otherwise indicated, furnish entrance mats and accessories by a single manufacturer for entire project.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions for each type of entrance mat. Include methods of installation for each type of substrate.

B. Samples: Submit samples for each type and color of exposed entrance mat, frames and accessories required. Provide 12" square samples of mat materials and 12" lengths of frame members.

C. Shop Drawings: Submit shop drawings for entrance mats. Include full scale sections of typical installations. Show details of patterns or designs, anchors, and accessories.

D. Maintenance Data: Submit manufacturer's printed instructions for cleaning drying, maintaining and rehandling of removable entrance mat units.

1.04 SEQUENCING/SCHEDULING

A. General: Except as otherwise indicated herein, sequencing or scheduling for performance of work of this section in relation with other work is Contractor's option.

B. Protection: Upon completion of frame installations and finish flooring work, provide temporary filler of plywood or fiberboard in mat recesses, and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and project is near time of substantial completion.

C. Delay installation of mats, foot grilles and other finish flooring units until near time of substantial completion for project.

PART 2 - PRODUCTS

2.01 RECESSED MATS

A. General: Equal to “PediTred” by Construction Specialties and Activ-Grate 600 Series-Roll Up Entrance Grate by JL Industries**;** shall be extruded 6105-T5 aluminum alloy with 3/4" deep tread rails joined by an EPDM hinge and cushion to compromise the overall grid

length (traffic direction). The hinge shall be complete with perforations between each tread rail for drainage, unless otherwise specified. Rail finish to be selected by Architect. Unit must withstand 1000 lb. wheel loads (load applied to a 5" x 2" wide polyurethane wheel, 1000 passes without damage)

B. Shop fabricate units of entrance mat work to greatest extent possible, in sizes as indicated. Where not otherwise indicated, provide single unit for each mat installation, but do not exceed manufacturer's maximum size recommendation for units intended for removal and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements, with hairline joints, or provide prefabricated corner units without joints. Where possible, verify sizes by field measurement prior to shop fabrication.

C. Entrance Mat Frames: Provide manufacturer's standard design of size and style to suit the mat type and adjacent finish floor or wall construction, for permanent recessed installation in subfloor; complete with corner pins or reinforcing, and installation anchorages.

1. Coat surface of frame which will contact cementitious material with zinc chromate paint or manufacturer's standard protective coating.
2. Provide frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced, and with pieces spliced together by means of straight connecting pins.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install recessed frames and entrance mat to comply with manufacturer's instructions, at locations indicated and with top of frames and mats in proper relationship to one another and to adjoining finished flooring. Set mat tops at proper height for most effective cleaning action; coordinate top of mat surfaces with doors that swing across mats to provide adequate under door clearance.

1. Where frame is embedded in grout, provide necessary shims, spacers and anchorages for proper location and secure attachment.

END OF SECTION

SECTION 15010 - MECHANICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract apply to the work specified in DIVISION 15 - MECHANICAL.

B. Separation of Division 15 into Sections is for convenience only and is not intended to establish limits of work. Sections are as follows:

1. 15010 - MECHANICAL GENERAL PROVISIONS
2. 15400 - PLUMBING SYSTEMS
3. 15500 - FIRE PROTECTION SYSTEMS
4. 15600 - HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS
5. 15650 - HEATING, VENTILATING AND AIR CONDITIONING CONTROL SYSTEMS

1.2 SCOPE

A. Provide labor, materials and equipment for complete and operating systems.

1.3 CUTTING AND PATCHING

A. Cutting and patching for the work of this Division shall be in accordance with the requirements of the General Conditions. Work of this Division shall include providing information for any required openings to those responsible for concrete slabs and other concrete members. Openings associated with work of this Division not indicated or specified in other Divisions, shall be work of this Division. Field cut openings shall be located to avoid the reinforcing. Locations of field cut openings in slabs and structural members shall not proceed without the written approval of the Architect/Engineer.

1.4 DRAWINGS

The drawings are diagrammatic and are intended to show the general arrangement and approximate physical sizes of equipment, piping and ductwork. Every nut, bolt, brace, hanger, piping or duct rise, drop, offset, etc., is not indicated or specified. Each item (required, necessary or incidental, for the proper and dependable operation of each system) shall be provided under this Division whether specifically referred to or not. Refer to architectural drawings for necessary dimensions and to shop drawings and submittals for physical size of equipment.

1.5 CODES AND PUBLICATIONS

A. Work shall be executed in accordance with the presently enforced Codes and Publications which shall include but shall not be limited to the following:

1. St. Bernard Parish Building Code
2. St. Bernard Parish Mechanical Code
3. St. Bernard Parish Plumbing Code
4. International Building Code
5. Louisiana State Plumbing Code
6. ASPE Data Book
7. ASHRAE Publications
8. Louisiana State Fire Marshal Act
9. SMACNA, Sheet Metal and Air Conditioning Contractors National Association
10. NFPA 13 - Sprinkler Systems
11. NFPA 24 - Private Fire Service Mains & Their Appurtenances
12. NFPA 26 - Supervision of Valves Controlling Water Supplies for Fire Protection
13. NFPA 70 - National Electrical Code
14. NFPA 72 - National Fire Alarm Code
15. NFPA 90A - Installation of Air Conditioning & Ventilating Systems
16. NFPA 101 - Life Safety Code

B. Where the above are at variance with the Contract Documents, the more stringent requirements shall be applicable.

1.6 REVIEWS, PERMITS AND INSPECTIONS

A. Equipment installed outdoors shall be installed at or above the FEMA Base Flood Elevation (BFE). Buildings that are built with the floor slab exceeding the FEMA BFE shall have outdoor equipment installed at elevations indicated on the Contract Documents, however, should these elevations be at variance with the FEMA BFE the equipment shall still be installed at or above the FEMA BFE.

B. Apply for and pay for governmental and regulatory agency reviews, permits and inspections. Provide plumbing riser diagrams, sketches, etc. as required by regulatory agencies for permit issuance. No work shall be concealed until approved by the governmental or regulatory agency inspectors and the Architect/Engineer. Local regulations shall be adhered to. Upon completion, a Certificate of Approval from the appropriate regulatory agencies shall be provided the Architect/Engineer.

1.7 FEES AND DEPOSITS

A. Arrange for and pay regulatory inspection and service connection fees (sewer, drainage, and water) including the cost of any main extensions. Pay meter deposits for utility services. After substantial completion of the project, the meter registration shall be transferred to the Owner .

1.8 VISITING SITE

A. The Bidder shall visit the site of proposed work so that he may understand the facilities, difficulties, and restrictions attending the execution of the Contract. No additional compensation will be allowed for failure to be so informed.

1.9 UTILITY CONNECTIONS

A. Coordinate connection of utilities which are work of this contract to utilities installed as work of other contracts prior to starting any work. Verify connection points, inverts, valving, etc., prior to commencing any work. No additional compensation will be allowed for conflicts that occur due to the lack of coordination.

B. Prior to starting any work on the project, verify with the various parish utility agencies and utility companies the availability of each utility service (sewer, storm drain, water, and gas) that is required for this project and the respective location of each connection point. Verify depth of each utility and resolve conflicts that may arise due to interference of existing mains that may prevent project utilities from connecting to public mains prior to start of any work. Verify meter locations (water and gas) with utility agency or company prior to installing piping to metering location. No additional compensation will be allowed for work installed and conflicts that occur due to the lack of coordination.

1.10 WORK IN OTHER DIVISIONS

A. Prior to bidding, the Contractor shall coordinate items of work referred to as **"work of other Divisions"** to insure items are not omitted or duplicated.

1. Utility connections - sewer, storm drainage, and water.

2. Electrical work (wiring, raceways and disconnect switches), fire alarm work (wiring, raceways, equipment and devices) associated with work of this division and not specified as work of Division 16 - Electrical, shall be work of this division.

3. Supports for work of this Division, except supports specifically indicated to be provided under other Divisions, shall be provided as work of this Division. Supports provided under other Divisions shall be checked and coordinated under this Division to ensure that they suit the work to be installed.

4. Painting, including painting of exposed insulation, exposed piping, and exposed ductwork not specified as work of DIVISION 9 - FINISHES, shall be work of this Division. Damaged surfaces of factory finished items shall be repaired to the satisfaction of the Architect/Engineer as the work of this Division. Nameplates shall be protected until painting has been accomplished. Protection shall be removed and nameplates cleaned prior to acceptance of equipment.

1.11 MANUFACTURER'S RECOMMENDATIONS

A. Equipment and materials provided under this Division of the specifications shall be installed according to manufacturer's recommendations. Each manufacturers' application and installation instructions shall be reviewed prior to ordering equipment or

commencing with the work. If the drawings or specifications show or describe any deviations from the manufacturer's recommendations the Contractor shall request clarification, from the Architect/Engineer and provide as directed at no additional cost to the Owner .

1.12 GUARANTEE AND SERVICE

A. The equipment, materials and workmanship shall be guaranteed for one year after beneficial use of a particular system, beneficial occupancy of the building or final acceptance of entire project. Where specifically indicated extended warranties shall be provided. Beginning date of guarantee will be established only after written request is received by the Architect/Engineer from the Contractor, and agreed upon by the Architect/Engineer stating the date the systems were turned over to the Owner for beneficial use or occupancy.

B. During the one year period of guarantee, any defects in equipment, materials, or workmanship shall be promptly corrected without cost to the Owner. Mechanical and associated electrical equipment shall be serviced and adjusted without cost during the guarantee period. Servicing and adjusting shall include labor, material, parts, etc., required during the first year. It includes but is not limited to: oiling motors, adjusting belts, adding refrigerant, adjusting and calibrating controls, and repairing leaks.

1.13 SPECIAL CONDITIONS

A. No piping, ducts or other mechanical equipment foreign to electrical equipment shall pass through or above spaces dedicated to electrical panelboards, electrical distribution panels, electrical switchboards, and motor control centers. Work shall conform with NFPA 70. Working clearances and dedicated spaces at electrical equipment shall be maintained per NFPA 70. Coordinate with each trade.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

A. Equipment and materials shall be new and shall be listed by Underwriters' Laboratories, Inc. (UL) or Factory Mutual (FM) in categories for which standards have been set by that agency. Methods of installation shall be in full accord with the latest and current engineering practices. Pressure vessels, as called for by respective codes, shall be ASME and National Board Commission stamped.

2.2 SUBSTITUTIONS

A. Names of manufacturers and catalog numbers indicated in the Contract Documents are to establish a standard as to design and quality. Other products similar in design and of equal quality may be used if submitted to the Architect/Engineer and found acceptable. Refer to General Conditions for additional information. When the Contractor elects to use an acceptable alternate manufacturers' equipment, the Contractor shall be responsible to coordinate the change with the trades affected. The Contractor shall also

pay for any additional work required under this Division as well as any other Division if the alternate equipment is used. If required by Architect/Engineer because of substitutions, submit for review ¼" scale working drawings of equipment areas with plan and section views.

2.3 SUBMITTALS

A. Within 30 days after award of the Contract, and before executing any work, submit for review six copies of descriptive equipment literature or shop drawings **in one complete indexed and bound submittal** for the following items:

Access Doors
Magnetic Starters
Plumbing Valves and Cocks
Cleanouts and Covers
Backflow Devices
Wall Hydrants
Mechanical Insulation
Plumbing Fixtures & Trim
Drains
Water Heaters
Hot Water Circulating Pumps
Tempering Valves
Flow Measuring Devices
Fire Protection Shop Drawings
Fire Protection Equipment
HVAC Valves
HVAC Water Specialties
Refrigerant Specialties
Flexible Duct and Fittings
Air Flow Monitors
Vibration Isolators
Chillers
Air Handling Units
HVAC Pumps
Filters
Electric Duct Heaters
Electric Wall Heaters
Split System Equipment
Fans and Accessories
Dampers
Variable Speed Drives
Air Distribution Devices
Air Terminal Units
Water Treatment
HVAC Control System Drawings
HVAC Control System Components
Testing and Balancing Contractor

B. The same equipment manufacturer shall be provided for multiple items of similar equipment, regardless of capacities, on this project, unless prior written deviation is given by the Architect/Engineer. Submittals shall be identified with project name, equipment name and number as indicated on the drawings, and specification paragraph reference. Submittals shall be properly marked to show proposed model number and accessories being provided and shall have the Contractor's stamp certifying that he has reviewed the submittal and found it to be in accordance with the specifications and drawings. Where applicable, submissions shall include installation drawings and brochures showing locations, methods of anchoring, connections to work of others, wall conditions at each particular installation and special floor mounting conditions. Submittals which do not comply with the above will be returned without review, for resubmittal.

2.4 ACCESS DOORS

A. Doors in gypsum board or masonry construction shall be Karp type DSC-214M or Milcor style M-Standard, 16-gauge steel frame and 14-gauge steel door

construction, continuous piano hinge and a zinc chromate prime coat. Doors in glazed or ceramic tile construction shall be same type as above except stainless steel construction. Doors in inaccessible acoustical tile ceilings, or walls with wall covering shall have 16-gauge steel frame and 18-gauge steel panel construction, recessed door for acoustical tile or gypsum board insert covered with matching wall covering, concealed hinge with a zinc chromate prime coat, and exposed edges painted white when installed in acoustical tile ceiling. Doors in fire rated partitions or ceilings (up to 1½ hour rating) shall carry the Underwriters' Laboratories "B" label. Doors required in types of construction not hereinbefore specified shall suit the type and style of material in which installed. Unless otherwise indicated doors shall have screw driver operated locks.

2.5 ENCLOSURES

A. Control equipment enclosures provided by the Contractor or provided as part of a packaged piece of equipment shall meet the following minimum standards unless specifically indicated otherwise. Where indicated on the drawings or in the specifications, flush mounted enclosures shall be provided.

B. Control equipment enclosures provided within the building shall be equivalent to or greater than NEMA 1 type construction. Control equipment enclosures provided outside of the building, a non-enclosed area of the building or in an accessible crawl space under a building shall be equivalent to or greater than NEMA 3R type construction with drain and breather. Control equipment enclosures provided within hazardous areas, controlling explosion-proof equipment shall be NEMA 7 or 9 type construction. Control equipment enclosures provided for cooling towers and associated equipment within 20'-0" of towers shall be NEMA 4X noncorrosive type construction.

2.6 FUSES

A. Provide fuses for all fused equipment provided under this Division. Fuses shall be size and type required by the equipment manufacturer.

2.7 MAGNETIC STARTERS

A. Provide combination type magnetic starters for three phase motors. Provide magnetic starters or contactors for single phase motors which start and stop as part of an automatic control sequence. Unless noted otherwise magnetic starters shall be across-the-line type rated per NEMA standards. Starters shall have under voltage protection when used with momentary-contact push button stations and shall have undervoltage release when used with maintained contact push button stations. Enclosures for starters shall be as hereinbefore specified. Starters in motor control centers shall be fully compatible with the motor control center. Provide two-speed starters for two-speed motors. Two-speed starters shall have timing relay for time delay between speed changes.

B. Starters shall be non-reversing type complete with integrally fused 120 volt control transformer, start-stop push button and pilot light or hand-off-auto switch and pilot light, where indicated, or as required for control. Two speed starters shall have hand-off-high-low selector switches and pilot lights. Starters for motors interlocked to run with other

motors or which have automatic start-stop controls (exclusive of safety controls such as firestats, freezestats, etc.) shall have hand-off-auto switch. Starter shall be wired so as not to by-pass safety controls when in the "hand" position.

C. Starter contacts shall be of silver alloy, and shall be of the double break type. The movable magnet and contact assembly, an arc hood in which the fixed contacts are mounted, solenoid cell, and thermal overload relays (one in each phase) shall be assembled and mounted on a heavy steel back plate. The only moving part shall be the magnet and contact assembly which shall move up and down. Each pole shall be enclosed in an individual arc chamber.

D. Starters for 5 horsepower and larger 3-phase motors shall include under voltage/phase-reversal/phase-loss protection relay wired into the control circuit. Overload protective devices shall be selected in accordance with the motor nameplate, and shall be of the thermal inverse time limit type and shall include a manual reset type push button on the outside of the cover. Overloads shall operate on the melting alloy principle. Starters shall have normally open and/or closed external electrical interlocks as required to suit equipment controlled. Magnetic starters shall include a disconnect switch with visible blades and Class R fuse rejection features. Acceptable manufacturers: Furnas Class 14, Square D Class 8536, GE Series 300 or approved equal.

2.8 MAGNETIC CONTACTORS

A. Magnetic contactors shall be Square D Series 8903-SMG70-V02 or equal, 30A, 3 pole, mechanically held, with 120 volt coil and non-fused disconnect.

2.9 MOTORS

A. Unless otherwise indicated, motors shall be NEMA Design B, constant speed, variable torque construction. Motors shall conform to the Energy Policy Act of 1992 and shall be of the premium efficiency type suitable for use with variable speed (variable frequency or voltage) motor drives. Electrical characteristics shall conform with the electrical supply as indicated on the electrical drawings.

B. Single-phase motors shall be split-phase or capacitor start type with built-in thermal overload. Three-phase motors shall be squirrel cage type.

C. Motors shall be guaranteed to operate continuously at full load with a 10% voltage variation above or below the specified voltage. Motors shall be rated for an ambient temperature of 40 degrees C and a temperature rise not to exceed 40 degrees C with a 1.15 service factor. Motors shall have either sleeve or pre-lubricated ball bearings as required for the particular application.

D. Motors shall be copper wound. Open drip-proof (ODP) motors shall have Class B insulation. Totally enclosed (TE) or totally enclosed fan cooled (TEFC) motors shall have Class F insulation. Motors shall be T-frame conforming to NEMA MG13 and tested in accordance with NEMA MG1 Part 12 and IEEE Test Procedure 112, Method B.

Nameplate information shall include the manufacturer's nominal and guaranteed efficiency values.

E. Unless noted otherwise on the drawings or in the specifications, housings for motors in indoor locations shall be open drip proof (ODP) or explosion proof (XP) type. Motors in outdoor locations or subject to excessive moisture shall be totally enclosed (TE) or totally enclosed fan cooled (TEFC) type. Belt drive motors shall have bases with provisions for adjustment in field.

F. Motors provided on equipment not as an integral part of the equipment but propelling the equipment by the use of belts, sheaves, couplings, etc., shall be as manufactured by Emerson, General Electric, Marathon, U.S. Electric, or approved equal. Alternate manufacturers requesting approval shall submit evidence of a factory authorized service facility within a reasonable distance of the project to service or replace motors under warranty. Motors manufactured by or specifically for equipment manufacturers and provided as an integral part of the equipment package need not comply with the requirements of this paragraph.

2.10 SAFETY PANS

A. Safety pans shall be fabricated from 18-gauge (min.) galvanized sheet steel. Sides of pans shall be a minimum of 2" high with top edges hemmed. Sides longer than 6'–0" shall have additional flat bar or angle top edge bracing to prevent sagging. Joints and seams shall be watertight. Pans shall be extend at least 6" beyond the sides of the equipment it is serving. Provide a 1" steel female pipe coupling in side of pan near the bottom for overflow piping connection.

2.11 PREPARED OPENINGS

A. Piping and tubing installed through masonry or concrete walls, floor/ceiling assemblies, and floors above grade shall be installed through pipe sleeves.

B. Ducts installed through masonry or concrete walls and non-rated concrete floors above grade shall pass through 20-gauge galvanized sheet metal sleeves. Duct sleeve shall have a ½" maximum annular clearance around duct. Allowance shall be made for external duct wrap (if specified). Ducts, tubing and piping installed through floors of mechanical rooms shall have a 4" high concrete curb on each side to prevent water from leaking through openings. Exposed piping installed through walls shall be fitted with chromium plated escutcheons on each side of the wall. Exposed ductwork passing through non-rated masonry or concrete walls shall be fitted with a 2" wide sheet metal flange around each side of duct on each side of the wall.

C. Ducts installed through partitions, walls or floors which are smoke rated or have a fire rating of one hour or greater shall be installed in accordance with SMACNA standards. Piping and tubing installed through partitions, walls, or floors which are smoke rated or have a fire rating of one hour or greater shall be installed through pipe sleeves.

2.12 ROOF MOUNTED EQUIPMENT, DUCTS AND PIPING

A. Roof mounted equipment shall be installed on equipment supports or curbs as detailed on the drawings or as specified. Tops of curbs shall be level. Ducts penetrating the roof shall be installed within a waterproof curbed area as detailed on the drawings. Piping penetrating the roof shall be installed through a pitch pocket or piping curb as noted or detailed on the drawings. Any penetrations of the roof shall be watertight.

2.13 PIPE SLEEVES

A. Sleeves for tubing and piping installed through masonry or concrete walls shall be Schedule 40, galvanized steel pipe. Sleeves for tubing and piping installed through fire or smoke rated dry wall partitions, floors, and floor/ceiling assemblies above grade shall be a minimum of Schedule 10, galvanized steel pipe. Sleeves for tubing and piping installed through basement walls, and floors, and slabs below water level shall have a water stop flange welded to sleeve.

2.14 FIRE BARRIER MATERIAL

A. Fire barrier material shall be provided in annular spaces between sleeves and piping or tubing where piping or tubing penetrates floors or partitions that have a fire rating of one hour or greater. Material shall be UL classified as a through penetration fill, void or cavity material and shall be capable of passing a 4 hour fire test per ASTM E 814. Material shall be installed in strict accordance with the manufacturers instructions. Acceptable manufacturers: 3M Fire Barrier, Metacaulk, Nelson Fire Stop, PTI Fire Seal, Thomas & Betts Fire Safe, or approved equal.

2.15 SAFING MATERIAL

A. Safing material shall be installed in annular spaces between sleeve and pipe or tubing where sleeve and pipe or tubing penetrate partitions that are designated as smoke separations. Material shall be mineral wool designed for hand packing. Material shall have an ASTM E 84 rating of flame spread –10, fuel contributed –0, smoke developed –0 and shall be rated non-combustible per ASTM E 136. Acceptable manufacturers: Carborundum, U.S. Gypsum, or approved equal.

2.16 CURBS AND SUPPORTS

A. Prefabricated metal curbs and equipment support rails for equipment provided on built-up roofs, unless otherwise noted on the drawings, shall be provided under SECTION 15600 - HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS. Curbs and equipment supports for equipment installed on metal roofs shall be a product of the metal roof manufacturer. Poured in place concrete curbs and supports shall be in accordance with DIVISION 3 - CONCRETE. Interior and exterior supports such as, but not limited to pipe stands, elbow supports, strut channels, trapeze supports, structural steel supports and hanger rods shall be hot-dipped galvanized after fabrication.

2.17 SUPPORTS

A. Supports shall adequately support the weight of the pipe and material contained within. Supports shall be manufactured in accordance with MSS SP-58, ANSI B31.1 and UL 203. Acceptable manufacturers: Elcen Mfg. Co., Michigan Hanger Co., Anvil, Persing & Co., or approved equal. Supports for piping above grade shall be as follows:

B. Cast iron or steel piping:

1. Interior:
   a. Anvil Figure 260 adjustable clevis hanger and rod, carbon steel construction, zinc plated finish.
   b. Strut channels, supporting steel, and trapeze hangers, carbon steel with zinc plated finish.

2. Exterior (Crawl spaces and unenclosed areas):
   a. Anvil Figure 260 adjustable clevis hanger and rod, carbon steel construction, hot dipped galvanized finish.
   b. Strut channels, supporting steel, and trapeze hangers, carbon steel with hot dipped galvanized finish.

3. Copper tubing - Anvil Figure CT-69 adjustable tubing ring and rod, carbon steel ring with copper finish and malleable iron adjusting nut.

4. Riser clamps:
   a. Clamps, bolts and nuts for cast iron or steel piping shall be Anvil Figure 261, carbon steel construction, hot dipped galvanized finish.
   b. Clamps for copper tubing, glass or plastic piping shall be Anvil Figure 261c, black carbon steel construction, copper plated for copper tubing or with formed section plastic coated for glass or plastic piping.

C. Hangers for piping under concrete slabs on grade or fill - Waste and vent, storm drainage, fire protection and domestic water piping shall be type 316 stainless steel rod. Hangers for any other piping shall be type 316 stainless steel clevis type hanger and rod with rod lapped over the slab reinforcing steel. See drawings for details.

2.18 UNIONS AND FLANGES

A. Unions:

1. Steel piping 2½" and smaller - Unions shall be ANSI B16.39 malleable iron, WOG, female pattern, threaded ends, brass seat, with ground joint.

2. Copper tubing 2½" and smaller - Cast copper unions shall have solder ends, with ground joint.

B. Flanges:

1. Steel piping 3" and larger - Welding neck or slip-on type, flat or raised face, forged steel, ASTM A 181, Grade I, ANSI B16.5, Class 150 or 300 as required. Bolts shall be ASTM A 307, Grade B8. Nuts shall be ASTM A 307, Grade 8. Exterior bolts and nuts shall be stainless steel.

2. Copper tubing 3" and larger - Flanges shall be ANSI Standard B16.24, Class 150, with solder joint ends. Bolts shall be ASTM A 307, Grade B8. Nuts shall be ASTM A 307, Grade 8. Exterior bolts and nuts shall be stainless steel.

3. Gaskets shall be 1/16" thick, similar to Garlock or Cranite, factory cut, one piece. Provide full-face gaskets for flat-face flanged joints, and ring gaskets for raised-face flanged joints.

2.19 DISSIMILAR METALS

A. 2" and smaller - Dielectrically isolated unions, couplings or nipples. 2 1/2" and larger dielectrically isolated and gasketed flanges.

2.20 PIPE IDENTIFICATION

A. Identification of piping shall be by the use of colored, waterproofed, all-temperature, self-adhering pipe markers and directional arrows. Acceptable manufacturers: Ready Mode, Seton Style RPM, MAPA Label Tabs, or approved equal.

2.21 VALVE TAGS

A. Tags shall be provided for each valve. Tags shall be constructed from 19-gauge brass sheets, 1½" in diameter. Tags shall be attached to valves using brass jack chain and/or S-hook. Each tag shall contain ¼" high letters defining the valve service. The valve number shall be ½" high. Lettering and numerals shall be black enamel filled. Acceptable Manufacturers: Ready Mode, Seton Style 250-BL, or approved equal.

2.22 TAMPER PROOF FASTENERS

A. Where equipment is specified to have tamper proof or vandal proof fasteners, the Contractor shall coordinate and use the same type of fastener on each item. Provide Owner with two wrenches, screw drivers, etc., for each type of fastener used on the project.

PART 3 - EXECUTION

3.1 INSTALLATION OF VALVES

A. Valves shall be provided where indicated on the drawings or as hereinafter described. Valves shall be installed so that the handle is accessible and operable. Where required due to space limitations, special short style handles may be provided on ball valves. Gate, globe and other style valves having packing glands shall have valve handles

installed in the horizontal or vertical (down) position or any angle between to keep packing glands moist.

B. Valves located in walls, chases and above suspended, inaccessible ceilings shall be provided with access doors. Valves located above accessible acoustical tile ceilings shall have the location of each valve marked with a pressure sensitive colored dot applied to the T-bar. Color to be selected by the Architect/Engineer. Valves located above ceilings indicated to be used for drains, or for future use shall have a pipe plug or nipple and cap closure. Valves in equipment spaces indicated to be used for drains, blowdowns, etc., shall have hose threads for extensions to floor drains. Hose bibbs shall not be used.

3.2 EXCAVATING AND BACKFILLING UNDER BUILDING SLABS

A. The Contractor shall do excavating, trenching and backfilling for the work of this Division. The Contractor shall work around or remove obstructions as necessary. Bottoms of trenches shall be tamped hard. Bell holes shall be excavated to insure that pipe rests on solid earth for its entire length.

B. Backfilling trenches for piping under structural pile supported slabs shall be done by hand. Fill shall be "walked" or hand tamped on each side of pipe to provide compaction that will hold the piping in alignment. The remainder of the trench may be backfilled by hand or approved mechanical means. Care shall be taken during tamping to keep piping in alignment and hanger rods straight and plumb. Refer to DIVISION 2 - SITEWORK for fill material.

C. The Contractor shall remove any water which may be found or may accumulate in the trenches and shall perform work necessary to keep them clear of water while the work is in progress, or as may be required for inspections.

3.3 DISPOSAL OF EXCESS EXCAVATED MATERIAL

A. Excess fill taken from excavations shall, unless otherwise provided in the Contract Documents, be removed as soon as possible as work of this Division.

3.4 SHEETING AND SHORING

A. Sheeting and shoring shall be placed in excavations and trenches as required to suit the ground conditions and to properly and safely support the excavations and trench walls and any adjacent structures. Placement of the sheeting and shoring in the trench shall not restrict the excavation and trench width specified in other Sections. Sheeting and shoring for excavations and trenches less than five feet in depth may be of treated wood. Wood indicated to remain in excavations and trenches shall be treated type. Sheeting and shoring for excavations and trenches greater than five feet in depth shall be of steel construction.

B. The Contractor shall employ a Civil Engineer registered in the state of this project to design the steel sheet piling system required for excavations of five feet or greater. The Contractor shall submit one copy of the Engineer's sealed calculations and

drawings to the Architect/Engineer for record and file purposes only. The Contractor shall be responsible for the design and construction of the sheet piling system.

C. Unless otherwise instructed by the Architect/Engineer wood sheeting, shoring and bracing shall be cut-off at an elevation of 24" below finished grade. The lower portion of the sheeting and bracing below grade shall remain in the ground. If instructed by the Architect/Engineer to remove the wood or steel sheeting and shoring it shall not be removed until backfilling is completed.

3.5 RESTRAINED JOINTS

A. Restrained joints shall be provided for underground water mains 4" and larger and sewer force mains at each change of direction 11¼ degrees or greater and at tees. Restrained joints shall be installed per NFPA 24.

3.6 RECORD DRAWINGS

A. At the completion of the work, unless noted otherwise in the general conditions, mark-up one reproducible set with colored pencils in a neat and understandable manner to show significant changes made during construction. Provide an electronic copy of the drawings in .pdf format on a disc to be included in the closeout documents. Underground piping, valves and cleanouts outside of the building shall be dimensioned on the record drawings. Dimensions shall indicate the location of exterior mains with reference to the exterior building walls and/or corners. Contractor shall pay for reproduction costs.

3.7 OPERATING INSTRUCTIONS

A. Prior to the time scheduled for occupancy, the Contractor shall provide the services of a competent mechanic to instruct the Owner in the care and operation of equipment. Before final acceptance, the Contractor shall prepare and deliver to the Architect/Engineer three bound copies of operating instructions, which shall be contained in hard back loose leaf type binders, divided into a suitable number of volumes so as to permit easy reference, and shall include:

1. Description of major components of systems, including the function of major items.

2. Detailed operating instructions and instructions for making routine minor adjustments.

3. Routine maintenance operations.

4. Manufacturer's catalog data, service instructions wiring diagrams, fabrication drawings and parts list for each piece of operating equipment.

5. Copies of equipment submittals and shop drawings, including review sheet, reviewed by and acceptable to the Architect/Engineer.

6. Guarantee and Warranty Information.

7. Names and telephone numbers of subcontractors and suppliers.

3.8 ELECTRICAL WORK

A. Refer to schedules and electrical drawings for motor voltages. Motors for mechanical equipment shall be provided under this Division. The work of this Division shall include setting and aligning integral drive motors in operating position. Unless noted otherwise, combination magnetic starters and, magnetic motor starters for mechanical equipment shall be provided under this Division and installed and electrically connected under DIVISION 16 - ELECTRICAL.

B. Electrical work in connection with DIVISION 15 - MECHANICAL required but not indicated as work of DIVISION 16 - ELECTRICAL shall be work of this Division. Control disconnects, monitoring, level, electrical interlock and signaling wiring and raceways shall be work of this Division. Safety, signaling, and control devices such as thermostats, firestats, damper motors, valve operators, push buttons, pilot lights, control and/or monitoring panels, crank-case heaters, etc., shall be provided and wired under this Division in strict accordance with an approved wiring diagram. Wiring and raceways installed under this Division shall comply with the requirements of DIVISION 16 - ELECTRICAL and shall be installed by a licensed electrician.

3.9 CONCRETE

A. Formed and poured in place concrete work including equipment housekeeping pads, concrete equipment bases that are installed on vibration isolators, and piping supports not provided as work of other Divisions shall be provided as work of this Division and shall be standard weight concrete in accordance with the American Concrete Institute's Standard Specifications, and shall test at 3000 psi in 28 days.

B. Provide required templates and dimensioned drawings for housekeeping pads, supports, and anchor bolts. A 4" high (min.) reinforced concrete housekeeping pad shall be provided under each piece of exterior and interior floor supported mechanical equipment. Pads shall extend a minimum of 6" beyond edges of equipment. Edges of pads shall be chamfered.

3.10 EQUIPMENT SUPPORTS

A. Unless otherwise specified, supports necessary for properly supporting the work and the equipment of this Division shall be provided under this Division. Additionally, provide isolation materials to prevent transmission of vibration to the building structure. Isolation of equipment as shown on drawings or specified is the minimum required, and any additional isolation required to prevent transmission of vibrations shall be provided under this Division, in accordance with the equipment manufacturer's recommendations. Foundations for supports shall be provided under DIVISION 3 - CONCRETE or DIVISION 5 - METALS.

3.11 SAFETY PANS

A. Provide safety pans under water heaters, hot water storage tanks, fan coil units, air handling units, boilers, etc. Pipe safety pan outlet to floor drain, trapped waste, or to outside of building.

3.12 OPENINGS, GROUNDS AND CHASES

A. Openings, grounds, chases and lintels will be provided under other Divisions, as directed by this Division, to accommodate the piping, ductwork and equipment. Sleeves and prepared openings shall be accurately located in slabs or walls before pouring of concrete. It shall be the responsibility of this Division to verify that openings and chases are properly located. Openings associated with work of this Division not indicated or specified in other Divisions, shall be work of this Division. Coordinate location of grease ducts through roof and arrange for roof framing to be relocated to avoid offsetting of ducts.

B. Holes through existing concrete shall be either core drilled or saw cut. Drilled or cut holes required shall have the approval of the Architect/Engineer prior to cutting or drilling. Sleeves set in openings cut in existing masonry or concrete walls or concrete slabs shall be one pipe size smaller in outside diameter than the cored hole. The sleeve shall be grouted in place with non-shrinking waterproof grout. Where piping is installed through smoke and/or fire separations, fill annular space between sleeve and piping with safing or fire barrier material.

3.13 ACCESS DOORS

A. Equipment which may require constant or periodic operation or adjustment such as but not limited to valves, water hammer arresters, cleanouts, automatic smoke and fire dampers, damper operators, mixing boxes, variable volume equipment, steam traps, plumbing traps, plumbing fixture connections, etc., located in or above inaccessible ceilings, walls, or chases shall have hinged metal access doors as required by type of construction.

B. Minimum door size shall be 8" x 8". Doors shall be of sufficient size to adequately service, repair, replace or inspect the equipment. Locations of access doors in ceilings shall be coordinated to avoid conflict with ceiling mounted devices (lighting fixtures, fire alarm devices, ceiling diffusers, sprinkler heads, etc.). Locations shall be approved by the Architect/Engineer.

3.14 PIPE SLEEVES

A. Piping and tubing installed through masonry or concrete walls, concrete floors above grade, exterior metal wall panels, and smoke or fire rated partitions shall be installed through pipe sleeves as hereinbefore specified.

B. Sleeves are not required for soil, waste, vent, storm drainage, fire protection, or domestic water piping through slabs on grade or fill. Any other piping shall be provided with sleeves. Sleeves shall be finished flush with both sides of wall. Sleeves through

floors above grade shall project a minimum of 2" above finished floors. Sleeves through exterior metal wall panels shall be installed to prevent water from entering around perimeter of sleeve. Diameter of sleeves shall be large enough to provide a 1/4" minimum annular space between pipe and sleeve or insulation and sleeve. Annular space shall be large enough to accommodate pipe movement due to expansion or contraction.

C. Where piping or tubing is installed through fire or fire/smoke rated separations, the annular space between the piping or tubing and sleeve shall be filled with UL Classified fire barrier material. Where piping or tubing is installed through smoke rated separations, the annular space between the piping or tubing and sleeve shall be packed solid with safing material. Annular space between pipe or tubing and sleeve installed through exterior walls shall be made waterproof by filling with a silicone type caulking compound on the exterior side only. Annular space between pipe and sleeve installed through basement walls, floors and slabs on grade or fill and slabs below water level shall be made waterproof by using a mechanically expandable seal, or an approved equal means.

3.15 SUPPORTS

A. Hangers, guides, brackets and braces shall be adequately fastened to the structure by means of concrete inserts, drilled expansion shields, drilled wedge type devices, bolts or beam clamps. Powder driven fasteners shall not be used. Inserts in slabs and beams for fastening work shall be cast in place in new slabs. Inserts required in existing concrete shall be drilled type. Drilling shall not penetrate the post-tensioning tendons.

B. Where building construction consists of a metal roof supported by metal purlins, provide additional steel members to span between roof supports to provide supports for hanger rods.

3.16 GENERAL PIPING INSTRUCTIONS

A. Exposed and concealed horizontal lines of pipe and tube shall be carried on hangers and supports hereinbefore specified and properly spaced to maintain alignment. Install pipe and tubing true to line and grade. Piping shall be concealed except where noted. Piping shall be installed above suspended ceilings and in furred partitions. Exposed piping shall be installed parallel to or at right angles with building walls, except where otherwise shown on drawings. Changes in elevation, to suit varying ceiling heights, shall be made so that piping will stay exposed. Exposed pipe through walls, floors and ceilings shall be fitted with chromium plated escutcheons securely held in position with allowance for expansion. Escutcheons shall be large enough to fit the pipe, tubing or insulation and to cover openings around the sleeves through walls. Minimum bury for exterior piping shall be 18" below finish grade, unless noted otherwise on drawings or in specifications. PVC water mains shall have 30" minimum cover.

B. Wherever changes in sizes of piping occur, changes shall be made with reducing fittings. The use of reducing couplings in rolled or cut groove joint piping or bushings in other piping systems will not be permitted.

C. Cutting and boring through structural members shall be done only when approved by and under supervision of the Architect/Engineer. Offsets in piping above slab shall be made with fittings. Bending of pipe shall not be permitted. Automatic valves or traps shall be provided with unions and shut-off valves so that they can be removed for servicing. Valving shall also be arranged so as to eliminate the necessity of draining major parts or entire system while service or repairs are made. Drains where required by manufacturer and at each low point or trapped area of each system shall be provided.

3.17 CONNECTION OF COPPER TUBING

A. Copper tubing shall be cut with square ends, and burrs and fins removed. Tubing shall be handled and protected carefully and tubing cut, dented, or otherwise damaged shall be replaced. Ends of tubing and fittings shall be cleaned using sand or emery cloth.

B. Copper Water Tube: Apply a thin coat of flux to end of tube and solder cup. Insert tube into fitting full depth and apply heat. Apply solder until bead appears at end of fitting. Clean excess solder and flux from completed joint.

C. Copper Refrigerant Tube: Refrigerant piping shall be installed so proper oil drainage and entrainment are maintained. Materials used in the construction and installation of refrigerant piping system shall be suitable for the refrigerant used and no material shall be used that will deteriorate due to the chemical action of the refrigerant or the oil or the combination of both. Equipment and piping openings shall be plugged or capped to prevent air, dirt, or moisture from entering the system. Piping must be thoroughly cleaned before the system is charged with refrigerant. Suction lines shall be pitched no less than ½" per 10' toward the compressor. During the brazing process dry nitrogen shall be bled continuously through the piping.

3.18 CONNECTION OF SCREW JOINTED PIPING

A. Piping shall be square cut and free from fins, burrs, die marks, etc. Threads shall be full cut to depth of die. Apply approved lubricant or thread sealing tape on male threads only. Screw fitting and pipe together using pipe wrenches so that not more than three threads remain exposed on pipe. Clean excess joint material from completed joint. Joints in galvanized piping systems shall be cleaned and sprayed with two coats of zinc rich rust inhibiting paint.

3.19 CONNECTION OF WELDED JOINT PIPING

A. Welded joints shall conform to the requirements of ANSI B31.1. Welders shall be qualified using shielded metal arc welding process or other approved process in accordance with the applicable provisions of the ASME Boiler and Pressure Vessel Code, Section IX. Prior to erection, each length of pipe shall be held in an inclined position and repeatedly tapped to loosen any scale or foreign matter within the pipe. Each length of pipe shall be thoroughly swabbed prior to erection.

3.20 CONNECTION OF GROOVE JOINTED PIPING

A. Piping shall be inspected and verified free from indentations, projections, grooves, weld seams or roll marks on the exterior pipe surface over the entire gasket seating area to insure a leak-tight gasket seating. Pipe ends shall be square cut. Cut and roll grooves shall meet the manufacturer's criteria. Gasket, pipe ends and coupling housing shall be properly lubricated per manufacturer's recommendations prior to seating and aligning.

3.21 SUPPORTS AND CLAMPS

A. Vertical support and bracing for risers shall be by use of riser clamps at every floor but not less than 15'-0" o.c. Horizontal **piping above grade** and within buildings shall have supports and rods adequate for size, material and service, and be supported at not more than the following intervals on straight runs of piping:

MAXIMUM SUPPORT SPACING - CAST IRON PIPING

PIPE DIAMETER	SUPPORT SPACING	MIN. HANGER ROD-DIAMETER
2"	5'-0" and at each Joint	⅜"
3"	5'-0" and at each Joint	½"
4"-5"	5'-0" and at each Joint	⅝"
6"-8"	5'-0" and at each Joint	¾"

MAXIMUM SUPPORT SPACING -STEEL AND COPPER PIPING

PIPE DIAMETER	SCREWED, SOLDERED & WELDED JOINTS	GROOVED JOINTS	MIN. HANGER ROD DIAMETER
½" to 1¼"	6'-6"	6'-6"	⅜"
1½" to 2"	10'-0"	7'-6"	⅜"
2½" to 3"	10'-0"	10'-0"	½"
4" to 6"	10'-0"	10'-0"	⅝"-¾
8" to 12"	14'-0"	12'-0"	¾"-⅞"

B. Unless otherwise detailed on the drawings, **underground piping** shall have hanger rod sizes as listed below to support the piping at not more than the following intervals on straight runs of piping:

PIPE DIAMETER	MAX. SUPPORT SPACING	MIN. SUPPORT ROD DIAMETER
½" to 6"	4'-0"	¼" *
8" to 10"	4'-0"	⅜" *

** If allthread rod is used in lieu of smooth rod, allthread rod shall be one size larger.*

C. When interior support rods for pressurized piping are over 12" in length, provide lateral bracing every fourth hanger or as required to prevent swaying. Offsets or bends in hanger rods or pipe hanging from pipe are not acceptable. Piping shall be racked and handled in a manner to prevent entrance of dirt and foreign matter. Open pipe ends shall be plugged or capped during erection. Horizontal pipe shall be supported not over 1' from the fitting at each change in horizontal direction or vertical elevation of the piping. Pipes must be installed so that they may contract or expand freely without damage to other work or injury to themselves.

D. In securing rods and hangers to wood or metal, angle clips, beam clips or C-clamps shall be used. Angle clips must be attached to structure by means of screws or bolts. Securing rods to concrete shall be as hereinbefore specified. Trapeze supports with U-bolts, pipe straps or clamps may be used where two or more pipes run parallel at the same elevation. Perforated type strap hangers shall not be used. Exterior pipe supports shall be hot dipped galvanized after fabrication.

E. Vibrations or movement developing in piping shall be eliminated or isolated by re-spacing of supports, anchoring or installation of spring supports as directed. Refrigerant liquid piping shall be isolated by providing a 6" long piece of ¾" thick elastomeric type insulation between pipe and hanger. Insulated piping with a normal operating range of 55 degrees or less, provide a 20-gauge sheet metal saddle approximately 12" long and having 180-degrees of contact with insulation between the hanger or support and the insulation for each pipe. Insulated piping with a normal operating range of 56 degrees or greater may have the hanger installed between the pipe and the insulation. Where individual pipe supports are installed outside of the insulation jacket or trapeze supports are used to support insulated pipes, a galvanized sheet metal saddle, as described above, shall be installed between the support and the insulation.

F. Piping and fittings below pile supported slabs on grade or fill shall be supported as follows:

1. Piping shall be hung on 4' centers.

2. PVC piping shall have one or two 12" long solid wall PVC half-sleeves installed between the hanger and the pipe as indicated in the Contract Documents.

3. Additionally waste and vent, storm drainage, acid waste and vent, greasy waste and vent fittings shall be hung as follows:

   a. Vertical combinations, wye and eighth bends and up-right tees shall have two hangers.
   b. Horizontal combinations, wye and eighth bends and tees shall have three hangers.
   c. Horizontal double combinations, double wye and eighth bends and crosses shall have four hangers.

3.22 UNIONS OR FLANGES

A. Unions or flanges shall be provided at items of equipment to facilitate their easy maintenance, including tube bundle or coil removal, and/or cleaning. It shall not be necessary to remove any valve, strainer, or device to do the required maintenance. Piping connections at equipment shall be in accordance with the current engineering and installation practices. The requirements of this paragraph will be strictly enforced and if in the opinion of the Architect/Engineer it is not adhered to, the Contractor will be required to re-pipe the equipment as directed.

3.23 WORK RELATED TO EQUIPMENT NOT FURNISHED AS WORK OF THIS DIVISION

A. Unless specifically indicated otherwise, any required mechanical services for and required mechanical connections to items indicated on the drawings or in the specifications or items provided by the Owner shall be mechanically connected as work of this Division. The Contractor shall provide piping, valves, traps, etc., as required for complete operation of each piece of equipment.

3.24 DISSIMILAR METALS

A. Inert NSF/FDA lined dielectric nipples shall be provided between copper, bronze or brass piping material or valves and steel piping material or steel tanks. Dielectric nipples and brass or copper unions or flanges shall be provided at cast iron valves and equipment where hereinbefore specified for equipment maintenance. Dissimilar metals shall be isolated from surface contact with each other by the use of a non-conductive material, tape, etc.

3.25 PROTECTION OF WORK

A. The Contractor shall protect equipment, fixtures, and work from damage. Damaged work will be rejected and replaced at the expense of the Contractor. Where possible, rooms containing new plumbing fixtures shall be kept locked until the building is turned over to the Owner. Immediately after installation of each plumbing fixture, it shall be covered with a fixture protector.

B. Mechanical equipment shall be protected from damage and from the weather. Provide adequate and proper storage facilities for items during the progress of the work.

3.26 CLEANING OF EQUIPMENT AND MATERIAL

A. Prior to acceptance, the Contractor shall clean equipment and remove grease, dirt and foreign matter. Pressure regulating assemblies, traps, strainers, flush valves and similar items shall be thoroughly cleaned. Air, oil and natural gas piping shall be blown out with clean compressed air. When connections are made to existing systems, the Contractor shall do cleaning and purging of the existing systems required to restore them to the condition existing prior to the start of work.

3.27 FRICTION LOSSES, ELECTRICAL RATINGS AND SPACE REQUIREMENTS

A. The values of air and water friction losses, electrical current ratings and space requirements for various pieces of equipment, as contained in these specifications or as scheduled, are estimated values and sizes and have been used in obtaining specifications for equipment and for sizing ducts, pipe, electric wiring and motor controls. Any necessary changes in any of these items resulting from values other than the estimated ones shown shall be the responsibility of the Contractor and shall be subject to the approval of the Architect/Engineer. The Contractor shall pay any costs for additional labor and material required including costs of any other Contractor involved. Should substitute equipment require different requirements from that shown on the drawings, the Contractor shall be responsible for the cost of the changes. Any such changes must be approved by the Architect/Engineer.

3.28 MARKING OF EQUIPMENT

A. Each piece of mechanical equipment shall be suitably identified by means of ¼" high letters cut in white laminated phenolic strip to show black letters. Mechanical equipment, such as but not limited to, boilers, air handling units, exhaust fans, starters, etc., shall be labeled. Strip shall be secured to interior equipment using self-adhesive backing and to exterior equipment by means of two brass bolts and nuts or screws.

3.29 IDENTIFICATION OF PIPING

A. Piping, whether insulated or not shall be identified. Identification may be omitted from piping in inaccessible chases and furring and where use is obvious, due to its connection to fixtures or equipment and where the appearance would be objectionable, as in finished rooms.

B. Identification shall be placed as follows - near each valve and branch connection, above accessible ceilings wherever piping emerges or disappears from view when viewed from the floor of the room in which it is installed, labels shall not be more than 10' apart.

3.30 VALVE TAGS

A. Every valve provided on the project shall be tagged. Valve tags shall be provided so that tags are readily readable. Valve tags shall be listed on a valve tag chart. Chart shall indicate valve service, valve number, room number and if above ceiling or in wall. Copies of valve tag chart shall be included with project acceptance documents.

3.31 CHANGES TO PIPING OR DUCTS

A. Should the Contractor desire to make changes in the routing or arrangement of piping or ducts, whether for his own convenience, to avoid conflict with the work of other trades, or to conform to local codes, such changes shall not be made without the prior approval of the Architect/Engineer.

3.32 STARTING AND TESTING

A. A competent and experienced service and installation mechanic shall be employed by the Contractor to start test and adjust the equipment. The Architect/Engineer reserves the right to require the test of any item of equipment or machinery. Such tests shall be conducted by the Contractor in the presence of the Architect/Engineer.

3.33 PROJECT CLOSEOUT DOCUMENTS

A. Prior to the final acceptance of the project the Contractor shall deliver to the Architect/Engineer for review, the following in two three-ring binders:

1. Certificates of approval from local regulatory agencies.

2. Extended equipment warranties.

3. Signed receipts showing that keys to access doors, locked equipment, underground valve wrenches and vandal-proof screwdrivers have been delivered to the Owner.

4. Valve tag list.

5. Operating instruction manuals which shall include copies of reviewed submittals and shop drawings including review sheet.

6. Results of potable water sterilization tests.

7. Performance tests of backflow preventer.

8. NFPA 13, 14, and 2001 acceptance certificates for the sprinkler system, standpipe system, and fire suppression systems.

9. NFPA 24 contractors material and test certificate for the underground piping serving the installed fire suppression systems.

10. Copy of reviewed sprinkler, standpipe, and gaseous suppression system shop drawings.

11. HVAC test and balance reports.

12. Record drawings.

B. Final payment will be withheld until each applicable item has been provided to and is found satisfactory by the Architect/Engineer.

- END OF SECTION -

SECTION 15400 - PLUMBING SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

A. Work under this Section shall include providing a complete and functioning plumbing system for the project and any appurtenances indicated or necessary. Terminate each system 10 feet beyond the edge of structural pile supported slabs, unless indicated otherwise on the drawings, for extension under other Divisions of the specifications. The systems shall include but shall not be limited to the following:

1. Sanitary system (sewer, soil, waste, and vent)
2. Storm drainage system
3. Domestic water system (hot and cold)
4. Plumbing fixtures
5. Associated equipment

B. Items specified or required shall be provided for a complete and operating system as described in SECTION 15010 - MECHANICAL GENERAL PROVISIONS.

1.2 BACKING

A. Each plumbing fixture not specified to be installed on a concealed chair carrier shall be provided with proper backing within the wall. Such backing shall be provided under other Divisions as directed by this Division.

1.3 SPECIAL REQUIREMENTS

A. PVC piping shall not be installed in any above ceiling plenum space or any mechanical equipment room used as a return air plenum.

1.4 ELECTRICAL WORK

A. Electrical work in connection with work of this Section not indicated as work of DIVISION 16 - ELECTRICAL, including disconnect switches for control wiring, shall be work of this Section.

PART 2 - PRODUCTS

2.1 VALVES (Plumbing)

A. Valves shall be as listed below unless otherwise noted on the drawings. All valves for use in potable water system shall be lead free model of the valves listed below:

1. Water shut-off valves above grade:

a. 4" and smaller - Nibco Series S-FP-600N or Watts Series B, full port ball valve; 600 psi ASTM B-283 bronze body, ASTM B-16 chrome plated brass ball and stem; PTFE seats, packing, and gaskets; solder ends; two piece construction with lever handle. Acceptable manufacturers: Conbraco, Hammond, Red-White, Milwaukee, Nibco, Watts, or approved equal.

2. Water check valves above grade:

a. 2½" and smaller - Nibco Series S-413 or Watts Series WCV, 150 psi swing check; ASTM B 62, bronze body, and disc holder; composition type removable disc; soldered ends. Acceptable manufacturers: Crane, Hammond, Red-White, Milwaukee, Nibco, Watts, or approved equal.

b. 3" and larger - Nibco Series F-918 or Watts Series WCV, 125 psi swing check; ASTM A 126, iron body with ASTM B 62 bronze disc and seat ring; flanged ends for ANSI standard 150 psi flanges. Acceptable manufacturers: Crane, Hammond, Red-White, Milwaukee, Nibco, Watts, or approved equal.

c. At the Contractor's option he may furnish for each 2½" and larger check valve above grade, Nibco #F-910 or Metraflex #900, 125 psi flanged globe style check valve; ASTM A 48, Class 35 cast iron body with ASTM B 584 bronze seat and disc; flanged ends for ANSI standard 150 psi flanges. Acceptable manufacturers: Bell & Gossett, Metraflex, Mussco, Nibco, or approved equal.

3. Water shut-off valves underground:

a. 2½" and smaller - Nibco #S-113 or Hammond #IB647 solid wedge, non-rising stem gate valve; 200 psi ASTM B 62 bronze body and wedge; TFE impregnated asbestos packing; solder ends; and stem extension to bring handle to within 9" (±) of finished grade. Acceptable manufacturers: Crane, Hammond, Red-White, Milwaukee, Nibco, or approved equal.

b. 3" and larger - Nibco #F-619-SON or Hammond #IR1138 solid wedge, non-rising stem, bronze mounted gate valve; 200 psi ASTM A 126, Class B iron body; ASTM B 62 wedge face ring on iron wedge; flanged ends for ANSI standard 125 psi flanges; #341, 2" square operating nut. Acceptable manufacturers: Crane, Hammond, Red-White, Milwaukee, Nibco, or approved equal.

4. Water check valves underground - Same as hereinbefore specified for check valves above grade.

B. Ball and throttling valves installed in insulated piping shall have factory furnished metal stem extensions suitable for the thickness of the insulation installed. Each type of valve furnished for the project shall be the product of the same manufacturer; i.e.,

each ball valve or butterfly valve, unless prior written deviation is given by the Architect/Engineer .

2.2 VALVES (Fire Protection)

A. Valves below grade:

1. Gate valves - Kennedy #71X, non-rising stem; iron body, ASTM A 126; bronze mounted, ASTM B 62, solid wedge; 175 psi rated; indicator post flange with 2" square nut; mechanical joint ends and stainless steel T-bolts, nuts and washers. Acceptable manufacturers: Nibco, Stockham, or approved equal.

2. Check valves - Stockham #G-939, swing check; iron body, ASTM A 126; bronze mounted, ASTM B 62; 175 psi rated; bolted cap; flanged ends and stainless steel hexagon head bolts, nuts and washers. Acceptable manufacturers: Nibco, or approved equal.

3. Valves used in the fire protection system shall be UL and/or FM listed.

2.3 VALVE BOXES

A. Valve box covers shall have the word "WATER" or "GAS" cast on top.

1. 2½" and smaller covers in non-traffic areas shall have cast iron ring with removable cover, ASTM A 48.

2. 3" and larger covers shall be of extendable, screw type, three piece, cast iron roadway box construction with drop in cover, ASTM A 48. Acceptable manufacturers: Tyler #6870 series, Vulcan #VAB-3, or approved equal. A T-handle socket wrench to fit 2" square valve operating nut shall be provided.

2.4 PIPE, FITTINGS, AND JOINTS

A. Soil, Waste, and Vent:

1. Underground and underslab pipe and fittings:

a. Service weight, centrifugally spun, cast iron pipe, and drainage type fittings with hub and spigot ends, ASTM A-74; pipe and fittings shall be coated per ASTM A-74; joints shall be neoprene insert type compression gaskets, ASTM C-564. Cast iron pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and listed by NSF International.

2. Above grade pipe and fittings:

a. Service weight, centrifugally spun cast iron pipe and drainage type fittings with plain or beaded ends, ASTM A 888 and CISPI 301; pipe and fittings shall be coated per ASTM A-74. Cast iron pipe and fittings shall

be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and listed by NSF International. Joints shall be neoprene elastomer sleeve with stainless steel shield and clamp assembly; sleeve shall bear the ASTM C 564 marking, clamp shall bear the CISPI 310 NO-HUB marking. Horizontal waste arms between stacks and plumbing fixtures shall be hard drawn, copper drainage tube, type DWV, ASTM B 306, or seamless copper water tube, type L, ASTM B 88; fittings shall be wrought copper drainage type, ASME B16.29 or cast copper drainage fittings, ASME B16.23; joints shall be solder type using 95-5 type tin-antimony solder, ASTM B 32, Alloy grade 95A..

B. Storm Drainage:

1. Underground and underslab pipe and fittings:

a. Service weight, centrifugally spun, cast iron pipe, and drainage type fittings with hub and spigot ends, ASTM A 74; pipe and fittings shall be coated per ASTM A 74; joints shall be neoprene insert type compression gaskets, ASTM C 564. Cast iron pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and listed by NSF International.

2. Above grade pipe and fittings:

a. The drainage system shall have service weight centrifugally spun, cast iron pipe, and drainage type fittings with plain or beaded ends, ASTM A 888 and CISPI 301; pipe and fittings shall be coated per ASTM A 74. Cast iron pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and listed by NSF International. Joints shall be neoprene elastomer sleeve with stainless steel shield and clamp assembly; sleeve shall bear the ASTM C 564 marking, clamp shall bear the CISPI 310 NO-HUB marking, clamp shall be Clamp-All Hi-Torq 80, Husky SD-4000, or approved equal.

C. Domestic Water:

1. Underground pipe and fittings outside of slabs:

a. Piping 3" and smaller - Seamless copper water tube, type L, hard drawn, ASTM B 88; fittings shall be wrought copper pressure type, ASME B16.22 or cast bronze pressure type, ASME B16.18; joints shall be solder type using 95-5 type tin-antimony solder, ASTM B 32, alloy grade 95A.

b. Piping 4" and larger - Extruded unplasticized pressure rated polyvinyl-chloride (PVC) plastic pipe, AWWA C900, Class 150 (DR18); with integral bell and spigot joints, ASTM D 3139; joints shall be push type, ASTM D 3139, using a solid cross section elastomeric ring, ASTM F-477; gaskets furnished by fitting manufacturer; fittings shall be cast iron water main type,

CI-PVC, ANSI/AWWA C104/A21.4, cement mortar lining shall be a minimum of 1/8" thick, ANSI/AWWA C104/A21.4.

2. Pipe and fittings under slabs on grade:

a. Piping 1½" and smaller - Seamless copper tube, type L, soft annealed, ASTM B 88. No joints will be allowed below the slab. Turn piping up and make joints above the slab.

b. Piping 2" through 3" - Seamless copper water tube, type L, hard drawn, ASTM B 88; fittings shall be wrought copper pressure type ANSI B16.22 or cast bronze pressure type, ANSI B16.18; joints shall be silver soldered using brazing alloys AWS A5.8, melting at or above 1000 degrees F.

c. Piping 4" and larger - Extruded unplasticized pressure rated polyvinyl-chloride (PVC) plastic pipe, AWWA C900, Class 150 (DR18); with integral bell and spigot joints, ASTM D 3139; joints shall be restrained type, ASTM D 3139, using a solid cross section elastomeric ring, ASTM F-477; gaskets furnished by fitting manufacturer; fittings shall be cast iron water main type, CI-PVC, ANSI/AWWA C104/A21.4, cement mortar lining shall be a minimum of 1/8" thick, ANSI/AWWA C104/A21.4.

3. Pipe and fittings above grade:

a. Piping 2½" and smaller - Seamless copper water tube, type L, hard drawn, ASTM B 88; fittings shall be wrought copper pressure type, ASME B16.22 or cast copper pressure type, ASME B16.18; joints shall be solder type using 95-5 type tin-antimony solder, ASTM B 32, alloy grade 95A.

b. Piping 3" and larger - Seamless copper water tube, type L, hard drawn, ASTM B 88; 3" and 4" fittings shall be roll grooved wrought copper pressure type, ASTM B 75; 5" and larger fittings shall be roll grooved, ASTM B 584; joints shall be made by using a two piece malleable coupling, ASTM A 47, or ductile iron, ASTM A 536 housing; gasket shall be molded EPDM suitable for -30 degrees to +230 degrees Fahrenheit; bolts and nuts shall be track-head, heat treated carbon steel, ASTM A 183.

D. Fire Protection:

1. Underground pipe and fittings - Extruded unplasticized pressure rated polyvinyl-chloride (PVC) plastic pipe, AWWA C900 Class 150 (DR8); with integral bell and spigot joints, ASTM D 3139; joints shall be push type, ASTM D 3139, using a solid cross section elastromeric ring: ASTM F-477; gaskets furnished by fitting manufacturer; fittings shall be cast iron water main type: CI-PVC, AMSI/AWWA C104/821.4, cement mortar lining shall be a minimum of 1/8" thick. ANSI/AWWA C104 A21.4.

2. Piping penetrating building floors, or walls - Ductile iron pipe, Class 52, 350 psi, ANSI A21.51; cement mortar lining shall be a minimum of 1/8" thick, ANSI A21.4. Pipe and fittings shall have an ANSI A21.11 mechanical joint with stainless steel bolts, nuts and washers and an ANSI B16.1 flanged joint above floor line.

2.5 WATER HAMMER ARRESTERS

A. Arresters shall be tested and sized per P.D.I. Standard WH 201 and ANSI A112.26.1M. Arresters shall be permanently sealed units constructed of copper, brass, or stainless steel materials. Acceptable manufacturers: Josam Series 75000, Precision Plumbing Products, Sioux Chief, Smith Series 5000, Wade Series W, Zurn Series Z-1700, or approved equal.

2.6 CLEANOUTS AND COVERS

A. Cleanout plugs installed in cast iron and copper piping systems shall be cast brass, flanged type with raised square head, CSS301. Cleanout plugs installed in plastic piping systems shall be of same material and have raised square head.

B. Covers installed outside the building shall be cast iron, 10" diameter, with a cast iron ring. Word "SEWER" or "DRAIN" shall be cast on the cover. Covers installed inside the building in un-carpeted floors shall be cast nickel brass, 10" diameter, with a scoriated satin finish and brass ring. Acceptable manufacturers, Josam #58610-10, Smith #4810, Wade, Zurn, or approved equal. Cleanouts installed in carpeted floors shall be a cast iron cleanout with adjustable nickel brass top with carpet clamping plate. Acceptable manufacturers Josam #5610-X, Smith #4020S-X, Wade, Zurn, or approved equal.

2.7 HOSE BIBBS

A. Hose bibbs shall be ¾" nickel plated brass, female flange to wall, vacuum breaker installed as an integral part of hose bibb and lock shield with loose key. Acceptable manufacturers: Woodford Model 24P, Prier Brass Model C135 nickel-plated finish or approved equal.

2.8 WALL HYDRANTS

A. Wall hydrants shall be box type. Box and cover shall be stainless steel or cast brass with nickel finish. Hydrant shall be cast bronze or brass with tubing inlet, integral vacuum breaker, and loose key operator for hydrant and box cover. Contractor shall verify wall thickness for each hydrant prior to placing order. Acceptable manufacturers: Josam, Smith, Wade, Woodford, Zurn, Prier or approved equal.

2.9 BACKFLOW PREVENTERS

A. Reduced Pressure Backflow Preventer (Potable Water Service):

1. The reduced pressure device shall consist of two independently operating, spring loaded, center guided, "Y" pattern check valves, and one

hydraulically dependent differential relief valve. The device shall automatically reduce the pressure in the "zone" between the check valves at least 5 psi lower than the water inlet pressure. Should the differential between the upstream and the zone of the unit drop to 2 psi, the relief valve shall open and discharge to the drain. The device shall be rated at 175 psi working pressure with a water temperature range of 32 degrees F to 180 degrees F.

2. The mainline valve, body and caps, relief valve body and cover shall be bronze. Check valve and relief valve components shall be serviceable without removing the valve body from the piping system. Internal parts shall be of corrosion resistant materials. Included with the reduced pressure device shall be two shutoff valves, an in-line "Y" type strainer, air gap drain accessory, and 4 test cocks. Device shall meet the requirements of ASSE Standards 1013; AWWA Standards C506 and FCCCHR-USC. Acceptable manufacturers: AMES, Febco, Watts, or approved equal.

3. Where indicated on the drawings or required due to construction conditions, the backflow preventer shall be listed for vertical installation.

B. Double Check Device (Fire Service) - The double check detector assemblies shall consists of two independent check modules in a single housing, sleeve access port, four test cocks and two drip tight shut off valves. The checks shall be removable and serviceable, without the use of special tools. The housing shall be constructed of 304 (Schedule 40) stainless steel pipe with groove end connections. Checks shall have reversible elastomer discs and in operation shall produce drip tight closure against the reverse flow of liquid caused by back pressure for back siphonage. The bypass assembly consist of a meter registering gallon measurements, a double check valve assembly and required test cocks. Acceptable manufacturers: Ames, Fabco, Watts, or approved equal.

C. Water Heater Vacuum Relief - Brass construction, rated for 200 psi, 250 degrees F., and tested under ANSI Z21.22. Watts #N36 or approved equal.

D. Atmospheric Vacuum Breaker - Atmospheric vacuum breakers shall have bronze size orifice, non-spilling type. Poppets shall be molded plastic with a high heat resistance disc. Exterior finish shall be polished chrome. Vacuum breaker shall comply with ANSI A112.1.1 and ASSE Standard 1011. Acceptable manufacturers: Febco #710/ 715, Watts #288A, or approved equal.

E. Hose End Vacuum Breakers - Vacuum breakers shall be of brass construction with polished chrome finish. Internal working parts shall be stainless steel with silicone rubber diaphragm and disc. Female inlet and male outlet threads shall be standard ¾" garden hose type. Vacuum breakers shall have provisions for draining and "non-removable" features. Assembly shall comply with ASSE Standard 1011. Acceptable manufacturers: Watts #NF or approved equal.

2.10 INSULATION AND ACCESSORIES

A. Insulation shall have a vapor barrier jacket or facing complying with NFPA 90A fire and smoke hazard rating as determined by Underwriters Laboratories procedure

UL 723, ASTM E 84 and NFPA 255 not to exceed a flame spread of 25 and smoke developed of 50. Maximum jacket permeability (if jacketed) shall be 0.02 perms per ASTM E 96. Accessories such as adhesives, mastics, cements, tapes, etc., shall have the same fire and smoke hazard rating as jacket or facing.

B. Fiberglass insulation:

1. Pre-formed, split type, fiberglass pipe insulation with an all service jacket having a maximum "k" factor per ASTM C 335 of 0.23 Btu×in/hr×ft²×°F at a mean temperature of 75 degrees F. Acceptable manufacturers: Certainteed 500 Snap-on, Owens-Corning 25 ASJ/SSL, or approved equal.

2. Domestic cold water piping - ½" thick.

3. Domestic hot water supply and hot water circulating piping. Branch piping 2" and smaller not exceeding 12'-0" in length - ½" thick. Branch piping exceeding 12'-0" in length and main piping 2" and smaller - 1" thick. Main piping 2 ½" and larger 1 ½" thick.

4. Storm drain - duct wrap.

5. Fitting insulation shall be blanket type, ¾ pound per cubic foot density, commercial grade duct wrap with foil facing having a maximum "k" factor per ASTM C 518 of 0.32 Btu×in/hr×ft²×°F at a mean temperature of 75 degrees F. Acceptable manufacturers: Certainteed Standard Duct Insulation, Owens-Corning Commercial Faced Duct Wrap, or approved equal.

C. Fitting and valve insulation:

1. Fiberglass blanket insulation equal in thickness to the adjacent pipe insulation, field cut to fit fittings. Valves shall be insulated using oversized pipe insulation field cut to fit valves.

D. Accessories:

1. Fitting Covers - Preformed, one-piece, snap-on PVC jacket covers for fittings. Rated at 25/50 per ASTM E-84. Acceptable manufacturers: Certainteed Snap-Form, Proto LoSmoke, Zeston, or approved equal.

2. PVC Jackets - Smooth white PVC, 0.02" thick with self-sealing strip. Rated at 25/50 per ASTM E-84. Acceptable manufacturers: Proto LoSmoke or approved equal.

2.11 FIXTURES AND TRIM

A. Before ordering fixtures, the contractor shall review field conditions and shall coordinate with work of other trades including:

1. Coordinate counter mounted fixtures with cabinets details and counter tops to ensure adequate clearance and proper flange type for installation at each location.

2. Confirm that ADA fixtures are provided with appropriate ADA trim and accessories for full ADA compliance.

3. Confirm left/right hand features.

4. Confirm clearances for carriers.

B. Fixtures shall be provided with traps, set true and plumb, and securely fastened in place. Supply pipes to fixtures shall be fitted with stop valves. Exposed metal parts, trimmings, piping, fittings, valves, etc., shall be chromium plated brass. Heavy pattern cast iron floor flanges or threaded nipples with suitable gaskets to make joints gas and watertight shall be used on china fixtures.

C. China fixtures shall be white (unless otherwise noted) and shall be as manufactured by American Standard, Crane, Eljer, or Kohler.

D. Stainless steel sinks shall be as manufactured by Elkay or Just.

E. Electric water coolers shall be as manufactured by Elkay, Halsey Taylor, Haws, Oasis, or Sunroc.

F. Standard type brass supply fittings and trim shall be as manufactured by American Standard, Crane, Eljer, Kohler, Speakman, or Delta HDF. Hot and cold water valves on supply fittings shall be 1/4-turn cartridge type.

G. Flush valves shall be as manufactured by Delany, Sloan, or Zurn.

H. Drains and fixture carriers shall be as manufactured by Josam, Smith, Wade, Watts, Sun or Zurn.

I. Water closet seats shall be as manufactured by Beneke, Bemis, Church, Jones Stephens, Olsonite, or Centoco.

J. Terrazzo mop basins shall be as manufactured by Fiat or Stern-Williams.

K. Specialty type brass supply fittings and trim shall be as manufactured by Chicago Faucet, T&S Brass, Elkay or Zurn.

L. Safety equipment shall be as manufactured by Haws, Bradley, Guardian, Speakman, or Western.

M. Stainless steel institutional and prison fixtures, supply fittings and trim shall be as manufactured by Acorn, Bradley, Metcraft, or Willoughby.

N. Shower valves and heads shall be as manufactured by Leonard or Powers.

O. Fixtures:

1. Water Closets:

a. (WC-1) American Standard Afwall 1.6 #2257.103 or Kohler Kingston Lite #K-4430 wall hung, 1.6 gpf siphon jet, elongated vitreous china bowl with 1½" top spud.

1) Church #9500SSC or Centoco #1500CCSS solid white plastic open front elongated seat with check hinge and stainless steel hinge posts.

2) Sloan Regal #111 or Delany Flushboy #402, 1.6gpf manual flush valve with vacuum breaker and screwdriver stop. Where trap primer is required, provide trap primer option.

3) Concealed commercial chair carrier as required to suit wall or chase.

b. (WC-2) ADA fixture, Same as specified for (WC-1), but installed at ADAAG height.

2. Lavatories:

a. (L-2) ADA fixture, American Standard Studio #0614 or Kohler Ladena# K-2214 lavatory, undercounter vitreous china bowl, with overflow; size - 20"x17". Install at ADAAG height.

1) American Standard Heritage #5400.142H or Kohler Triton #K-7404-2A all brass supply fitting, 4" spread, with 1/4-turn lever handles, 1½ gpm flow restrictor, grid waste and tailpiece.

2) Lead free ASSE 1070 compliant point of use mixing valve, 3/8" O.D. Chrome plated compression tee, Flexible chrome plated brass supply risers with cone or flanged top.

3) 1¼"x1½" 17-gauge cast brass, slip joint type P-trap.

4) Flexible chrome plated brass supply risers with cone or flanged tops, chrome plated wall extensions, and loose key angle compression stops.

5) Truebro LavGuard or equal trap and pipe insulation.

3. Urinals:

a. (U-1) American Standard Lynnbrook #6601.012 or Kohler Bardon #K-4960-ET wall hung, siphon jet or washout, vitreous china urinal with integral trap, 3/4" top spud with chair carrier.

1) Sloan Regal #186 or Delany Flushboy #451 manual 1.0 gpf flush valve with vacuum breaker and screwdriver stop.

2) Concealed commercial chair carrier as required to suit wall or chase.

b. (U-2) ADA fixture, Same as specified for (U-1) but installed at ADAAG height.

2. Electric Water Coolers:

a. (EWC-1) ADA fixture, Halsey Taylor # HTHB-HAC8BLSS-WF or equal wall hung filtered hi-low water cooler with bottle filling station and ADA skirt. Receptor, backsplash, and cabinet enclosure shall be stainless steel finish. Compressor shall be mounted below receptor. Capacity at 80 F ambient shall be 8.0 gph of 50 F water. Compressor shall be air cooled, 1/15 hp, 4.8 amps at 115 volts. Install at ADAAG height.

1) 1¼" x 1½" 17-gauge tubular brass, slip joint type P-trap.

2) Flexible chrome plated copper or brass supply riser with cone or flanged top and wheel handle compression stop.

3) In wall Bi-Level fountain carrier.

3. Sinks:

a. (S-1) Elkay Dayton # DSESR127224 or equal, 8" deep, 18-gauge type 304 stainless steel, top mounted, single compartment countertop bowl; four hole punching.

1) Elkay #LKD-2443C or equal. 8" Centerset exposed deck mount faucet with arc spout and 2-5/8" lever handles with side spray chrome and aerator for four hole punching.

2) Two Elkay #LKAD-35 or Just #J-ADA-35-FS stainless steel crumb cup strainers with neoprene stopper and chrome plated brass tailpiece; 1 1/2" offset waste.

3) Elkay #LK-53 or Just #35, 1½" chrome plated brass, end outlet continuous waste.

4) Lead free ASSE 1070 compliant point of use mixing valve, 3/8" O.D. Chrome plated compression tee, Flexible chrome plated brass supply risers with cone or flanged top.

5) 1½" x 2" 17-gauge tubular brass, slip joint type P-trap.

6) Flexible copper or brass supply risers with cone or flanged tops and wheel handle 1/4 turn angle compression stops.

b. (S-2) Elkay Lustertone #LRAD-3321 or Just Stylist #DL-ADA-2133-A-GR, 6" deep, 18-gauge type 304 stainless steel, ADA compliant top mounted, double compartment countertop bowl; three hole punching.

1) Elkay #LKD-2442C or equal. 8" Centerset exposed deck mount faucet with arc spout and 2-5/8" lever handles chrome, and aerator for three hole punching.

2) Two Elkay #LKAD-35 or Just #J-ADA-35-FS stainless steel crumb cup strainers with neoprene stopper and chrome plated brass tailpiece; 1 1/2" offset waste.

3) Elkay #LK-53 or Just #35, 1½" chrome plated brass, end outlet continuous waste.

4) 1½" x 2" 17-gauge tubular brass, slip joint type P-trap.

5) Lead free ASSE 1070 compliant point of use mixing valve, 3/8" O.D. Chrome plated compression tee, Flexible chrome plated brass supply risers with cone or flanged top.

6) Flexible copper or brass supply risers with cone or flanged tops and wheel handle 1/4 turn angle compression stops.

4. Service Sinks:

a. (SS-1) American Standard Lakewell #7692.008 or Kohler Bannon K-6716 enameled cast iron with wall hanger and drilled back for faucets; size - 22" x 18".

1) American Standard Heritage #8341.076 or Kohler #K-8906 rough chrome finish supply fitting with vacuum breaker in spout, bucket hook, indexed lever handles and stops in shanks.

2) Chrome plated strainer outlet.

3) American Standard #7798.030 or Kohler #K-6673 acid-resisting inside enameled cast iron P-trap standard with painted exterior chrome plated strainer, and supporting flange; 3" size.

1.2 MOUNTING HEIGHTS OF PLUMBING FIXTURES

Fixture	Standard Height	Adult ADAAG	Pre-K & Kindergarten
W.C.	15" rim to floor	*17" - 19" seat to floor	*11" seat to floor
L.	31" rim to floor	29" bottom of apron to floor	30" rim to floor
U.	24" rim to floor	17" rim to floor	----------
E.W.C.	40" rim to floor	36" spout outlet to floor	30" rim to floor
S.	36" rim to floor	**34" rim to floor	
S.S.	26" rim to floor	----------	

*Handle for flush valve in barrier-free stall shall be mounted to wide side of stall, refer to architectural drawings.

**Sink bowl shall be 6½" deep (max.).

1.3 DRAINS - Refer to DRAIN SCHEDULE on drawings for each required drain.

1.4 ELECTRONIC TRAP PRIMERS

A. Electronic trap priming manifold shall supply a minimum of 2 ounces of potable water per opening at 20 PSIG once in each 24 hour period. The electronic trap priming manifold must be capable of equally priming from 4 through 30 individual floor drain traps. Electronic components shall include single point power connection at 120/1/60, manual override switch, minimum 5 amp breaker, 24 hour geared timer with relay and 5 second dwell function.

B. The unit shall be factory assembled, prepiped, tested and shall include a bronze body ¾" female NPT, WOG rated ball valve, ¾" water hammer arrester, copper barrel with brass piston and type "L" copper sweat connection, electronic brass body ¾" solenoid valve, and type "L" copper manifold with brass ½" compression fitting and orifice opening for precision water distribution to each floor drain trap. Units shall be insulated. In a 16 gauge steel enclosure suitable for surface or recess mounting. In addition, the components must comply with nationally recognized standards. The electronic trap priming manifold shall be fully warranted for the life of the plumbing system. Acceptable manufacturers: Precision Plumbing Products PT series or approved equal.

1.5 THERMOMETERS

A. Bi-Metal Type:

1. Each thermometer not furnished as part of packaged equipment shall be a rigid or angle style and have a stainless steel case, bezel, fittings, and stem. Scale plate shall be of white aluminum with permanent black figures and graduations. Head assembly shall be sealed with a glass window. Bi-metal element shall be a silicon coated low-mass helix carefully sized and aged, encased within the thermometer stem. Scale size shall be 5" diameter; stem length shall be 2½". Temperature ranges shall be 20 to 240 degrees F.

2. Furnish for each thermometer a separable well of brass construction, lagging extension type, for use in insulated piping systems. Thickness of insulation is as hereinafter specified. Acceptable manufacturers: Palmer, Weksler, or approved equal.

1.6 ELECTRIC WATER HEATER

A. Heater shall be of the commercial vertical electric storage type, fit the allocated space, be suitable to operate on the voltage indicated and have the capacity scheduled on the drawings. Tank shall be of steel construction, lined with a high temperature glass, hydraulic cement, or baked on fluorocarbon polymer. Tank shall be equipped with dip tube, anode rod, and drain valve. Minimum working pressure of tank shall be 150 psi. Tank shall be insulated with heavy density fiberglass insulation and encased in a factory finished metal jacket. A suitably sized ASME temperature and pressure relief valve shall be furnished and installed. Acceptable manufacturers: A.O. Smith, Hubbell, Ruud, State, or approved equal.

B. Heater shall be factory pre-wired and tested and shall be UL listed. Heating elements shall be Incoloy immersion type with individual fusing. Thermostat shall be immersion type or surface mounted. High temperature limit device shall be manual reset type. Control transformer shall be 120 volt. Where input exceeds 18 kw, multiple thermostats shall be provided to limit input in steps not exceeding 18 kw.

1.7 THERMAL EXPANSION TANK

A. Upper and lower domes of the tank shall have an outer shell of steel construction designed for 150 psi working pressure and 200degrees F temperature. The shell shall be specifically designed for a replaceable bladder tank. Tank shall be finished with zinc chromate primer. An integral support base shall be provided on floor models. Seamless replaceable bladder shall be constructed of heavy duty Butyl and shall be FDA approved for use in potable water systems. Fittings shall be non-ferrous. Tanks shall be factory pre-charged to 40 psig. Acceptable manufacturers: ELBI DTS Series, Wessels TXA Series, or approved equal.

1.8 TEMPERING VALVE

A. Central System:

1. High-low dual stage thermostatic water mixing valve system (which will provide standby service should one mixing valve be isolated for maintenance), shall have capacities as scheduled on the drawings, and shall be furnished with a large and small thermostatic water mixing valve, each including a solid bimetal thermostatic element which cannot puncture or fatigue and is covered by the manufacturer's seven year thermostat warranty. Both mixing valves shall be furnished with integral checkstops, unions on the inlets, outlet ball valve shutoffs, and locking temperature regulators. The system shall include a color-coded dial thermometer on the mixed water outlet. The system shall be factory assembled, manifolded and tested, with one cold water, one hot water, and one mixed water outlet connection. Manufacturer shall be certified to operate at any location in the domestic hot water system with or without a continuously operating return line circulator. The assembly shall be piped in accordance with the manufacturer's instructions and a piping diagram shall be furnished as part of the submittals. Acceptable manufacturers: Lawler, Leonard, Powers, Symmons, or approved equal.

B. Individual Fixture - Wall mounted, polished chrome plated 25 gpm at 45 psi thermostat mixing valve complete with combination union angle stop-check valves and removable strainers, dial thermometer, volume control and vacuum breaker. Assembly shall include an over-the-rim filler for use with mobile whirlpools. Wash-out hose assembly shall also be furnished and piped consisting of a polished chrome plated control valve, vacuum breaker, ¾" hose and nozzle and wall mounting bracket for hose. Acceptable manufacturers: Ille, Lawler, Leonard, Powers #431, or approved equal.

1.9 HEAT TRACING CABLE

A. Provide a complete UL listed system of cable, components, and controls to prevent pipelines from freezing. The cable shall be self-regulating type and shall consist of two #16 AWG tinned-copper bus wires embedded in parallel in a self-regulating polymer core that varies its power output to respond to temperature along its length, allowing the cable to be crossed over itself without overheating, to be used directly on plastic pipe, and to be cut to length in the field. The cable shall be covered by a radiation cross-linked modified polyolefin dielectric jacket. To prevent overheating, the cable shall have a self-regulating factor of at least 90 percent. The self-regulation factor is defined as the percentage reduction, without thermostatic control, of the cable output going from 40 degrees F pipe temperature operation to 150 degrees F pipe temperature operation. Acceptable manufacturers: Chemelex, Chromalox, Raychem XL Trace, Thermon FLX, or approved equal.

B. The cable shall operate on line voltages of 120 volts without the use of transformers. The following accessories shall be furnished for each cable circuit:

1. Power connection, end seal, splice and tee kits and require components for field installation.

2. Ambient sensing thermostat (non-capillary).

1.10 ELECTRICAL WORK

A. Materials shall be new and shall be Underwriters Laboratories labeled or listed. Wiring shall be contained in metallic raceways. Raceways shall meet the requirements of DIVISION 16 - ELECTRICAL. Wiring for 115 volts and higher shall be copper #12 AWG or larger. Wiring type, insulation, etc. shall meet the requirements of DIVISION 16 - ELECTRICAL. Wiring less than 115 volts shall be copper. Wire size, type and insulation shall be selected to suit the application.

PART 2 - EXECUTION

2.1 UNDERGROUND PIPING

A. Underground piping shall be laid with bell ends pointing upgrade. Pipe shall be graded carefully, bell holes shall be separately excavated and each length of pipe supported firmly and uniformly at the proper elevation and grade. Adjacent lengths of piping shall be adjusted with reference to each other, shimming or wedging between bell and spigot will not be permitted.

2.2 JOINTS

A. Cast iron compression joints - Joints shall have neoprene insert type gasket designed for use with plain end pipe and fittings. Gasket shall be folded and placed into hub so that retaining lip of gasket is properly seated. Approved gasket lubricant shall be applied to inside of gasket only. End of pipe or fitting shall be inserted into gasket and jacked into place using an approved jacking tool or lead maul and wood blocking per manufacturers recommendations.

B. Hubless cast iron joints and cast iron to PVC joints - Joints shall be made using approved connectors as hereinbefore specified. Piping shall be inserted into sleeve until seated, install shield to completely cover sleeve, tighten clamps with torque wrench to specified pressure.

C. Welded underground joints - Before field wrapping and coating of field welded joints the joint shall be thoroughly wire brushed and cleaned of scale, rust and other deleterious substances. Ends of the factory applied coating shall be trimmed back as necessary. Apply one coat of primer as recommended by the manufacturer of the tape being applied. Install two spiral wraps of 10 mil tape with ½" width laps.

D. Solvent welded (PVC) joints - Piping shall be cut square and accurate. Remove each burr from outside of pipe and ream inside to remove any chips. Ends of piping shall be beveled and cleaned prior to applying solvent. Apply a liberal coat of MEK (methyl-ethyl-ketone) solvent to the entire outer surface of the pipe to a width slightly more than the depth of the fitting socket. Apply a light coat of solvent to the entire inner surface of the fitting (being careful not to apply excessive quantities and avoid buildup inside socket when pipe is socketed). Apply a second liberal coat of solvent to the entire outer surface of the pipe. Immediately after applying the second coat of solvent to the pipe, insert the pipe to the full socket depth while rotating the pipe or fitting ¼ turn. Hold for 10 to 15

seconds to insure joint rigidity. After joining and before joint is set, wipe off excess cement from circumference of pipe and fittings.

E. Threaded and bonded (TAB) joints - Clean ends of piping using joint cleaner (methyl chloride, acetone or methyl ethyl keytone) and paper towels. Clean entire bonding surface to remove oil, grease, mud, fingerprints, etc., do not touch after cleaning. Thoroughly mix adhesive per manufacturers instruction. Apply adhesive to the machined portion of the spigot end of the pipe and ½" past the last thread of the bell end of the pipe or fitting. Screw the pipe together using wrenches suitable for use with fiberglass piping. Check lock-up of joint by moving pipe in a up-and-down or side-to-side motion. If movement of pipe at joint is noted tightened until no movement is noted.

F. Installation of screw jointed, and solder jointed, grooved jointed, and/or welded jointed piping shall be as specified in SECTION 15010 - MECHANICAL GENERAL PROVISIONS.

2.3 VALVE BOXES

A. Valve boxes shall be set flush with finished grade, concrete collar or paved surface. Each valve box shall be set in a precast or poured-in-place 4" thick concrete collar. Collar shall be 12" larger than the outside diameter of the valve box ring.

B. For valves 2½" and smaller, install a suitable length of 8" diameter PVC pipe between pipe and cast iron ring. Plastic pipe shall be notched to fit over the pipe. Valve shall not be deeper than 12" below grade. If the piping system is deeper than 18" below grade, the piping shall be offset to bring the valve within 12" of finished grade.

C. Valves 3" and larger, the adjustable riser portion of the roadway box shall be long enough to allow for the top to be raised an additional 2" inches without replacing the lower section. Provide two T-handle socket wrenches of sufficient length to operate the deepest valve on the project. Obtain a signed receipt from the Owner {} when wrenches are delivered.

2.4 CLEANOUTS AND COVERS

A. Cleanouts shall be of the same size as pipes in which they are installed up to 8" in diameter. Cleanouts shall be installed at the base of each stack and at each change of direction more than 45 degrees. Cleanouts shall be installed not more than 50 feet apart in lines 3" and smaller; 75 feet apart in 4" lines and not more than 100 feet apart in lines 5" and larger. Cleanout plugs shall be within 3" of finished grade or building slab.

B. Covers shall be installed on each cleanout concealed underground and under slabs on fill or grade. Cleanouts outside the building shall have the cover installed flush with the concrete paving or shall be set securely in a precast or reinforced concrete collar 12" larger than the diameter of the cast iron ring flange flush with finished grade. Cleanouts in the floor inside buildings shall have the covers and ring set flush with the finished floor covering. Cleanouts in carpeted areas shall have ring with an additional carpet flange. Cleanouts in walls, chases, or inaccessible ceilings shall have access doors as specified in SECTION 15010 - MECHANICAL GENERAL PROVISIONS.

2.5 HOSE BIBBS AND WALL HYDRANTS

A. Hose bibbs and wall hydrants shall be installed a minimum of 18 inches above finished grade. Water lines serving bibbs or hydrants shall be securely anchored to prevent movement. Flanges shall be set flush with finished wall surfaces.

2.6 WATER HAMMER ARRESTERS

A. Install water hammer arresters on each cold water header serving two or more flush valves and on each hot and cold water header serving four or more fixtures without flush valves. Also, install arresters at each quick closing valve such as, but not limited to, disposers, washing machines, dishwashers, solenoid valves, etc. Care shall be exercised when selecting arresters for high volume water usage equipment. ARRESTERS shall be selected, sized and installed per P.D.I. Standard WH 201. Install access doors as hereinbefore specified for each arrester installed in inaccessible chases, walls, or ceilings.

2.7 BACKFLOW DEVICES

A. Installation of backflow devices, where indicated on the drawings, shall be by a certified installer. Prior to acceptance of the project, the backflow device shall be tested by the installer and a test report furnished the Architect/Engineer .

B. Backflow devices shall be installed a minimum of 12" above finished floor or grade and shall be protected against physical injury. Vacuum breakers (atmospheric type) shall be installed a minimum of 6" above the flood level of the fixtures or equipment served. Device shall be constructed so that it may be serviced without removing the device from the piping system.

C. When installed inside the building an air gap drain (AGD) funnel shall be installed on each reduced pressure backflow device and piped to the nearest floor drain unless otherwise noted. When installed outside of the building, the device shall be protected by an insulated enclosure.

2.8 INSULATION

A. Pipe, fittings, valves, etc., shall be insulated as hereinafter specified unless otherwise noted.

B. Piping systems:

1. New domestic water piping, fittings and valves installed inside the building or in an accessible crawl space shall be insulated with pipe insulation as hereinbefore specified. Underground domestic hot and tempered water piping, fittings and valves shall be insulated with ¾"-thick foamed elastomeric slip-on tubular type insulation as hereinbefore specified.

2. Fitting insulation shall be covered with jacket covers. Jacket cover joints shall be fastened using stainless steel tack fasteners, pressure sensitive tape, brushed-on vapor barrier mastic or any approved combination.

3. New horizontal runs of waste and horizontal runs of storm drainage piping inside the building including the fittings shall be insulated. The bottom of the roof drain body and the vertical pipe between the drain body and the horizontal main shall also be insulated. Piping installed above suspended ceilings shall be wrapped with duct wrap as hereinbefore specified. Exposed piping shall be insulated with split type pipe insulation as hereinbefore specified for water piping. Use oversized insulation on hub and no-hub joints.

4. Floor drains and P-traps receiving air conditioning condensate and electric water cooler waste piping above the lowest floor slab, shall have the waste piping and fittings including the bottom of the floor drain insulated from the floor drain or P-trap to the waste stack.

C. Joints:

1. Fiberglass - Transverse joints in exposed fiberglass insulation shall be secured by self-adhering butt strips. Longitudinal joints in exposed fiberglass insulation shall be secured by self-adhering lap strips which are an integral part of the vapor barrier jacket. Longitudinal joints in concealed fiberglass insulation shall be secured as specified for exposed insulation or may be stapled by using outward clinching staples. If the self-adhering lap strips do not adhere firmly, the Contractor shall re-secure the defective lap strips by stapling as specified above.

D. Protective covering:

1. Where insulation is exposed to areas of physical abuse or damp and wet areas such as toilet rooms, crawl spaces, kitchens, dishwashing rooms, mechanical, and water heater rooms, etc., exposed insulation up to 6'-0" above the floor shall be covered with a PVC jacket.

2. Where fiberglass insulation is exposed to the weather it shall be covered with two layers of 15 pound inorganic roofing felt secured in place with aluminum tie wires in 12" centers. Transverse joints of the felt shall be lapped a minimum of 6". The felt shall be covered with a PVC jacket, as hereinbefore specified. Fitting insulation shall be covered with UV stabilized PVC jacket covers. Each fitting joint shall be weatherproofed. Elastomeric insulation shall be weatherproofed by applying two coats of latex paint, per manufacturers recommendations, to the insulation.

2.9 FIXTURES AND TRIM

A. General:

1. Each fixture shall be securely fastened to its supporting device (blocking, carrier, floor, or wall hanger). Each fixture shall be installed level and

plumb for proper operation. Space between the finished wall and the top and sides of each fixture shall be caulked with flexible silicone based compound. Water lines serving fixtures shall be securely anchored in wall to prevent undue movement. Adjacent and similar fixtures shall be installed at the same elevation. Edges, tops and sides of fixtures requiring caulking or grout shall have joint finished flush with fixture.

2. Where commercial chair carriers are specified for fixtures, carriers shall be securely and properly bolted to the floor slab using wedge type anchor bolts. Securing carriers to adjacent metal studs for support will not be permitted.

3. Where wall hangers are specified for fixtures being installed on metal stud walls, the Contractor shall, if required by the type of fixture, provide additional bracing to prevent wall from deflecting when 150 lbs. of pressure is applied to front edge of fixture. Where wall hangers are specified for fixtures being installed on masonry walls, the Contractor shall use inserts as required to properly secure hanger.

B. Water Closets:

1. Bowls hung from chair carriers shall have proper washers and nuts installed behind bowl and have the outside acorn nuts torqued to proper tightness.

C. Lavatories and Sinks:

1. Wall hung bowls shall have the chair carrier set screws properly tightened to secure lavatory to carrier arms.

2. Countertop bowls shall be set in a continuous heavy bead of flexible silicone caulking compound and anchoring screws tightened securely.

D. Urinals:

1. Bowls hung from chair carriers shall have proper washers and nuts installed behind the urinal and acorn nuts torqued to proper tightness.

E. Service Sinks:

1. Fixture shall have a wall hanger securely fastened to the blocking in the wall. Trap standard support leg shall be adjusted to bear the weight of the fixture.

F. Drains:

1. Floor Drains - Floor drains shall be installed at the low point of the floor unless drain is used as a hub or kitchen drain.

2. Hub Drains - Hub drains serving equipment shall have the rim of the drain installed above the finished floor for use as an open sight drain

3. Membrane flashing clamp shall be attached to the waterproof membrane furnished under other Divisions.

2.10 SANITARY SYSTEM

A. Sewage piping from soil and waste stack lines shall be extended to 10 feet outside of the building and terminated with a plug for extensions under other Divisions of the Specifications.

B. Horizontal sanitary piping shall be graded not less than 1/8" per foot unless otherwise noted. See drawings for grading other than specified above. Swing joints shall be installed in sewer systems where piping leaves pile supported slabs. Changes in direction in the sanitary system shall be made by the appropriate use of 45 degree wyes, long or short sweep quarter bends, sixth, eighth, or sixteenth bends, or by a combination of these or equivalent fittings. Single or double sanitary tees and short quarter bends may be used only where the flow is from the horizontal to the vertical. Waste and vent lines shall be provided for each fixture and drain, as scheduled on the drawings.

C. Vent piping shall be connected at a height of not less than 12" above the flood level of the fixture served, and shall be graded to drip back into the soil, waste, or vent stack by gravity. Fixtures not specified to be provided with traps as integral parts of their assembly shall have separate traps. No PVC piping shall be installed in any return air plenum space.

D. Vertical stacks, (stack vents and vent stacks) unless indicated otherwise, shall be extended full size not less than 9" above the roof and shall be placed in position before the roofing is applied. Vents shall be flashed using two piece boot and thimble type flashing with the top of thimble turned down into the cavity of the pipe. Flashing shall be of 2½ pound sheet lead and shall extend 8" from the outside of the boot in all directions. Vertical stacks installed through metal roofs shall have flashing furnished and installed under other Divisions of the Specifications. No vertical stacks shall be installed within 10'-0" of any new or existing air intakes. Offset stacks in ceiling below to comply with this requirement.

2.11 STORM DRAINAGE SYSTEM

A. Drainage piping from interior roof drain leaders and interior area drains shall be extended to 10 feet outside of the building and terminated with a plug for extensions under other Divisions of the Specifications.

B. Horizontal piping shall be graded not less than 1/8" per foot unless otherwise noted. See drawings for grading other than specified above. Swing joints shall be installed in storm drainage systems where piping leaves pile supported slabs.

C. Changes in direction in the drainage system shall be made by the appropriate use of 45 degree wyes, long or short sweep quarter bends, sixth, eighth, or sixteenth bends, or by a combination of these or equivalent fittings.

2.12 WATER SYSTEM

A. Water piping (domestic and fire) shall be extended to outside the building line and connected to the site water systems.

B. Underground copper water mains shall be installed with a minimum earth cover of 18". Underground plastic water mains shall be installed with a minimum earth cover of 2'-6". Offsets, where indicated on the drawings, shall be installed in water system piping, to compensate for ground subsidence, where piping leaves pile supported slabs. Branch lines from hot and cold water mains shall be provided and connected to fixtures, heaters, hose bibbs and outlets indicated. Shutoff valves shall be provided where shown, specified or noted and on each supply to each fixture not provided with a compression stop or auxiliary shutoff valve.

C. Provide valved make-up and/or quick-fill connections where indicated on the drawings for the chilled, hot and/or condenser water systems. Sizes shall be as indicated. Final connection will be made under SECTION 15600 - HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS. Provide a pressure reducing valve set at 20 psi on the hot water supply line to each commercial dishwasher and clothes washer.

2.13 WATER HEATERS

A. Waters shall be installed within a drain pan on a concrete pad. Heater shall be positioned so that piping connections are accessible. NEC clearance shall be provided for access to electrical components. Heaters shall have adequate clearance to remove and replace heating devices (electrical elements or gas burners). Space shall be allowed for heaters to be removed and replaced without removing adjacent piping or equipment.

2.14 THERMAL EXPANSION TANK

A. Thermal expansion tank shall be connected into the cold water piping to the water heaters, between the heater inlet and the check valve. When multiple heaters are installed, connection point shall be the common line serving each heater.

2.15 CLEANING AND FLUSHING

A. New water lines shall be cleaned and flushed prior to being placed in use and before final acceptance. Water shall be allowed to flow at full main pressure through fixtures and outlets for a minimum of 15 minutes. Prior to flushing, aerators shall be removed and shall be replaced after flushing.

2.16 DISINFECTION OF POTABLE WATER PIPING

A. Potable water lines shall not be used until tested, disinfected and approved by the Architect/Engineer and the Division of Health, Louisiana Department of Health and Human Resources Administration. Furnish suitable plugs or caps for the pipe, injection pumps, pipe connections, disinfectant, and equipment together with any labor required. Sterilization shall comply with the requirements of the Louisiana State Plumbing Code and other local authorities.

1. Before disinfection, each line shall be flushed clean. Sterilization shall be accomplished with a chlorine solution made with liquid chlorine or hypochlorite containing not less than 50 ppm of available chlorine. Other disinfectants may be used upon approval of the Architect/Engineer .

2. The chlorine solution shall be introduced in a manner that will insure uniform distribution. While the solution is being applied to any section of the system, the water shall be allowed to escape at the extremities of this section until an orthotolidin test indicates a 50 ppm chlorine residual. The chlorine solution shall be allowed to remain in the section for a minimum of 24 hours after which the lines shall be thoroughly flushed until the residual chlorine is reduced to 1.0 ppm.

3. Samples shall be taken for bacteriological tests. If tests indicate that the lines are not completely sterilized, the process shall be repeated on that section, at no additional cost, until the bacteriological tests indicate that the section is disinfected.

2.17 PROTECTION OF TUBING

A. Water piping installed through concrete slabs on grade or fill shall be protected by a 0.008 mm thick plastic sleeve, color coded (red for hot, blue for cold) and shall extend from 12" below slab to minimum of 6" above slab. Tubing shall be installed at least 3" clear of any reinforcing steel, conduits, etc. Where copper tubing is installed through holes or notches studs, joists, etc., or through furring strips on hollow masonry walls, an approved steel plate shall be installed on each side of member to protect the tubing from damage by nails, screws, staples, etc.

2.18 TESTS OF PIPING

A. The tests described below shall be made in the presence of the Architect/Engineer and a representative of the authority having jurisdiction, if required.

B. Soil, Waste, Vent and Storm Drainage - Piping shall be tested in sections not less than 10' nor more than 40' in height. Stacks shall be filled with water to the highest point and allowed to stand for 30 minutes without dropping. A smoke or peppermint test may also be required should leaks not be identified during the pressure test.

C. Water - Piping shall be subjected to a hydrostatic pressure test of 100 psi for one hour with no drop in pressure. Piping systems installed above an existing ceiling system shall be tested with compressed air at 100 psi for one hour.

2.19 HEAT TRACE CABLE (Freeze Protection)

A. Apply the cable linearly on the pipe after piping has been successfully pressure tested. Secure the cable to metallic piping with cable ties or fiberglass tape. For installation on plastic piping, the cable shall be applied using aluminum tape (AT180). After installation and before and after installing the thermal insulation, subject cable to testing using a 1000 VDC megger. Minimum insulation resistance should be 20 to 1000

megohms regardless of length. Apply "electric traced" signs to the outside of the thermal insulation.

B. The cable shall be sized according to the table below. The required heater output rating is in watts per foot at 50 degrees F.

Pipe Size	Wattage per foot
3 inch or less	5 watt
4 inch	5 watt
6 inch	8 watt
8 inch	2 strips - 5 watt
12 inch to 14 inch	2 strips - 8 watt

2.20 ELECTRICAL WORK

A. Control or signaling wiring shall not be installed in raceways with power wiring. Wiring and raceways for line voltage interlocking shall be work of this Section. Voltage shall be 115 volts, 1-phase, 60 hertz. Provide transformer where required. Control and signaling wiring and raceways between equipment specified under this Section shall be work of this Section.

B. A source of power may be indicated under DIVISION 16 - ELECTRICAL for activating control devices where power for controls does not originate at the control transformer furnished with the starter or control panel. Work of this Section shall include wiring required for controls from this source. If additional 120 volt power is required it shall be obtained from spare breakers at a location approved by the Architect/Engineer . The cost of installation of raceways, wiring, etc. shall be included as work of this Division. The Contractor shall review electrical drawings prior to bidding.

- END OF SECTION -

SECTION 15500 - FIRE PROTECTION SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

A. The work under this Section includes the design and installation of a complete coverage light hazard wet pipe automatic sprinkler system in accordance with NFPA 13, The system shall include items specified or necessary for a complete and operating system.

B. The wet pipe sprinkler system shall be provided with the required components to provide a complete and working system which shall include but shall not be limited to control valve, system check valve, strainers, water gauges, drain and test valves, ball drips, fire department connection, sprinkler heads, piping, and flow and valve supervisory switches.

1.2 SPECIAL REQUIREMENTS

A. **The project includes several unique elements which will require careful attention during preparation of sprinkler system shop drawings. Bidders shall thoroughly review all portions of the contract documents to obtain a full understanding of project requirements. Some of the unique elements which effect layout of the sprinkler system include:**

1. All sprinkler piping shall be concealed with exception of the fire service in Mechanical Room 110.

2. There are many special ceiling features throughout the project. The main corridors extend to the underside the sloping roof above with a raised center section which has clerestory windows. There area series sloping ceilings, acoustical baffle ceilings, gypsum board ceilings, and lay-in ceilings.

3. Review location of fire department connections with the Local Fire Department and obtain their approval prior to preparation of shop drawings.

4. Prior to performing hydraulic calculations, the contractor shall preliminary submit drawings showing proposed head locations and proposed piping layout for Architect/Engineer review. The drawings shall demonstrate full sprinkler coverage and full coordination with ceilings, structure, lighting, and other building elements

5. The contractor shall prepare hydraulic calculations and final sprinkler shop drawings for submission to the Office of the State Fire Marshal only after receiving A/E approval of the preliminary shop drawings.

1.3 CONTRACTOR QUALIFICATIONS

A. The installation of the fire protection system shall be by a licensed Fire Protection Contractor, certified by the State of Louisiana, regularly engaged in the installation of fire protection systems and equipment.

1.4 SUBMITTALS

A. Prepare equipment brochures, hydraulic calculations, and shop drawings for the work of this contract. Equipment brochures shall consist of items specified hereinafter and items that are pertinent to the work. Hydraulic calculations shall be computer generated in an acceptable NFPA format. Shop drawings shall show the location of heads, arrangement of piping, equipment and details necessary to install the work. Shop drawing size shall not exceed “E” size (30" x 42") sheets.

B. Submit the following to the Architect/Engineer for review:

1. Six sets of equipment brochures.
2. Six sets of hydraulic calculations.
3. Four sets of shop drawings.
4. Completed Louisiana State Fire Marshal's plan review forms.
5. Check for review fee, if applicable.

C. The hydraulic calculations and shop drawings shall be prepared by and certified by a NICET Level III designer or a registered Louisiana mechanical engineer.

D. In the event additional clarifying details and/or components are required by the inspecting authorities, the Contractor shall prepare the details, secure approval and provide components at no additional cost to the Owner.

1.5 ELECTRICAL WORK

A. Electrical work in connection with work of this Section not indicated as work of DIVISION 16 - ELECTRICAL, including disconnect switches for control wiring, shall be work of this Section.

PART 2 - PRODUCTS

2.1 PIPING

A. Interior wet sprinkler piping:

1. Piping 2" and smaller - Welded and seamless carbon steel pipe, Schedule 40, ASTM A 53, fittings shall be threaded black cast iron 125 psi, ANSI B16 .4; joints shall be threaded.

2. Piping 2½" and larger - Welded and seamless carbon steel pipe, Schedule 40, ASTM A 53; fittings shall be grooved type malleable iron, 500 psi rating, ASTM A 47, listed by UL and/or FM; joints shall be rolled or cut grooved type.

3. Flexible sprinkler piping and fittings are not acceptable.

B. Flanges:

Where indicated on the drawings or required by products hereinafter specified, flanges shall be installed. Flanges shall be carbon steel, ASTM A 181, Grade 1, 150 psi, ANSI B16.5. When installed on piping required to be galvanized, flanges shall also be galvanized.

C. Flanged fittings:

Where indicated on the drawings or required by products hereinafter specified, flanged fittings shall be installed. Fitting shall be black cast iron, short body, Class 250, ANSI A21.10; tar coated outside, cement mortar lined inside, ANSI A21.4. When installed on piping required to be galvanized, fittings shall also be galvanized.

2.2 JOINTS

A. Flanged joints shall be in accordance with ANSI B16.1. Gaskets shall be full face of 1/8" minimum thickness red rubber. Flange bolts inside building shall be hexagon head machine bolts with heavy hexagon nuts, cadmium plated, in accordance with ANSI B18.2. Bolts, washers, and nuts installed outside of buildings shall be stainless steel.

B. Grooved joints shall be UL listed and FM approved. Gasket material shall be butyl rubber. Coupling shall be secured using track head cadmium plated bolts and nuts. Grooves shall be cut or rolled type for Schedule 40 pipe. Bolts, washers, and nuts installed outside of buildings shall be stainless steel.

C. Welded joints shall be in accordance with ANSI B31.1.0, ANSI B31.1.0a, and ANSI B31.1.0b.

D. Screwed joints shall be in accordance with ANSI B2.1.

2.3 VALVES

A. Valves above grade:

1. Gate valves 2½" and smaller - Bronze body solid wedge ASTM B 62, rising stem, outside screw and yoke (OS&Y); 175 psi rated; malleable iron handwheel; female threaded ends.

2. Gate valves 3" and larger - Iron body, ASTM A 126; solid bronze wedge, ASTM B 62; rising stem, outside screw and yoke (OS & Y); 175 psi rated; malleable iron handwheel; grooved ends or flanged ends for ANSI 150 psi flanges.

3. Butterfly valves 2 ½" and larger - Iron body with EDPM molded rubber disk, 175 psi rated; grooved ends; wheel handle operator; valve position indicator; built-in SPDT supervisory switch.

4. Check valves 2½" and smaller - Iron body swing check, ASTM A 126; bronze mounted, ASTM B 62; 175 psi rated; bolted cap, screwed ends.

5. Check valves 3" and larger - Iron body swing check, ASTM A 126; bronze mounted, ASTM B 62; 175 psi rated; bolted cap, grooved ends or flanged ends for ANSI 150 psi flanges.

B. Valves used in the fire protection system shall be UL and/or FM listed.

2.4 FIRE DEPARTMENT CONNECTION

A. Fire department connection hose inlets shall be brass female having individual clapper valves, 2½" double female snoots with rigid end NPT x pin lug hose thread swivels, with chrome plated brass caps and chains. Body shall be angle or straight type as required by job conditions. Inlet threads shall be 7½ NST threads per inch. Nameplates shall be chrome plated brass and lettered AUTO-SPKR

B. Fire department connection shall be located away from the building and have a Y-type, chromium plated 2-way type 2½" x 2½" x 4" size with cast brass body and escutcheon.

2.5 RISER CHECK VALVE

A. The riser check valve shall be a control check valve which provides for the proper functioning in a wet pipe sprinkler system riser. It shall be complete with the following features: Body shall be cast iron with a stainless steel clapper assembly; tappings for pressure gauges and drains; two pressure gauges and angle drain valve; elastomer seal-facing on spring-loaded clapper; and valve shall have grooved ends.

2.6 ELECTRIC ALARM BELL

A. Bell shall be 6" size suitable for fire alarm service. Bell shall be vibrating type with red finish suitable for outdoor use. Bell voltage shall be 24VDC. Provide weatherproof backbox for outdoor use. Bell shall be UL listed and FM approved.

B. Minimum dB rating at 10 feet for 6"-24VDC bell shall be 76.

2.7 INSPECTOR'S TEST AND DRAIN

A. Valve shall be ball type, bronze body, 300 psi rated; glass impregnated Teflon seat; screwed ends, with sight glass; pressure gauge; bypass piping and relief valve if required. Acceptable manufacturers: AFG Manufacturing Co., or approved equal.

2.8 SWITCHES

A. Flow switches - Flow switches shall be installed in the sprinkler system where indicated on the drawings. Switches shall be designed for horizontal or vertical installation and shall not be installed within 12" of any fitting that changes the direction of flow. Switches shall be listed by UL and/or FM. Switch shall be actuated by a polyethylene vane extended into the waterway of the pipe and shall operate an automatic recycling pneumatic retard element. Retard element shall have an adjustable range of 0 to 60 seconds. Sensitivity setting of switch to signal flow of water that equals or exceeds the discharge from one sprinkler head. Switch shall have two SPDT auxiliary contacts. Switch shall be attached to pipe by securing the base plate to the pipe with a U-bolt clamp. Cover of switch shall be impact resistant and shall have ½" conduit hole for wiring connection to the fire alarm system. Acceptable manufacturers: ADT, Grinnell, Notifier Series WFD, or approved equal.

B. Pressure Switches - Pressure switch shall be installed on the dry pipe system accelerator. Switch shall contain two single pole double throw, normally closed, snap-action type switches. Switches shall be UL listed and/or FM approved. Housing shall be metal, watertight, NEMA 4 construction. Connection to the sprinkler system shall be ½" NPT male, connection to the alarm system shall be a 7/8" O.D. knockout. Switch shall be activated by a 3 psi (± 2 psi) drop in system pressure. Switch shall be rated at 300 psi with an adjustable range of 2 to 20 psi. A safety stop shall be provided at 20 psi to prevent setting switch pressure above water main pressure. Acceptable manufacturers: ADT, Notifier, Potter Electric, Viking, or approved equal.

C. Supervisory switch for gate valves - Switches shall be installed on each valve designated on the drawings or in the specifications. Switch shall be mounted so as not to interfere with the normal operation of the valve and shall be adjusted to activate within two revolutions of the valve control or when the stem has moved no more than one-fifth the distance from its normally open position. Switches shall be UL listed and/or FM approved. The mechanism shall be contained in a weatherproof housing, with a 1" tapped conduit entrance and incorporate the necessary facilities for attachment to the valve. The switch mechanism shall have two SPDT contacts and shall be rated at 5 amps at 125 VAC or 0.25 amps at 125 VDC. Removal of the installed assembly shall cause the switch to activate. Switch shall be connected to the fire alarm system. Acceptable manufacturers: ADT, Grinnell, Notifier #SGV, Potter Electric, or approved equal.

D. Supervisory switches for post or wall indicators - Switches shall be installed on post or wall indicators installed on this project. They shall be mounted so as not to interfere with the normal operation of the valve and shall be adjusted to activate within two revolutions of the valve control or when the stem has moved no more than one-fifth the distance from its normally open position. The mechanism shall be contained in a weatherproof cast aluminum housing, with a ¾" tapped conduit entrance and incorporate the necessary facilities for attachment to the valve. The switch mechanism shall have one SPDT contact rated at 1 amp at 125 VAC or 0.25 amp at 24 VDC. Removal of the installed

assembly or the cover shall cause the switch to activate. Switch shall be connected to the fire alarm system. Switches shall be similar to Notifier #NIP and shall be listed by UL and FM. Acceptable manufacturers: ADT, Grinnell, Potter Electric, or approved equal.

2.9 PRESSURE GAUGES

A. Gauges shall have a 3½" dial diameter with cast aluminum flange less case, phosphor bronze bourdon tube, stainless steel movement and Delrin gears. Accuracy shall be ½ of 1 percent of the scale range. Gauge shall have a ¼" NPT forged brass socket and tip. Gauge scale shall be from 0 to 150 psi. Acceptable manufacturers: Marshaltown Model 175P, Weksler, U.S. Gage, or approved equal.

2.10 SPRINKLER HEADS

A. Heads installed in areas without ceilings or in spaces above suspended ceilings shall be upright type with bronze finish. Light hazard heads shall be quick response type. Heads installed in areas with smooth suspended ceilings shall be one or more of the flush type. Cover plates for flush heads shall have custom finish selected by architect. Other types of heads exposed to view shall be chromium plated with matching escutcheons.

B. Heads shall be rated at 165, 212, and/or 286 degrees Fahrenheit as required to suit the hazard protection. Connections shall be ½ or ¾ inch, male threads, ANSI B2.1, with ½ and/or 17/32 inch orifice. Heads shall be tested and listed by UL and/or FM. Sprinklers shall be the product of the manufacturer represented by the successful sprinkler Contractor. Sprinkler heads installed where they may be exposed or subject to mechanical damage shall be provided complete with head guards.

2.11 SPARE HEAD BOX

A. Provide in a conspicuous place near the main riser valve or fire pump, an enameled steel box housing 12 spare heads and a sprinkler wrench. Style and rating of heads shall be in proportion to the style and ratings of the heads installed.

2.12 IDENTIFICATION SIGNS

A. Drains, alarm test valves, etc., required to have signs by NFPA 13 and 14 shall have standard identification signs. Signs shall be painted fire red with white lettering and shall be attached in a conspicuous position.

2.13 INSULATION

A. Insulation shall have a vapor-barrier jacket or facing complying with NFPA-90A fire and smoke hazard rating as determined by Underwriters Laboratories procedure UL 723, ASTM E 84 and NFPA 255 not to exceed a flame-spread of 25 and smoke-developed of 50. Maximum permeability of jacket shall be 0.02 per ASTM E 96.

B. Accessories such as adhesives, mastics, cements, tapes, etc., shall have the same fire and smoke hazard rating as jacket or facing.

C. Piping Systems:

1. Piping shall be insulated with preformed split-type insulation as indicated below. Insulation type and thickness shall be in accordance with the following table:

Fire Service Piping			
Service	**Pipe Size**	**Insulation Type**	**Insulation Thickness (inches)**
Branch and main piping serving the Receving.	All	Fiberglass with 0.03" thick white PVC jacket.	1”

2. Fiberglass Piping Insulation - Pre-formed split-type fiberglass insulation, nominal 3-pound per cubic foot density, white all service jacket, and with thermal conductivity (k factor) of 0.23 at mean temperature of 70° F. Insulation shall be by Knauf, or approved equal. Insulation shall accommodate the heat tracing cable specified below.

2.14 HEAT TRACING CABLE

A. Provide a complete UL listed system of cable, components, and controls to prevent pipelines from freezing. System shall be specific UL/FM listed for main and branch piping fire systems.

B. The cable shall be self-regulating type and shall consist of two #16 AWG tinned-copper bus wires embedded in parallel in a self-regulating polymer core that varies its power output to respond to temperature along its length, allowing the cable to be crossed over itself without overheating, to be used directly on plastic pipe, and to be cut to length in the field. The cable shall be covered by a radiation cross-linked modified polyolefin dielectric jacket.

C. To prevent overheating, the cable shall have a self-regulating factor of at least 90 percent. The self-regulation factor is defined as the percentage reduction, without thermostatic control, of the cable output going from 40 degrees F pipe temperature operation to 150 degrees F pipe temperature operation.

D. The cable shall operate on line voltages of 208 volts without the use of transformers.

E. The following accessories shall be furnished for each cable circuit:

1. Power connection, end seal, splice and tee kits and require components for field installation.

2. Provide Tyco Digitrace Model No. C910-485 or equal, single point heat tracing control system, 208V, for fire main heat trace supervisory. This system shall be installed per the published manufacturer's installation recommendations with single-point interlock with building fire alarm system.

3. Ambient sensing thermostat (non-capillary).

2.15 ELECTRICAL WORK

Materials shall be new and shall be Underwriters Laboratories labeled or listed. Wiring shall be contained in metallic raceways. Raceways shall meet the requirements of DIVISION 16 - ELECTRICAL. Wiring for 115 volts and higher shall be copper #12 AWG or larger. Wiring type, insulation, etc. shall meet the requirements of DIVISION 16 - ELECTRICAL. Wiring less than 115 volts shall be copper. Wire size, type and insulation shall be selected to suit the application.

PART 3 - EXECUTION

3.1 TESTS AND ACCEPTANCE

A. The fire protection system shall be tested under hydrostatic pressure not exceeding 200 psi for a duration of not less than two hours. Piping installed above existing ceilings shall be tested with compressed air for two hours at 200 psi.

B. Piping subjected to the hydrostatic test shall be filled with water and thoroughly checked for the elimination of air. Joints shall be proven tight by the test. Defective work or materials shall be corrected or replaced in an approved manner. If necessary, piping shall be dismantled and reassembled with the use of new pipe or fittings. No caulking or makeshift method of temporary repair of defective work will be permitted. Tests shall be repeated until the particular line or system receives the approval of the representative of the Architect/Engineer. Final acceptance of the fire protection work will not be granted until the system is inspected and accepted by a representative of the State Fire Marshal.

3.2 WATER DAMAGE

A. Damage to the work and materials of others, to the building, and property caused by leaks in the fire protection system during the installation and/or testing of the fire protection system shall be the responsibility of this Section of the specification. The fire protection Contractor shall pay for the replacement or repair of any work or items so damaged.

3.3 SPRINKLER HEADS

A. Sprinkler heads shall be provided to provide complete building coverage per NFPA 13. When installed in acoustical tile ceilings, sprinkler heads shall be located as follows:

1. 2' x 2' ceiling tiles - Head shall be centered in the tile.

2. 2' x 4' ceiling tiles - Head shall be centered on the 2'–0" dimension and located 1'–0" from either end of the tile, or centered in the 4'–0" dimension.

B. Refer to architectural reflected ceiling plans for the location of ceiling mounted devices. Should the project require additional heads, the location of these additional heads shall be coordinated with the Architect/Engineer prior to installation.

C. Pendant, recessed and flush style heads shall have the escutcheon or cover plate installed tight to the ceiling and shall completely cover the opening provided for the head.

3.4 HYDRAULIC CALCULATIONS

A. The hydraulic calculations shall be based on the fire protection system described in paragraph 1.1.A SCOPE. Prepare hydraulic calculations for the design of the system and submit them to the Architect/Engineer for review. Hydraulic calculations shall be prepared in accordance with NFPA 13 formats.

B. Prior to designing the system, conduct a flow test to determine the current gpm, static and residual pressures available in the public water mains at the site. The designer shall allow a **15 psi residual pressure safety factor** in compiling the hydraulic calculations.

3.5 SPRINKLER SYSTEMS

A. The sprinkler systems shall be hydraulically calculated and designed as follows:

1. Wet Pipe Systems:

a. Light hazard areas shall be calculated for 0.10 gpm/sf over the most remote 1500 sf with a combined hose allowance of 100 gpm. Enclosed concealed spaces contain combustible material shall be calculated for the most remote 3000 sf.

b. Ordinary hazard, group 1 areas shall be calculated for 0.15 gpm/sf over the most remote 1500 sf with a combined hose allowance of 250 gpm. Enclosed concealed spaces containing combustible material shall be calculated for the most remote 3000 sf.

c. Ordinary hazard, group 2 areas shall be calculated for 0.20 gpm/sf over the most remote 1500 sf with a combined hose allowance of 250 gpm.

d. Extra hazard, group 1 areas shall be calculated for 0.30 gpm/sf over the most remote 2500 sf with a combined hose allowance of 500 gpm.

e. Extra hazard, group 2 areas shall be calculated for 0.40 gpm/sf over the most remote 2500 sf with a combined hose allowance of 500 gpm.

3.6 PIPE SUPPORTS

A. Piping shall be supported by means of hangers tested and listed by UL and/ or FM. Sizing, spacing and installation shall be in accordance with NFPA 13 and 14. Bolts and threaded rods shall have double nuts and washers or single nut, washer and lock washer. Starting length, end length, and alternate lengths of main piping with grooved joint couplings shall be provided with two supports.

3.7 FLUSHING

A. Before filling the interior fire protection system with water and before connections are made to the automatic sprinkler risers, each part of the underground system shall be thoroughly flushed until the water runs clear. Minimum flow during flushing shall be as follows:

Pipe Size	Flow, GPM
3"	300
4"	400
6"	750

B. Before performing pressure tests, the interior mains shall be thoroughly flushed by flowing water through each of the mains for five minutes. Provide temporary piping or hoses as required.

3.8 SPRINKLER SYSTEM OPERATION

A. Wet Pipe System:

When sprinkler heads have been fused, water from the piping system flows from the fused heads. This flow of water opens the check valve clapper and water flows to the system. To sound an alarm, water flowing in the riser or main activates the flow switch.

3.9 INSTALLATION OF HEAT TRACE CABLE

A. Install heat trace cable on fire system piping subject to freezing and where indicated on the drawings.

B. Apply the cable linearly on the fire protection pipe after piping has been successfully pressure tested. Secure the cable to piping with cable ties or fiberglass tape.

C. For installation on plastic piping, the cable shall be applied using aluminum tape (AT180). The cable shall have an outer braid of tinned-copper and an outer jacket of modified polyolefin (-CR).

D. After installation and before and after installing the thermal insulation, subject cable to testing using a 1000 VDC megger. Minimum insulation resistance should be 20 to 1000 megohms regardless of length.

E. Apply "electric traced" signs to the outside of the thermal insulation.

F. The cable shall be sized according to this table. The required heater output rating is in watts per foot at 50 degrees F.

Pipe Size	Wattage per foot
4" or less	5
6"	8

3.10 GAUGE INSTALLATION

A. Gauge shall be installed at the inlet and outlet of each sprinkler system alarm or check valve. Gauges shall be located in a suitable place which is protected from freezing. Provide a gauge cock at each gauge and make provisions for draining.

3.11 ELECTRICAL WORK

A. Fire protection equipment, controls and alarm panels shall be supplied from an emergency power source, if available.

B. Control or signaling wiring shall not be installed in raceways with power unless specifically indicated on the drawings. Wiring and raceways for line voltage interlocking shall be work of this Section. Voltage shall be 115 volts, 1-phase, 60 hertz. Provide transformer where required. Control and signaling wiring and raceways between equipment specified under this Section shall be work of this Section. Signaling wiring and raceways associated with work of this Section and not specified as work of DIVISION 16 - ELECTRICAL shall be work of this Section.

C. A source of power may be indicated under DIVISION 16 - ELECTRICAL, for activating control devices where power for controls does not originate at the control transformer furnished with the starter or control panel. Work of this Section shall include wiring required for controls from this source. If additional 120 volt power is required it shall be obtained from spare breakers at a location approved by the Architect. The cost of installation of raceways, wiring, etc. shall be included as work of this Division. The Contractor shall review electrical drawings prior to bidding.

- END OF SECTION -

SECTION 15600 - HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

A. Work under this Section shall include providing complete and functioning Heating, Ventilating and Air Conditioning (HVAC) systems for the project and appurtenances indicated or necessary.

B. Items specified or required shall be provided for a complete and operating system as described in SECTION 15010 - MECHANICAL GENERAL PROVISIONS.

1.2 ELECTRICAL WORK

A. Electrical work in connection with work of this Section not indicated as work of DIVISION 16 - ELECTRICAL, shall be work of this Section.

PART 2 - PRODUCTS

2.1 VALVES

A. Valves shall be as listed below unless otherwise noted on the drawings:

1. Shut-off Valves (Chilled Water):

a. 3" and smaller - Watts Series B-6081, Nibco Series S-545, full port ball valve, 400 psi ASTM B 124 - brass body, ASTM B 16 brass ball and blowout proof stem; PTFE seats, packing and gaskets; sweat ends; two piece construction with lever handles.

Acceptable manufacturers: Conbraco, Hammond, Milwaukee, Nibco, Red-White, Watts, or approved equal.

b. 4" and larger - Hammond Series #6211-01, Metraflex Series BW-2, or Nibco Series LD-2000-3 butterfly valve; 200 psi ASTM A 126 or A 536 iron lug style body with aluminum bronze disc, ASTM B 148; EPT liner; for ANSI standard 150 psi flanges; with locking lever handle.

Acceptable manufacturers: Centerline, DeZurik, Hammond, Metraflex, Nibco, or approved equal.

2. Throttling Valves (Chilled Water):

a. 3" and smaller - Watts Series B-6081-BS, or Nibco Series S-545 fall port ball valve; 400 psi ASTM B 124 brass body, ASTM B 16 brass

ball and blowout proof stem; PTFE seats, packing and gaskets; solder ends; memory stop plate; two piece construction with lever handle.

Acceptable manufacturers: Conbraco, Hammond, Milwaukee, Nibco, Red-White, Watts, or approved equal.

b. 4" and larger - DeZurik #499, 175 psi plug valve; cast iron body; electroless nickel plated cast iron plug with resilient insert; bronze bearings; #487 adjustable memory stop and drip cap; screwed or flanged ends for ANSI standard 150 psi flanges.

Acceptable manufacturers: DeZurik, Milliken, or approved equal.

3. Check Valves (Chilled Water):

a. 2½" and smaller - Nibco Series S-413, or Hammond Series IB912 or Jenkins #92-A, 150 psi swing check; ASTM B 62, bronze body and disc holder; composition type removable disc; soldered ends.

Acceptable manufacturers: Crane, Jenkins, Milwaukee, Nibco, Red-White, or approved equal.

b. 3" and larger - Jenkins #624, Hammond IR-1124, or Nibco Series F-918, 125 psi swing check; ASTM A 126, iron body with ASTM B 62 bronze disc and seat ring; flanged ends for ANSI standard 150 psi flanges.

Acceptable manufacturers: Crane, Hammond, Jenkins, Milwaukee, Nibco, Red-White, or approved equal.

c. At the Contractor's option, he may provide for 2½" and larger check valves above grade, Nibco #F-910 or Metraflex #900, 125 psi flanged, globe style check valve; ASTM A 48, Class 35 cast iron body with ASTM B 584 bronze seat and disc; flanged ends for ANSI standard 125 psi flanges.

4. Automatic Valves (2- and 3-Way):

a. Valves will be provided under SECTION 15650 - HEATING, VENTILATING AND AIR CONDITIONING CONTROL SYSTEMS.

5. Grooved Type Valves:

a. Valves provided for use with an approved grooved-piping system may be a product of the approved piping system manufacturer. Valve type, style, etc., shall be as hereinbefore specified for valve use.

6. Refrigerant Valves:

a. Valves shall be Henry Valve Co, packing type globe valves with seal cap, or approved equal.

B. Ball or butterfly valves installed in insulated piping systems shall have factory-furnished stem extensions suitable for thickness of insulation installed.

C. Each type of valve provided for the project (ball valves, butterfly valves, etc.) shall be of the same style and manufacturer, unless prior written deviation is granted.

2.2 STRAINERS

A. Strainers shall be as listed below unless otherwise noted on the drawings:

1. Y-type (Chilled Water):

a. 2" and smaller - Muesso #351 or Metraflex #BS-Y solder or screw joint strainer, 150 psi ASTM B 62 bronze body; screw type blow-off and strainer removal.

b. 2½" and larger - Muesso #751 or Metraflex #TF flanged-end strainer; 125 psi ASTM A 126, Grade B, cast iron body; bolted strainer removal and tapped blowoff; for ANSI standard 125 psi flanges.

c. Strainer baskets shall be stainless steel construction and shall have perforations as follows:

1) Water - 2" and smaller - 0.033" (1/32").
2 1/2" to 4" - 0.057" (1/16").
5" and larger - 0.125" (1/8").

B. Strainer blow-offs in water systems shall be provided with shut-off valves, as specified for type of service. On water piping sizes 1¼" and smaller, provide with a capped garden hose thread adapter.

2.3 PIPING

A. Piping shall be as listed below unless otherwise noted on the drawings:

1. Chilled piping and fittings above grade:

a. 2½" and smaller - Seamless copper water tube, ASTM B 88 Type L, hard-drawn; wrot copper solder-joint fittings, ANSI B16.22; joints shall be made with 95-5 solder, ASTM B 32, Grade 95A. **All threaded nipples and fittings ¾" diameter and smaller shall be brass.**

b. 3" and larger - ERW black carbon steel pipe, schedule 40, ASTM A 53, Grade B; fittings shall be standard black carbon steel, ASTM A 234; joints shall be welded.

c. ERW black carbon steel pipe, schedule 40, ASTM A 53, Grade B; mechanically rolled grooved; fittings shall be fabricated of malleable iron, ASTM A 47, or ductile iron, ASTM A 536 castings. Where required fitting pattern is not available factory-constructed, standard wall, seamless type welding fittings with rolled grooved ends may be used. Couplings shall be fabricated of ductile or malleable iron castings in two or more parts. Coupling gasket shall be molded synthetic rubber, per ASTM D 2000. Coupling bolts shall be cadmium plated, oval-neck, track-head, heat treated carbon steel type, with hexagonal, heavy nuts per ASTM A 183. Provide required adapters, nipples, flanges, etc., as required to connect to valves specified. Acceptable manufacturers: Victaulic, or approved equal.

2. Refrigerant tubing, piping and fittings:

a. Seamless copper air conditioning and refrigerant tube (ACR), ASTM B 280, Type L, hard-drawn; wrot copper solder-joint fittings, ANSI B16.22; joints shall be silver soldered or brazed, AWS A5.8.

3. Condensate drain piping and fittings:

a. 1" and smaller - Seamless copper water tube, ASTM B 88, Type L, hard-drawn; wrot copper solder-joint fittings, ANSI B16.22; joints shall be soldered using 95-5, ASTM B 32, Grade 95A solder.

b. 1¼" and larger - Seamless copper drainage tube, ASTM B 306, Type DWV; cast bronze solder-joint fittings, ANSI B16.23; joints shall be soldered using 95-5, ASTM B 32, Grade 95A solder.

4. Chilled Water piping and fittings below grade:

a. Provide a complete HDPE jacketed system of factory pre-insulated steel piping system.

b. Carrier pipe - ERW black carbon steel carrier pipe, schedule 40, ASTM A-53, Grade B. Fittings shall be schedule 40 black carbon steel, ASTM A 234. Fittings shall be factory pre-fabricated and insulated. Joints shall be made by welding. Joints shall be field insulated, coated, and jacketed as per the manufacturer’s written instructions. Provide in 40 foot lengths to minimize field joints.

c. Insulation - Minimum 3" thick polyurethane foam insulation bonded to both the jacketing and carrier pipe. Insulation shall be rigid, 90% closed cell foam insulation with not less than 2.0 pounds per cubic foot density, compressive strength of not less than 30 psi at 75° F, and thermal conductivity "k" factor of 0.15 Btu×in/hr×ft²×°F at 75° F.

d. Jacket - Jacketing material shall be extruded, black, high density polyethylene (HDPE), having a minimum wal thickness of 125 mils for sizes up to 12" and 150 mils for sizes larger than 12". The jacket shall be

seamless throughout the entire system with the exception of anchors, whose water shed rings are sealed with a wrap, prohibiting the ingression of water.

e. The underground piping installation is to be pre-engineered by the pre-insulated pipe manufacturer to suit field conditions. Provide expansion loops, anchors, thrust blocks and other provisions in accordance with the manufacturer's recommendations.

f. A certified manufacturer's representative shall visit the site as necessary to supervise and confirm proper unloading, storing and handling, piping installation, pressure testing, field joint insulation and backfilling to ensure full conformance withe the manufacturers requirements. The manufacturer shall provide written documentation that the installation is in strict conformance with their requirements.

g. Acceptable manufacturers: Thermacor Ferro-Therm or equal.

2.4 HEAT TRACING CABLE

A. Provide a complete UL listed system of cable, components, and controls to prevent pipelines from freezing. The cable shall be self-regulating type and shall consist of two #16 AWG tinned-copper bus wires embedded in parallel in a self-regulating polymer core that varies its power output to respond to temperature along its length, allowing the cable to be crossed over itself without overheating, to be used directly on plastic pipe, and to be cut to length in the field. The cable shall be covered by a radiation cross-linked modified polyolefin dielectric jacket. To prevent overheating, the cable shall have a self-regulating factor of at least 90 percent. The self-regulation factor is defined as the percentage reduction, without thermostatic control, of the cable output going from 40 degrees F pipe temperature operation to 150 degrees F pipe temperature operation. Acceptable manufacturers: Chemelex, Chromalox, Raychem XL Trace, Thermon FLX, or approved equal.

B. The cable shall be sized according to the table below. The required heater output rating is in watts per foot at 50 degrees F.

Pipe Size	Wattage per foot
3 inch or less	5 watt
4 inch	5 watt
6 inch	8 watt

C. The cable shall operate on line voltages of 120 [208] [220] [240] [277] volts without the use of transformers. The following accessories shall be furnished for each cable circuit:

1. Power connection, end seal, splice and tee kits and require components for field installation.

2. Ambient sensing thermostat (non-capillary).

2.5 SPECIALTIES

A. Water:

1. Expansion Tanks (Diaphragm):

a. Each tank shall have capacity and shall be of the horizontal or vertical style as indicated on the drawings.

b. Upper and lower domes of the tank shall have an outer shell of steel construction designed in accordance with ASME Section VIII Boiler Code. The shell shall be specifically designed for use in a diaphragm type tank. Tank shall be finished with high gloss enamel over zinc chromate primer. Where required due to size an inner support dome shall be provided. An integral support base shall be provided on floor models.

c. Seamless diaphragm shall be constructed of heavy duty Butyl.

d. Bottom liner shall be a separate unit of rigid polypropylene construction.

e. Diaphragm, liner and "O-ring" shall be mechanically bonded to shell for a complete waterproof seal.

f. Fittings shall be copper lined and silver brazed to tank for a watertight dielectric connection.

g. Tank shall be factory precharged to 12 psig.

h. Chilled water system tank shall be insulated as specified under insulation.

Acceptable manufacturers: Amtrol, Bell & Gossett, Taco, or approved equal.

2. Manual Flow-balancing devices:

a. 2½" and smaller: Bell & Gossett Series CB. Bronze or cast iron construction with bronze disc and integral adjustable calibrated balancing valve with readout connections for differential-pressure meter rated 200 psi at 400 F. Balancing valve shall have an indexing pointer and calibrated nameplate to indicate degree of valve closure. Readout connections shall have integral EPT check valves. Flow balancing device shall be sized for a pressure drop at design flow of not less than 1 psi and not more than 5 psi in the fully open position. Provide increasers/decreasers as required to suit line size.

b. 3" to 6": Bell & Gossett series CB cast iron construction with Class 125 flanges. Valves shall be fitted with a bronze seat, replaceable bronze disc with EPDM seal insert, and stainless steel stem. Valve shall

have memory stop feature and calibrated nameplate with pointer indicating valve position. Valves shall be rated 175 psi at 250 F and shall close leak-tight at full rated working pressure.

3. Temperature and Pressure test plugs (Chilled Water systems):

a. Each test plug shall be of solid brass construction suitable for 1000 psig and 275° F. Plug shall have ¼" or ½" NPT threads for installing into standard coupling or fitting. An EPT self-sealing valve core with removable brass cap shall be capable of receiving a 1/8" diameter thermometer or pressure-gauge stem. Fitting and cap shall be extended above insulation.

b. The Contractor shall provide the Owner prior to acceptance of the project one pressure/temperature test kit consisting of carrying case, one 1½" test gauge, one gauge adapter and two 1" thermometers.

4. Thermometers and Wells:

a. Bimetal type - Each thermometer not provided as part of packaged equipment shall be liquid-filled rigid or angle style and have a stainless steel case, bezel, fittings and stem. Scale plate shall be of white aluminum with permanent black figures and graduations. Head assembly shall be sealed within a glass window. Bimetal element shall be a silicone coated low-mass helix carefully sized and aged, encased within the thermometer stem. Scale size shall be 5" diameter; stem length shall be 2½". Temperature ranges shall be as follows:

(1) Chilled water systems - 0 to 150° F.

b. For each thermometer provide a separable well of brass construction, lagging extension type, for use in insulated piping systems.

5. Gauges:

a. Each gauge not provided as a part of packaged equipment shall have a 4½" dial diameter, aluminum flangeless case, phosphor bronze bourdon tube, bronze and stainless steel movement; ¼" NPT forged brass socket and tip; accuracy shall be 1 percent of scale range.

b. Gauge scales shall be selected so that the normal operating pressure falls approximately in the middle of the scale selected.

c. Each gauge shall be installed on a tee handle cock, solid brass construction. Gauges shall have a pressure rating to suit the system design pressure, but shall have a minimum rating of not less than 125 psi. [With Snubber]

d. Acceptable manufacturers: Marshaltown Model #175P, U.S. Gauge, Weksler #BA14-I, or approved equal.

6. Flexible Connectors:

a. 2" and smaller - Metraflex Model BBS with corrugated bronze inner hose and bronze outer braid with solder-joint copper tube ends; or approved equal. Rated working pressure 165 psi at 250 F.

b. 2½" & Larger - Metraflex Metrasphere, or equal, spherical elastomeric flexible pump connector rated for 190 psi working pressure at 200 F. Provide with tie rod type control units to limit elongation and compression. Provide with Class 150 end flanges. Provide Metraflex Vaneflex connector with internal carbon steel flow straightening vanes for connectors installed on pump discharge piping.

7. Air Separator:

a. Air Separator (Chilled Water Systems). Each separator shall be of cast iron construction up to 2½" in size and welded steel construction in 3" and larger sizes. Construction shall be in accordance with ASME Section VIII Boiler Code for 125 psig and carry the ASME and National Board certification. Tangential inlet and outlet connections shall be NPT up to 3" size and flanged for sizes 4" and larger. Internal collector tube shall be perforated, stainless steel.

b. Acceptable manufacturers: Armstrong #VAS, Bell & Gossett #R, Taco, or approved equal.

8. Air Control Products:

a. Any other air control products such as, but not limited to, the following:

1) Compression tank and air charger tank drain;

2) Manual air vents;

3) Automatic air vents, brass or bronze body, stainless steel float, Hoffman No. 78 or equal.

4) Acceptable manufacturers: Armstrong, Bell & Gossett, Taco, or approved equal.

9. Pressure Reducing Valves (Fluids):

a. Body construction of each valve shall be of brass or cast iron as required by piping system. Valves shall be equipped with low inlet-

pressure check valve and inlet strainer. Reduced-pressure setting shall be factory set but shall be easily externally adjustable.

b. Wetted parts shall be of noncorrosive construction (Buna-S, rubber, stainless steel or brass). Strainer, valve seat and stem shall be removable for service.

c. Acceptable manufacturers: Armstrong #HRD-11, Bell & Gossett #B3, Taco, Thrush, or approved equal.

B. Refrigerant Specialties:

1. Filter-Driers:

a. Provide a liquid line filter-drier for each system with the capacity required to suit the equipment specified and for the refrigerants used.

b. Acceptable manufacturers: Alco, Henry, Sporlan, or approved equal.

2. Moisture Indicators:

a. Provide refrigerant liquid line moisture-indicating sight glasses for each system of the size to match the size of the liquid line.

b. Acceptable manufacturers: Alco, Henry, Sporlan, or approved equal.

2.6 INSULATION

A. Insulation shall have a vapor-barrier jacket or facing complying with NFPA-90A fire and smoke hazard rating as determined by Underwriters Laboratories procedure UL 723, ASTM E 84 and NFPA 255 not to exceed a flame-spread of 25 and smoke-developed of 50. Maximum permeability of jacket shall be 0.02 per ASTM E 96.

B. Accessories such as adhesives, mastics, cements, tapes, etc., shall have the same fire and smoke hazard rating as jacket or facing.

C. Piping Systems:

1. Unless otherwise noted, piping installed inside the building shall be insulated with preformed split-type insulation. Insulation type and thickness shall be in accordance with the following table:

Inside the Building			
Service	**Pipe Size**	**Insulation Type**	**Insulation Thickness (inches)**
Chilled Water	1 1/2" and smaller	Fiberglass	1 1/2"
Chilled Water	2" through 6"	Cellular Glass	2"
Refrigerant Suction and Hot Gas	All	Closed Cellular	3/4"
Condensate Drain	All	Closed Cellular	1/2"

2. Piping installed outside the building and above grade shall be insulated with fiberglass split type pipe insulation in accordance with the following table:

Outside the Building and Above Grade			
Service	**Pipe Size**	**Insulation Type**	**Insulation Thickness (inches)**
Chilled Water	6" and smaller	Cellular Glass	2"
Refrigerant Suction and Hot Gas	All	Closed Cellular	1"
Condensate Drain	All	Closed Cellular	1/2"

3. Fiberglass Piping Insulation - Pre-formed split-type fiberglass insulation, nominal 3-pound per cubic foot density, white all service jacket, and with thermal conductivity (k factor) of 0.23 at mean temperature of 70° F. Insulate fittings, flanges and valves with factory molded or field mitered sections joined with adhesive and wired in place. Provide vapor seal at fittings with a layer of glass fitting tape embedded between two 1/16" coats of vapor retarder mastic. Fitting tape shall extend over the adjacent pipe insulation and overlap on itself at least 2".

4. Cellular Glass Piping Insulation - Preformed split-type cellular glass piping insulation, nominal 7.5 pound per cubic foot density, white all service jacket, and with thermal conductivity (k factor) of 0.29 at mean temperature of 75° F. Apply joint sealant at all joints. Insulate fittings, flanges and valves with factory molded sections joined with adhesive and secured with metal bands. Provide vapor seal with vapor retarder or weather barrier reinforced mastic. Insulation shall be Foamglas by Pittsburg Corning, or approved equal.

5. Closed Cellular - Foamed tubular elastomeric insulation. Insulation shall meet the requirements of ASTM C 534, have a flame spread rating of 25 or

less and a smoke developed rating of 50 or less per ASTM E 84. Miter fit insulation at fittings and accessories. All seams and spices shall be glued.

6. Pipe Insulation Jackets - Provide jackets over insulated piping, fittings, flanges and valves. Jackets shall be in accordance with the following table:

Piping Insulation Jackets			
Service	**Location**	**Jacket Type**	**Color**
Chilled Water	All exposed including exposed in Mechanical Rooms	0.030" PVC	White
Refrigerant	Outdoors	2 coats of manufacturer's recommended paint plus 0.020" PVC over straight sections	White

7. Acceptable manufacturers: Knauf, Owens-Corning, or approved equal.

D. Ductwork:

1. Ductwork indicated to be externally insulated.

a. External wrap shall be 2" thick, 1 pound-per-cubic-foot density (or 2.2" thick 3/4 pound-per-cubic-foot density) commercial-grade duct wrap. Insulation shall have a maximum "k" factor per ASTM C 518 of 0.29 Btu×in/hr×ft²×°F at 75° F mean temperature. Maximum permeability of facing shall be 0.02 per ASTM E 96. Provide with FSK (foil-scrim-kraft) jacket.

b. Ductwork external rigid board insulation shall be 2" thick, 6 pound density rigid duct board. Provide with FSK (foil-scrim-kraft) jacket.

c. External duct insulation shall have a vapor-barrier complying with NFPA 90A with fire and smoke hazard rating as determined by Underwriters Laboratories procedure UL 723, ASTM E 84, and NFPA 255 not to exceed a flame spread of 25 and a smoke developed of 50. Maximum permeability of facing shall be 0.02 per ASTM E 96.

2. Duct Lining (Flexible):

a. Ductwork inside buildings specified to have internal acoustical and thermal lining shall have 1" thick, 1½ pounds-per-cubic-foot density, coated, flexible duct liner.

b. Liner shall have a maximum "k" factor per ASTM C 518 of 0.23 Btu×in/hr×ft²×°F at 75° F.

c. Liner shall have a coating on the air-side of the lining which shall comply with Underwriters Laboratories procedure UL 723, ASTM E84, and NFPA 255 not to exceed a flame spread of 25 and smoke developed of 50.

d. Liner surface shall be treated with an EPA registered anti-microbial agent to prevent fungal and bacterial growth. The liner shall conform to ASTM C 1338, G21 and G22. The liner shall have an encapsulant edge coating.

E. Cold Equipment:

1. Cold equipment not provided with factory insulation and jacket shall be field insulated. Insulation shall have a maximum "k" factor per ASTM C 177 or C 158 of 0.28 Btu×in/hr×ft²×°F at 75° F mean temperature. Maximum permeability rating shall be 0.17 per ASTM C 355. Flame and smoke hazard shall comply with NFPA 90A as determined by ASTM E 84 not to exceed a flame spread of 25 and smoke developed of 50.

2. Adhesive used to secure insulation to equipment, etc., shall be of the contact type, approved by the insulation manufacturer, be compatible with the insulation and have the same fire and smoke hazard rating as the insulation.

3. Acceptable manufacturers: Armaflex, Rubatex, or approved equal.

F. Hot Equipment with normal operating temperatures of 180 deg F or less:

1. Hot equipment not provided with factory insulation and jacket shall be field insulated. Insulation shall have a maximum "k" factor per ASTM C 177 or C 158 of 0.28 Btu×in/hr×ft²×°F at 75° F mean temperature. Maximum permeability rating shall be 0.17 per ASTM C 355. Flame and smoke hazard shall comply with NFPA 90A as determined by ASTM E 84 not to exceed a flame spread of 25 and smoke developed of 50.

2. Adhesive used to secure insulation to equipment, etc., shall be of the contact type, approved by the insulation manufacturer, be compatible with the insulation and have the same fire and smoke hazard rating as the insulation.

3. Acceptable manufacturers: Armaflex, Rubatex, or approved equal.

2.7 DUCTWORK

A. General:

1. Inlet and outlet connections to fan equipment shall be made with flexible fiberglass, nylon cloth a maximum of 10" in length, DuroDyne Excelon, or

equal. The cloth shall be flame retardant and have a maximum flame spread rating of 25 and a maximum smoke developed rating of 50.

2. Joints and seams in duct systems shall be sealed with joint sealant.

3. Ductwork shall be fabricated and installed in accordance with applicable SMACNA standards.

4. Square and rectangular ductwork shall be constructed in accordance with the following table:

SQUARE AND RECTANGULAR DUCTWORK			
Service	SMACNA Pressure rating (Inches WG)	SMACNA Seal Class	Insulation Type
Supply Ductwork in VAV systems upstream of VAV boxes	4	A	Lined
Supply Ductwork in VAV systems downstream of VAV boxes	2	B	Lined
Supply Ductwork in constant volume and in Single Zone VAV systems	2	B	Lined
Return and Transfer Air Ductwork	-2	C	Lined
General Exhaust Ductwork	-2	C	None
Outside Air	-2	C	External

To protect against condensation, provide external duct insulation in addition to duct lining where lined supply air ductwork is installed in a non-air conditioned space.

5. Round and oval ductwork shall be constructed in accordance with the following table:

ROUND AND OVAL DUCTWORK			
Service	SMACNA Pressure rating (Inches WG)	SMACNA Seal Class	Insulation Type
Supply Ductwork in VAV systems upstream of VAV Boxes	4	A	External
Supply Ductwork in VAV systems downstream of VAV Boxes	2	B	External
Supply Ductwork in constant volume and in Single Zone VAV systems	2	B	External
Return Air Ductwork	-2	C	External
Outside Air Ductwork	-2	C	External
General Exhaust Ductwork	-2	C	None

B. Supply, Return, Outside Air and Exhaust Ductwork:

1. Square and Rectangular:

a. Ductwork shall be constructed from galvanized sheet steel except where stainless steel in indicated. Gauges and construction standard shall be in accordance with "SMACNA HVAC Duct Construction Standards, Metal and Flexible", latest edition.

b. 90-degree elbows in square and rectangular ductwork shall have single-thickness turning vanes on 1½" centers. Other changes in direction less than 90-degrees shall be made with radius type fittings. **Omit turning vanes in internally lined transfer ductwork.**

c. Sizes indicated on the drawings are sheet metal sizes. Where applicable, allowance has already been made for the lining.

2. Single Wall Round and Oval:

a. Except where indicated otherwise, duct and fittings as shown on the drawings shall be unlined, round or oval, spiral wound, manufactured from galvanized sheet steel complying with ASTM A653/653M, A924/A924M. Where indicated, ductwork and fittings shall be stainless steel. Ducts shall have lockseam construction.

b. Fittings shall be compatible with the duct and provided by the duct manufacturer. Elbows up to 8" in diameter shall be die-formed, elbows 9" and larger shall be segmented. Fitting joints shall be brazed or welded.

c. Snap-lock ductwork will not be allowed.

d. Joints between duct and fittings shall be flanged type for exhaust systems and shall be either slip or flanged type for supply.

2.8 FLEXIBLE DUCTS

A. Flexible ductwork shall be acoustical type Flexmaster 8M or equal, factory-fabricated, preinsulated assembly rated for a positive working pressure of 10" w.g. Assembly shall consist of a laminate inner liner encapsulating a high-tensile, spring steel helix wire. A fiberglass blanket with an insulating valve of R=6.0°F-Ft2-Hr/BTU shall cover the inner liner**.** The insulation shall be covered with a reinforced metalized jacket. Jacket shall have a perm rating of 0.01 per ASTM E 96-A. The entire assembly shall comply with UL 181, NFPA 90A and 90B as a Class 1 Air Duct Material. Assembly shall also have a flame spread rating of 25 or less and a smoke developed rating of 50 or less.

2.9 DUCT FITTINGS

A. Spin-in

1. Each rigid or flexible round duct shall be connected to the square or rectangular sheet metal main or branch ducts using an engineered, galvanized, sheet metal fitting as shown on drawings.

2. Fittings shall be constructed of heavy gauge, galvanized sheet steel with riveted construction. Where duct sizes allow, provide conical-converging type to reduce the pressure-drop through the fitting. Throats of fittings shall be constructed so that positive seals are provided when fittings are installed.

3. The following options shall be provided:

a. Adjustable dampers with positive-locking, damper regulators with handles (delete dampers in VAV systems upstream of VAV boxes).

b. Insulation stand-offs to allow for damper adjustment without damaging insulation.

2.10 DUCT ACCESS DOORS

A. Frame shall be 22-gauge galvanized steel with neoprene gasket seal and "dove tail" edges to attach to ducts. Size of doors shall be as required to service item inside duct.

B. Doors shall be 22-gauge galvanized steel with continuous piano hinge and cam locks. Quantity of locks shall depend on door size.

C. Door shall be insulated with 2" thick, fiberglass insulation compressed to 1". "R" factor shall be 7.7.

D. Access doors installed at fire dampers shall have glass panel insert.

E. Acceptable manufacturers: Air Balance, Karp type KHD, Krueger, Ruskin type ADH-22 or ADHW-22, or approved equal.

2.11 DUCT JOINT SEALANT

A. Indoor Application:

1. Duct and duct mounted equipment installed indoors shall be sealed using a mineral-gypsum impregnated fiber tape and a liquid adhesive. Tape and adhesive shall have a combined UL listing of a flame spread of 10 and a smoke developed of 0. Omit Sealant on ductwork exposed in finished areas.

2.12 VIBRATION ISOLATION

A. Provide isolators as specified. Where vertical height for installation is limited, modifications to the isolator connection may be required; i.e., custom brackets or supports to allow mounting of isolators to the side of in lieu of directly under equipment. Minimum deflection shall be in accordance with ASHRAE 2015 HVAC Applications Handbook, Page 48.45 for the specific installation conditions. Provide structural rails or structural bases where equipment base is not self supporting.

B. Isolation Type:

1. The following type isolation shall be provided unless specifically indicated otherwise on the drawings:

Equipment	Type	Description
Air Handling Units	C	Isolator Pads
Piping Systems	D	Spring and Rubber Hanger

2. Type A: Free-standing, unhoused, laterally stable steel springs incorporating leveling bolts and ¼" thick ribbed noise isolation pads. The springs shall have a lateral spring stiffness greater than 0.8 times the rated vertical stiffness, and shall be designed to provide 50 percent overload capacity. In capacities up to 5,000 pounds, springs shall be replaceable. In capacities over 5,000 pounds, springs shall be welded to the top and bottom load plate assemblies.

Acceptable manufacturers: Amber/Booth, Vibration Mounting Series AC, Kinetics Model FDS, or approved equal.

3. Type B: Reinforced concrete inertia bases with spring isolators. The steel members shall be designed and supplied by the isolator manufacturer. Concrete shall be poured into a welded steel frame, incorporating prelocated equipment anchor bolts, ½" diameter reinforcing bars on nominal 8" centers each way, and recessed isolator mounting brackets to reduce the mountain height of the equipment, but yet remain within the confines of the base. The thickness of the base shall be a minimum of 8 percent of the longest span between isolators, at least 6 inches, or as indicated on the drawings. Where inertia bases are used to mount pumps, the bases shall be wide enough to support piping elbows.

Acceptable manufacturers: Amber/Booth, Vibration Mountings Type WPF, Kinetics Model CIB, or approved equal.

4. Type C: Pads shall be individually coated with a flexible moisture impervious elastomeric membrane. Pads shall have a constant natural frequency over the operating load range, and the stiffness shall increase proportionately with load applied. Pads shall be no taller than the shortest horizontal dimension. Where the equipment base does not provide a uniform load surface, steel plates shall be bonded to the top of the pads.

Acceptable manufacturers: Kinetics Model KIP-Q Molded fiberglass, Vibration Mountings - Shear-Flex or Cork-Rib, or approved equal.

5. Type D: Combination spring and fiberglass (or rubber) hangers, incorporating precompressed molded fiberglass (or rubber) noise and vibration isolation pads, coated with a moisture impervious elastomeric membrane in series with springs, each encased in welded steel brackets. Springs shall be as hereinbefore specified. Isolators shall be designed for 50 percent overload capacity, and shall accommodate rod misalignment over a 30-degree arc. Brackets shall be designed to carry 500 percent overload without failure.

Acceptable manufacturers: Amber/Booth Vibrations Mounting Series RSH, Kinetics Model SFH, or approved equal.

2.13 AIR HANDLING UNITS (Central Station)

A. Provide air handling units of the central station type. Air handling units shall have the configuration, accessories, capacities and other features as indicated on the drawings and specifications. Each unit shall be complete with casings, fans, coil sections, drain pans, filters, accessories, and special features indicated.

B. Provide fans of type indicated in the unit schedule. Fan class (Class I, II or III) shall be selected to suit design conditions and such that the fan speed at design conditions does not exceed 80% of the maximum fan speed for the fan class. Fan shafts shall be solid steel, coated with a rust-inhibiting coating, and properly designed so that fan shaft does not pass through first critical speed as unit comes up to rated RPM. All fans shall be statically and dynamically tested by the manufacturer for vibration and alignment as an assembly at the operating RPM to meet design specifications. Fans controlled by variable frequency drives shall be statically and dynamically tested for vibration and

alignment at speeds between 25 percent and 100 percent of design RPM. Fan wheels shall be keyed to fan shafts to prevent slipping.

C. Provide shaft grounding rings for fans controlled by variable frequency drives.

D. Belt-driven fans shall be provided with grease lubricated, self-aligning, anti-friction bearings selected for L-50 200,000-hour average life per ANSI/AFBMA Standard 9. Lubrication lines for both bearings shall be extended to the drive side of the AHU and rigidly attached to support bracket with grease fittings. Lubrication lines shall be a clear, high-pressure, polymer to aid in visual inspection.

E. Belt drive fans shall be provided with variable pitch sheaves, suitable for adjustment within plus or minus 10 percent of specified rpm but selected so as not to exceed the maximum rpm of the unit and shall include the required V-belts. Provide replacement sheaves and belts to balance fans to design airflow during the HVAC testing and balancing procedure. Motors shall be selected so that the brake horsepower at design conditions does not exceed 80 percent of the motor nameplate rating and shall be mounted on an adjustable motor base with belt guard, and accessories as indicated on the drawings.

F. All fans, including direct-drive plenum fans, shall be mounted on spring isolation bases. Internally-mounted motor shall be on the same isolation base. Fan and motor shall be internally isolated with spring isolators. Provide a flexible connection (e.g. canvas duct) shall be installed between fan and unit casing to ensure complete isolation. Flexible connection shall comply with NFPA 90A and UL 181 requirements.

G. Fan sections containing multiple fans shall be provided as indicated on the schedule and drawings. Each fan shall operate in parallel to each other fan in the array. The fans shall be SWSI plenum type with high-efficiency AF blades. Fans shall be direct-driven. Motors shall be TEFC type. Fan wheels shall be aluminum. The horsepower characteristic of the fans shall be non-overloading. Provide a gravity backdraft damper for each fan in a fan array.

H. Fan sections containing multiple fans shall be controlled using a common control signal to modulate the fan speed. Provide factory wiring from each fan motor to a factory furnished and factory installed multi-fan terminal box with thermal overloads for each fan mounted on the outside of the unit. Provide an electrical disconnect switch for each fan.

I. Provide hinged and latched access doors as specified herein and as indicated on the drawings.

J. For units with plenum type fans, provide a kill switch on each fan compartment access door and on each fan inlet section access door and interlock the kill switches to de-energize the fan(s) and allow the fan(s) to stop rotating before the access door can be open.

K. The unit shall be constructed as a complete frame with removable panels. Removal of side panels shall not affect the structural integrity of the unit. The casing shall

be able to withstand up to 8" w.g. of positive static pressure for sections which operate under positive pressure and 8" w.g. of negative static pressure for sections which operate under negative pressure. All exterior wall panels shall be made of galvanized steel. Closed-cell foam gasketing shall be provided where modules join to prevent air leakage.

L. Modules shall be factory insulated. Insulation and insulation adhesive shall comply with NFPA-90A requirements for flame spread and smoke generation. Insulation adhesive shall be UL listed.

M. Panels shall be 2" double-wall construction to facilitate cleaning of the unit interior. The interior wall shall be constructed of galvanized steel. Casing panels shall have a minimum R-Value of 13 hr x ft^2 x deg F/BTU.

N. Provide perforated metal fiberglass acoustical liner in fan compartment, discharge plenum section and where elsewhere indicated on the drawings. Liner shall be fiberglass with a perforated stainless steel cover to completely encapsulate the fiberglass insulation to prevent deterioration of the insulation.

O. Unit construction shall include thermal breaks and continuous insulation to ensure that condensation will not form on the exterior surfaces of the unit when operating at a 55 deg F supply air temperature with the surrounding air at 81 deg F dry bulb and 73 deg F wet bulb.

P. Provide a drain pan for all cooling coil sections. Drain pans shall be type 304 stainless steel, insulated double wall construction. Drain pan insulation shall be a minimum ½" thick foamed-in-place type insulation, securely fastened to pan with an approved adhesive and sandwiched between the bottom pan and a stainless steel liner. Seams shall be sealed with a suitable mastic. Pans shall be pitched to the drain connections for positive drainage.

Q. Coils shall be of the aluminum fin, copper tube type. Tubes shall be mechanically expanded to bond the fin collars to the tube surfaces. Coils shall be a minimum of ½" O.D. copper tubes with aluminum fins. Cooling coils shall have a type 316 stainless steel casing no lighter than 16-gauge. Heating coils shall have a type galvanized steel casing no lighter than 16-gauge. Coils shall be mounted in the coil casing and be accessible for service and shall be removable from the unit without dismantling the entire unit. Water cooling coils shall be enclosed in an insulated coil section. Coil header and "U" bends shall be contained within the unit's cabinet. Coils shall be pitched in the unit casing for proper drainage and shall be completely drainable, with both supply and return headers supplied with drain and vent connections extending through the unit casings. Coils shall be tested at 150 psig air pressure under water.

R. Filter boxes shall be a side access housing assembly designed to receive filters of the type and capacities scheduled on the drawings. Box shall be designed to insure snug fit of filters to prevent air by-pass. Provide necessary transition pieces to match unit inlet.

S. Access Sections and Doors

1. Access sections shall be furnished for fans, and coils, and the upstream side of filters, and elsewhere as shown on the drawings.

2. Access door shall be furnished in each access section. Doors shall be 4" less than height of access section unless otherwise shown on the drawings. Doors shall be equipped with hinges and hand-operated (no tools required) latch on both inside and outside of casing.

3. Access doors shall be hinged to open against system pressure.

T. Provide unit demounts to allow for air handling unit rigging and installation through building openings.

U. Acceptable manufacturers: Trane, Carrier, York, Daikin, Temtrol or approved equal.

2.14 FILTERS

A. Provide filter sections with filters having capacities and efficiencies indicated on the drawings.

B. Prefilters:

1. Filter media shall have a minimum efficiency of 30 percent when tested in accordance with ASHRAE Standard 52–76. Filters shall have permanent frames, replaceable media, and rated by Underwriters Laboratories Standard 900 as Class I.

2. Filter boxes shall be of the same construction as the air unit and provided with spring loaded filler strips to prevent air from bypassing the filter media.

3. Acceptable manufacturers: American Air Filter, Cambridge, Continental, or approved equal.

4. Isolators shall be as specified for air handling units.

2.15 BLOWER COIL UNITS

A. Casings (structural components) shall be constructed of 18-gauge gallvanized steel, insulated with one-inch, 1½ lb. Density glass fiber material to provide thermal and acoustical insulation. Fan housing sides are directly attached to the air handler top and bottom panels, strengthening the entire unit assembly. Coil access panels are located on both sides of the air handler and allow easy removal of the internal coils and drain pan. Main access panels provide general access to the fan, motor and drive from both sides of air handler.

B. Coils shall have aluminum fins which are mechanically bonded to seamless copper tubes.

C. Fans to be forward curved, centrifugal blower type equipped with heavy-duty adjustable speed V-belt drive. The fan shaft is supported by heavy-duty, permanently sealed ball bearings. Fans shall be dynamically balanced.

D. Provide no corrosive polymer or stainless steel drain pan. Drain pan shall be double sloped for positive drainage. The coils shall mount above the drain pan, not in the drain pan - thus allowing the drain pan to be fully inspected and cleaned.

E. The main drain connection is at the lowest point of the drain pan. An auxiliary drain connection shall be provided on the same side as the cooling coil connection.

F. Povide two-inch 30% efficiency throwaway filters. Units to have a filter rack that is sized for less than 300 fpm at nominal airflow. All units and filter racks shall use standard filter sizes.

G. Motors to be open drip-proof with permanently sealed ball bearings, internal current and thermal overload protection, a minimum 1.15 service factor. Motors shall be factory installed and wired to the air handler junction box.

H. Acceptable manufacturers - Trane, York, Carrier, Daikin or approved equal.

2.16 DUCTLESS SPLIT SYSTEMS

A. Provide complete ductless splits systems with the features indicated in the contract documents. The systems shall be provided with all equipment, controls, wiring, piping, insulation, accessories and appurtenances for complete and properly operating systems.

B. Provide five year parts warranty on compressors.

C. Acceptable manufacturers: Mitsubishi, Daikin Industries or approved equal.

2.17 AIR COOLED WATER CHILLERS (Scroll Compressors)

A. Each packaged air cooled water chiller shall be completely factory assembled, including interconnecting refrigerant piping and internal wiring of controls, mounted on a steel base which accommodates the air cooled condenser, compressors and cooler. The unit shall be capable of being rigged from the top without a spreader bar. The unit shall be shipped with a full operating charge of Refrigerant. Chillers shall contain two separate refrigerant circuits, each with a separate compressor for standby operation. Each unit shall be rated in accordance with the latest ARI standard and be capable of producing the scheduled performance. Electrical components shall be protected from the weather. The unit shall be enclosed in a galvanized steel casing, zinc phosphatized, with baked enamel finish.

B. The compressors shall be scroll type. Provide a minimum of two compressors/unit. The compressors shall be mounted on neoprene isolators.

C. Manual restart of unit shall be required after motor stoppage due to thermal overload. Each compressor shall be equipped with an insert type crankcase heater to minimize oil dilution during shutdown periods. A contactor and a calibrated, manual reset ambient-insensitive overload protection shall be factory installed for each compressor motor. The protection shall be open the 3 phases in the event of overload in any one phase.

D. Each unit shall be factory equipped with an electrically operated device for loading and unloading compressor and a control for cycling compressors. Unloading shall be controlled by a solid state temperature controller.

E. The temperature controller shall be easily adjustable in the field.

F. The cooler shall be direct expansion multiple circuit and removable tube type with refrigerant in the tubes and liquid to be chilled in the shell or may be plate & frame type. The cooler shall be equipped with a heater cable, covered with fiberglass insulation and protected with a steel jacket for freeze up protection to –20° F ambient. The cooler shall be constructed and tested in accordance with ASME code requirements. The water connections shall be fully accessible without going through condenser sheet metal panel sections.

G. The condenser coil shall be constructed of seamless copper tubes, arranged in staggered rows, mechanically expanded into aluminum fins. The design working pressure of the condenser coil shall be 450 psig. The condenser shall include, as an integral part of the design, a subcooling circuit. The condenser coils shall be fully protected by sheet metal panels, or coil guards protecting finned surface.

H. The condenser fans shall be propeller type, providing vertical air discharge. Fan blades shall be statically and dynamically balanced, protected at outlet by anodized fan blade safety guards. Each fan shall be driven directly by an individual motor. The condenser fan motors shall be of the three phase high torque type, inherently protected, ball bearing construction, permanently lubricated and equipped with 5 year lubrication plugs.

I. The refrigerant circuit shall be constructed of copper tubing with brazed joints, and shall include: shut-off valve with charging connection, sight glass moisture-liquid indicator, direct acting thermal expansion valve, solenoid valve and filter-drier. The entire suction line and liquid line between the expansion valve and the cooler shall be insulated with flexible closed cell insulation. High pressure relief valve shall be factory installed.

J. The unit shall have separate control and power sections. Controls and motor starting equipment shall be factory wired and mounted in weatherproof compartments, and shall include: control fuses, high and low pressure cut-outs, oil safety switch, freeze protection control; freeze, high pressure and low oil pressure safety lights, timer to prevent compressor short cycling, interlocks for inherent motor protection cooler heater thermostats, low ambient temperature control, recycling pump down circuit, provisions for wiring in remote alarm, on-off switch, and air conditioning system time clock interlock contacts, fan cycling pressure control, 3-phase solid state fan speed controls, high discharge temperature cut-out, solid state operating thermostat with adjustable water

temperature setpoint and operating range. Pressure differential switch shall be provided for field mounting. A factory supplied bracket for mounting the control and power wiring disconnect switches shall be included. The compressor power terminals shall be capable of accepting either copper or aluminum wire of the size indicated on the Division 16 drawings.

K. A qualified factory service representative shall supervise the installation of the chillers, and completely check the unit controls and refrigerant circuits. The service representative shall place the unit in working order, log the machine, and instruct the Owner's personnel in the maintenance and operation of the unit.

L. Provide 5 year parts warranty for compressors.

M. Acceptable manufacturers: Trane, Carrier, York, Diakin, or approved equal.

2.18 CURBS AND SUPPORTS

A. Prefabricated metal roof curbs shall be provided for roof mounted fans, rooftop air conditioning units, etc.

B. Prefabricated metal roof support rails supporting roof mounted equipment shall be of 18-gauge galvanized steel construction with mitered and welded corner seams, integral base plate and integral cant strips.

C. All roof mounted curbs and supports shall be fully coordinated with the roof type and the roofing manufacturer’s installation details and requirements.

D. Curbs and rails on sloped roofs shall be sloped to suit the roof and installed tihe the top surface level.

E. All curbs and rails shall be fastened to the building structure to withstand hurricane force winds.

F. All equipment installed outdoors shall be fastened to their curbs, rails, supports and or building structure to withstand hurricane force winds. Provide galvanized or stainless steel straps or cables to anchor roof mounted equipment securely to structure to withstand hurricane force winds.

2.19 FANS

1. Fans shall be of the sizes and types scheduled on the drawings and shall be complete with back draft dampers and accessories scheduled. Fans shall be rated in accordance with AMCA Standards and shall be AMCA labeled. Fractional horsepower motors shall be provided with internal overload protection and disconnecting means.

2.20 VARIABLE SPEED DRIVES (VSD)

A. Where variable speed drives are not provided under Specification Division 16, provide motor control equipment to convert motors operating at a constant 60 Hz frequency to variable speed operation with the use of an adjustable frequency AC drive and the necessary hardware to provide the functions as herein specified.

B. Construction

1. The VSD shall be of the Pulse Width Modulated design converting the fixed utility voltage and frequency to a variable voltage and frequency output via a two step operation. Efficiency shall be 95% minimum at 100% speed and load. Line side displacement power factor shall not be less than (0.95) regardless of speed and load. The AFC shall be rated for 100% current for one minute.

2. The VSD including the bypass, all components, and accessories shall be housed in a NEMA 12 metal enclosure where installed indoors, NEMA 3R when installed outdoors and NEMA 4X when installed outdoors within 25 feet from a cooling tower.

3. Standard operating conditions shall be:

a. Incoming three phase AC power, rated voltage +10%, 60 Hz.

b. Humidity 0 to 95% (noncondensing and noncorrosive).

c. Altitude 0 to 3,300 feet above sea level.

d. Ambient temperature 0 to 40 C.

C. Design Characteristics and Features

1. The VSD shall provide the following design features as standard:

a. Microprocessor logic. The VSD shall be microprocessor based and utilize digital input for parameter adjustments. Use of potentiometers for parameter adjustment is not acceptable.

b. Auto restart. The VSD shall automatically attempt to restart after a malfunction or an interruption of power. The number of attempted restarts shall be selectable (0 to 5). If the drive reaches the limit of restarts without successfully restarting and running for a selectable length of time (60 to 600 seconds), the restart circuit shall lockout and shall provide contact annunciation.

c. Current limit. A current limit circuit shall be provided to limit motor current to a preset adjustable maximum level by reducing the drive operating speed or acceleration rate when the limit is reached. Range of adjustment shall be from 50 to 110%.

d. Digital output displays and input parameter programming. The VSD shall include a digital display and digital input programming capability on the main logic board. The display shall be programmable for indication of output speed in rpm, frequency or percent of base speed; motor amps, output motor volts, and output load. The display shall also function as a first fault indicator.

e. Input signal follower. The input signal follower circuit shall have selectable differential inputs and accept an electrical speed command from an external pneumatic (0 - 15 psi) source.

f. Motor overload protection including phase reversal and single phasing. Electronic motor protection shall be provided which is capable of predicting motor winding temperature based on inputting specific parameters including motor design type - TEFC, ODP, or other type, and speed range. The protection shall provide an orderly shutdown should the motor's thermal capabilities be exceeded.

g. Output signals. The VSD shall include analog output signals for output load, output speed, and motor voltage. The signals shall be 0 to 9 VDC @ 1mA.

h. Input power. The VSD shall operate within the following parameters:

i. Rated voltage +10%

j. Setup adjustments. Standard setup adjustments shall include:

k. Minimum speed, 0 to 60%

l. Maximum speed, 45 to 100%

m. Linear accel., 1 – 120 seconds

n. Linear deaccel., 1 – 120 seconds

o. Maximum output voltage, adjustable

p. V/Hz, adjustable with selectable profiles

q. Current limit, 50 to 110%

r. Operator panel. An operator panel shall be provided for the following functions:

s. Shall digitally display motor speed, load, motor amps, and output volts.

t. Shall have eight (8) LEDs for indicating drive run, drive ready, drive fault, plus operator function/status indication such as auto speed reference, and auto restart.

u. Shall provide selection for start, stop, auto, manual and/or Hand Off - Auto.

v. Keypad shall include electronic lock-out feature to prevent unauthorized personnel from parameter access.

w. Bypass control circuitry. Bypass control circuitry mounted integrally to the VSD enclosure. The bypass shall utilize an input circuit breaker disconnect switch to feed both the VSD and the bypass starter. An input contactor shall be utilized to feed the VSD and isolate the VSD for trouble shooting. An output contactor which is electrically and mechanically interlocked with the bypass starter shall be utilized on the VSD to provide a positive disconnect between the VSD and the motor. **Provide dual drives in lieu of drive and bypass assemblies for direct drive fans, for systems with fabric type supply duct and where specifically indicated on the drawings.**

x. Additional Protective Features

y. Input disconnect switch door shall be interlocked and padlockable.

z. Undervoltage protection.

aa. DC bus overvoltage protection.

bb. Able to withstand output line-to-line short circuits without component failure.

cc. Surge protection from ac line transients.

dd. Overload capability shall be 110% of the motor FLA based on the NEC ratings for 60 seconds.

ee. Line reactors for units 30 hp and larger.

ff. Opening of an output disconnect under load will not result in component damage.

gg. Rotating Motor Start. VSD shall be able to start into a rotating motor and accelerate (decelerate) to set speed without tripping or component loss.

hh. The VSD shall provide a programmable proof of flow form c relay output (broken belt/broken coupling) The drive shall be programmable

to signal this condition via a keypad warning, relay output and/or over the serial communications bus. Relay outputs shall include programmable time delays that will allow for drive acceleration from zero speed without signaling a false underload condition.

ii. The VSD shall include EMI RFI filters. The VSD shall comply with standard EN 61800-3 for the first environment, restricted level with up to 100' of motor cables.

jj. The VSD shall include a communications port to communicate with the Energy Management and Control system (EMCS). The port shall be an RS-485 port as standard. The standard protocols shall be Modbus, BACnet, Johnson Controls N2 bus, and Siemens Building Technologies FLN. Interface shall be provided by the drive manufacturer. As a minimum, the following points shall be controlled or accessible:

1) Start/Stop
2) Speed Reference
3) Fault Diagnostics
4) Meter Points
   a) Motor Power in HP
   b) Motor Power in KW
   c) Motor kW-Hr
   d) Motor Current
   e) Motor Voltage
   f) Hours Run

D. Codes and standards. The VSD shall meet the following standards:

1. CSA

2. ETL (UL 508)

3. NEMA

4. NEC

5. IEEE Standard 519

E. Maintainability:

1. Control circuit voltages (12 VDC, 24 VDC, 160 VDC and 120 VAC) shall be physically and electrically isolated from power circuit voltages (380 to 600 VAC, 600 VDC) to insure safety to maintenance personnel.

2. The VSD shall be provided with an alphanumeric diagnostic display with fault indications to include the following: bus overvoltage, bus undervoltage, overcurrent, ground fault, timed overload and drive fault.

3. Printed circuit boards shall utilize quick disconnect plugs and/or pull apart terminal blocks to facilitate maintenance by providing quick change out without disconnecting terminal strip connections thereby reducing wiring errors.

4. VSD shall be capable of starting and operating without a motor connected.

5. Setup and operating parameters shall be stored in nonvolatile memory. The static memory module shall be to be removed and installed in replacement logic boards with setup and operating parameters intact requiring no adjustment of replacement boards.

F. Service

1. The VSD manufacturer shall provide at no additional cost to the Owner, a startup service package for VSD's provided. Service shall include inspection, final adjustment, operational checks, and a final report for record purpose. The service package shall include a two year parts warranty from date of substantial completion and be performed by local factory employed service engineers. The service center must be permanently located within 200 miles of the jobsite.

G. Acceptable manufacturers: Trane, ABB, Yaskawa, Danfoss or approved equal.

2.21 DAMPERS

A. Provide fire, smoke and volume dampers at locations indicated on the drawings. Installation of dampers shall be in accordance with the applicable requirements of NFPA-90A and the guidelines of the Sheet Metal and Air Conditioning Contractor's National Association (SMACNA). Fire and smoke dampers shall be UL approved listed and labeled as required. The sizes of the dampers listed on the drawings are approximate sizes. The Contractor shall verify the actual size required by field measurements before final ordering. Where dampers include multiple sections, provide mullions, angles and other supports and accessories for an installation in full conformance with the manufacture’s installation instructions for the velocities and static pressures the damper will be subjected to.

B. Fire Dampers:

1. Provide Style B dynamic fire dampers with fusible links listed for 165° F.

2. Dampers shall be classified for dynamic closure to a minimum of 4000 FPM and 4" WG static pressure. Fire dampers shall have the same minimum rating as the partitions in which they are installed, but in no case shall the rating be less than 1½ hours in accordance with UL 555 Standard for Fire Dampers. Dampers shall be rated U.L. leakage Class I.

3. Each fire damper shall be installed within an approved sleeve and secured with mounting angles.

4. Where required due to the application, substitute thinline dampers, multi-blade dampers, dampers specifically designed for installation at grilles, etc., to allow for full conformance with UL installation requirements for fire dampers.

5. Dampers at outside air intake louvers may be static type.

C. Manual Volume Dampers:

1. Damper frames shall be of welded 16-gauge hot rolled galvanized steel construction with integral top and bottom blade stops.

2. Blades shall be constructed of triple-crimped 16-gauge hot rolled galvanized steel. Blades shall be a maximum of 8" wide and shall be of the opposed type, center pivoting and shall have blade edge seals on mating edges.

3. Blade actuators shall be ¼" diameter steel connecting bars attached to alternate blades with 12-gauge blade clips and bronze trunnion pins. Shaft end linkages shall be connected to adjacent blades.

4. Blade shafts shall be ½" diameter with steel stub ends on all but actuator shaft which shall be full length of blades with 6" extension and locking hand quadrants for duct mounting. Bearings shall be nylon type.

5. Dampers larger than 48" in any dimension shall be provide in multiple sections. Finish shall be standard mill finish.

6. Provide insulation stand-offs on externally insulated ductwork so that damper can be adjusted without damaging insulation.

D. Backdraft Dampers:

1. Provide Ruskin Model CBD2 counter-balanced backdraft damper with aluminum blades, vinyl edge seals and adjustable counter weight. Damper must be suitable for both horizontal and vertical installation with airflow in both directions.

E. Acceptable manufacturers: Ruskin, Nailor, Greenheck, or approved equal.

2.22 AIR DISTRIBUTION DEVICES

A. General

1. **Ceiling mounted air distribution devices shall be fully compatible with the ceiling type in each area. See architectural drawings and specifications. Ceiling mounted air distribution devices shall be fully compatible with the ceiling type in each area. All lay-in devices installed in narrow (or wide) tee ceilings shall have narrow (or wide) tee design borders.**

All lay-in devices installed in ceilings with dropped panels shall be dropped panel design.

2. For square or rectangular neck diffusers with round branch ducts, provide a square-to-round galvanized sheetmetal adapter with the round neck size equal to branch duct size indicated. Adapter shall be minimum of 4" deep so as not to reduce the effective area of the diffuser.

3. Provide an air extracting device where supply grilles or supply registers are installed on a branch duct tap.

a. At each supply register or grille with a rectangular duct tap not exceeding 1'–6", install a Titus Model AG-45 air-extracting device with a #3 key operator and access through face of register/grille.

b. At each supply register or grille with a rectangular duct tap from 1'–7" long to 3'–0" long and at each ceiling diffuser with a rigid duct tap up to 3'–0" long, install a Titus Model AG-45 air-extracting device with a push-pull wire operator.

c. At each ceiling diffuser with a rigid duct tap over 3'–0" long and any branch duct tap serving two or more supply air devices, provide a Titus Model AG-45 air-extracting device. Device shall be complete with end bearings, square shaft and a concealed operator in an accessible location.

B. Registers, Grilles and Ceiling Diffusers:

1. Supply Registers (SR) - Titus Model 272; ¾" spacing, airfoil blades, double deflection register with vertical face bars; Model AG-15 opposed blade damper and Model PF surface mount frame. Register, frame and damper shall be aluminum construction with aluminum enamel finish.

2. Linear Supply Registers (LSR) - Titus Model CT-581; linear bar diffuser with 1/2" spacing, fixed horizontal face bars, and adjustable directional blades at the rear. Provide with opposed blade damper and Model PF surface mount frame. Register, frame and damper shall be aluminum construction with aluminum enamel finish.

3. Ceiling Diffusers (CD) - Titus Model TDC-AA; louvered face square and rectangular ceiling diffuser with square or rectangular neck, with removable 1, 2, 3 or 4 way blow cores with opposed blade dampers. Diffuser and damper shall be aluminum construction with white enamel finish. . Face style lay-in type where in a full size lay-in tile. Face style shall be Type 1 - surface mount where installed in gyp board ceilings and in lay-in ceilings where there is not a full size tile.

4. Linear Diffusers (LD) - Titus Model ML; linear slot diffuser with integral 180-degree pattern controller. Entire diffuser shall be aluminum construction with matte black pattern controllers and white enamel finish. Face style shall be flange

border type for gypsum board ceilings, lay-in frame for standard tee ceilings, and NT frame for narrow tee ceilings.

a. Provide with each linear diffuser a field fabricated internally lined plenum to suit job conditions. Plenums shall be a minimum of 12" high for even air distribution. Provide extended plenums, notched plenums and other custom features to suit field conditions, structure and work of other trades. Field measure each location prior to constructing plenums.

b. Provide end borders, end caps or blank-offs for a complete installation.

5. Wall Mounted Return Grille (RG) - Titus Model 355; ½" spacing, 35 degree fixed deflection with horizontal face bars. Provide with PF mounting frame and all aluminum construction with satin aluminum enamel finish.

6. Ceiling Mounted Return Air Grille (RG) - Titus Model 50F; eggcrate grid core with ½" x ½" x 1" grid spacing. Grille shall be aluminum construction with white enamel finish. Frame style shall be Type 1 - surface mount with except for 22x22 and 46x22 sizes installed in lay-in ceilings which shall have lay-in frame.

7. Ceiling Mounted Exhaust Air Grille (EG) - Titus Model 355; ½" spacing, 35 degree fixed deflection. Grille shall be aluminum construction with white enamel finish. Frame style shall be Type 1 - surface mount.

8. Ceiling Mounted Exhaust Register (ER) - Same as ceiling mounted exhaust grille plus aluminum opposed blade damper.

2.23 VAV BOXES

A. Terminal units shall have a damper control consisting of a drive plate which is mechanically linked to an extruded aluminum throttling damper. The damper shall be offset pivoted in nylon bushing to balance air pressure forces. The controls shall be arranged to comply with the control scheme specified in Section 15650. The damper operators are to be compatible with the control system specified and shall be provided under Section 15650 and shall be factory mounted by the terminal unit manufacturer.

B. Terminal units shall be fabricated from zinc-coated steel, not lighter than 22-gauge. The interior surfaces of box and sound attenuators shall be acoustically and thermally insulated with non-porous insulation to prevent mold spores, bacteria and air erosion. Insulation shall be 1" thick with a minimum R-Value of 3.9 sq ft deg F h/BTU @ 75 deg F. Where VAV boxes are installed in non-conditioned spaces, provide an additional external layer of 3/8" thick closed cell elastomeric foam insulation with a minimum R-Value of 1.5 sq ft deg F h/BTU @ 75 deg F to mitigate the potential surface condensation. Edges of insulation shall be sealed from the airstream. The insulation material shall meet NFPA and NBFU No. 90A Standards as determined by Underwriters Laboratories method - NFPA No. 255 - ASTM E 84-50T. Performance of units shall be based on tests conducted in accordance with ADC Standards 1062R3 and ASHRAE Standard 36B.

C. A center averaging flow cross velocity sensor shall be provided on each box.

D. Where indicated on the drawings and where required to meet scheduled noise criteria, provide custom sized sound attenuators. Attenuators shall be transitioned as required to allow for branch duct connections as shown on the drawings.

E. Electric heat for VAV boxes shall be made with galvanized steel frame. Resistance coil terminals and nuts shall be stainless steel, and terminal insulators and bracket bushings shall be of high grade ceramic and securely positioned. Resistance wire shall be iron free, 80% nickel and 20% chromium. Heaters shall be tested dielectrically for 1000V plus twice the rated voltage or 2000V, whichever is higher. Heaters shall be derated to 35 watts/sq.in. of wire surface. Three phase heaters shall be provided with balanced three phase steps. Heater control panels shall be integral with heater and shall have hinged doors. Provide heaters with magnetic contactors and primary fused control power transformers. Overcurrent protection shall consist of automatic circuit breakers as required by NEC. An integral fused safety disconnect switch shall prevent the door from being opened unless the disconnect switch is in the off position. Fused disconnect shall have Class R rejection feature. Provide current limiting and time delay type RK-1 fuses. Control voltage shall be 24 volts. Magnetic contactors shall be disconnecting type. The contactors shall disconnect power from all ungrounded conductors. A differential pressure type air flow switch shall be built into the heater. A disc-type automatic reset thermal cutout shall be provided for primary protection. For secondary protection, a sufficient number of heat limiters (fusible links) in the power lines shall de-energize the elements in case the primary cutout fails.

F. Fan powered boxes shall have ECM motors with speed adjustment.

G. VAV boxes shall be Titus, Price, Nailor, Krueger, Trane, Siemens, Enviro-Tec, or approved equal.

2.24 CHILLED WATER TREATMENT

A. General:

1. Provide equipment and chemicals and provide the necessary service for a complete and operating water treatment system. A single water treatment company shall be responsible for products and services and be a recognized specialist in the field of industrial water treatment for a minimum of 10 years. The water treatment company shall have regional water analysis laboratories, research and development facilities, plus technical service representatives located within the trading area of the job site.

B. Preoperational System Cleanout:

1. The system and related piping shall be thoroughly flushed out with precleaning chemicals designed to remove deposits such as pipe dope, oils and loose rust, mill scale and other extraneous materials. Add recommended dosages of precleaner chemical products any circulate throughout the water system. Drain,

fill and flush water system until no foreign matter is observed and total alkalinity of the rinse water is equal to that of the make-up water.

C. Chemical Feeding and Control Equipment:

1. For each system, install a one-shot feeder with funnel, and air release valve, (minimum five gallon capacity) designed to meet pressure requirements of the system.

D. Water Treatment Chemicals:

1. Provide one year's supply of the recommended chemical formula for scale and corrosion protection of closed recirculating system. Formulation shall not contain any ingredients which are harmful to system materials of construction.

E. Testing Equipment:

1. Provide basic water test equipment, including carrying case and spare reagents for maintaining control of program standards in the hot water boiler systems. Test kits shall include the following:

a. Reagents and apparatus for determination of corrosion inhibitor level in the hot water boiler system.

F. Water Treatment Service Program:

1. The water treatment supplier shall provide consulting services for a period of one year from start-up of the hot water boiler system which will include:

a. Installation and system start-up procedure recommendations.

b. Preoperation system close-out procedure supervision.

c. Initial water analysis and recommendations.

d. Training of operating personnel on proper feeding and control techniques.

e. Periodic field service and consultation meetings.

2.25 ELECTRICAL WORK

A. Materials shall be new and shall be Underwriters Laboratories labeled or listed.

B. Wiring shall be contained in metallic raceways. Raceways shall meet the requirements of DIVISION 16 - ELECTRICAL.

C. Wiring for 115 volts and higher shall be copper #12 AWG or larger. Wiring type, insulation, etc. shall meet the requirements of DIVISION 16 - ELECTRICAL.

D. Wiring less than 115 volts shall be copper. Wire size, type and insulation shall be selected to suit the application.

PART 3 - EXECUTION

3.1 PIPING

A. General:

1. Per the National Electrical Code, piping shall not be routed over electrical panels or other electrical equipment. National electrical code service clearances shall be maintained for electrical equipment. Coordinate trades.

2. Open ends of piping and fittings shall be plugged or capped upon delivery to the jobsite and shall be stored in a matter that keeps the interior and exterior surfaces clean and dry.

3. Provide caps or plugs in all manual drains and vents.

4. Changes of pipe sizes shall be made by using eccentric pipe reducers only. In pump suction connections the flat part shall be on the top. In all other piping the flat part shall be on the bottom. The use of bushings is prohibited.

5. The piping arrangement shown is a design based on currently available equipment. The plans show typical equipment to scale and show practical arrangement. Modification will be necessary during construction, at no additional cost to the Owner, to adapt the equipment layout and piping plans to the precise equipment purchased by the Contractor. Accessibility for operation and maintenance must be maintained.

6. All piping shall be installed parallel to walls and column centerlines. Fully coordinate work of each trade to provide the designed systems without interference between systems.

7. When air handling units are provided with multiple (stacked) water coils, in addition to the coil connection requirements indicated in coil piping details, provide P&T plugs at each coil connection, provide a manual drain and vent for each coil, provide a flow balancing device on the leaving branch piping from each coil and a shut-off valve on the entering branch piping to each coil. Provide a supply and return water header with branch piping to each coil sized not to exceed 4 feet per second for sizes 2" and smaller and not to exceed 8 feet per second for sizes 2 1/2" and larger.

8. Manufactured fittings only shall be installed on piping 2½" and smaller. Manufactured fittings shall be used on piping systems 3" or larger except "weld-o-

lets" or "thread-o-lets" may be used for branch connections if the branch is less than one-half the size of the main. The use of "stab" type connections is prohibited.

9. Piping shall be racked and handled in a manner to prevent the entrance of dirt or foreign matter. Open pipe ends shall be plugged or capped at the end of each working day.

10. Automatic air vents shall be provided at each high point in the system and drain valves shall be provided at each low point. Drain lines from air vents shall be piped to the nearest floor drain or drain pan.

11. Piping shall be installed to permit proper circulating of fluids and to permit drainage. Circulating water piping shall be pitched upward in the direction of flow. Installation of piping shall include accessories as hereinbefore specified, as shown on the drawings or as required for the proper operation of the system.

B. Drain Line Piping:

1. Provide for evaporator coils and air conditioning equipment, a complete drainage system. Lines shall be installed to pitch down in the direction of flow not less than 1 inch in 40 feet, changes in directions shall be made using tees with plugs or caps.

2. Cooling coil drain outlets shall have a deep seal trap. Also provide a deep seal trap at drain connections for air handling system components with a positive or negative static pressure at the drain connection.

3.2 TESTING AND CHARGING REFRIGERANT SYSTEMS

A. The system shall be pressurized with dry nitrogen to 450 psi on the high pressure side and 150 psi on the low pressure side. Each joint shall be leak checked using a soap-water solution; leaks shall be corrected and the system retested as hereinbefore described. When the system proves tight, the pressure shall remain on the system for 24 hours with no drop in pressure. Line pressure and ambient temperature readings shall be taken immediately after the system is determined to be leak-free and again 24 hours later. A correction of 0.3 pounds per square inch will be allowed for each degree change between the initial and final temperature of the ambient air.

3.3 INSTALLATION OF HEAT TRACE CABLE (Freeze Protection)

A. Apply the cable linearly on the pipe after piping has been successfully pressure tested. Secure the cable to metallic piping with cable ties or fiberglass tape. For installation on plastic piping, the cable shall be applied using aluminum tape (AT180). After installation and before and after installing the thermal insulation, subject cable to testing using a 1000 VDC megger. Minimum insulation resistance should be 20 to 1000 megohms regardless of length. Apply "electric traced" signs to the outside of the thermal insulation.

B. Apply the cable linearly on the pipe after piping has been successfully pressure tested. Secure the cable to piping with cable ties or fiberglass tape in accordance with the manufacture's installation instructions.

C. For installation on plastic piping, the cable shall be applied using aluminum tape (AT180). The cable shall have an outer braid of tinned-copper and an outer jacket of modified polyolefin (-CR).

D. After installation and before and after installing the thermal insulation, subject cable to testing using a 1000 VDC megger in accordance with the manufacture's installation instructions.

E. Provide local disconnect switch with lighted pilot light and extend power circuit and connect to a suitable electrical power source. Review electrical drawing before bidding and coordinate trades.

F. Apply "electric traced" signs to the outside of the thermal insulation.

3.4 PREPARED OPENINGS

A. Provide a prepared opening for duct penetrations through partitions, walls, and floors.

B. Insulated ducts and piping passing through prepared openings and pipe sleeves shall have a 0.016" aluminum jacket installed over the external insulation. Jacket shall extend a minimum of 2" on either side of the wall. Secure jacket on each end with aluminum draw bands.

C. Where wall is fire and/or smoke rated and the opening is required to be sealed, the annular space between the two metal surfaces shall be packed solid with mineral fiber type fire rated safing insulation.

D. Where ducts and piping are exposed in any area or below a suspended ceiling a sheet metal flange or a chrome plated escutcheon large enough to cover the annular space and sleeve flange shall be installed.

3.5 PIPE JOINTS

Refer to SECTION 15010 - MECHANICAL GENERAL PROVISIONS for installation of any pipe joints.

3.6 SPECIALTIES

A. Flow Balancing Device:

1. Flow balancing devices shall be installed with the manufacturer's recommended straight length of pipe in front of and behind the device.

2. Readout connections shall be installed so that they are easily accessible and are above the horizontal center line of the fitting.

B. Gauges and Gauge Cocks:

1. Gauge cocks and T&P plugs shall be installed so that they are easily accessible and usable.

2. Permanently-installed gauges shall be positioned so that they are easily readable.

C. Flexible Connectors:

1. Flexible connectors shall be installed where indicated on the drawings. Connectors shall be installed at right angles to each other.

2. Piping systems shall be adequately braced and supported on each side of flexible connectors such that are no longitudinal or transverse loads from the piping system imposed on the connector.

D. Air Separators:

1. Separators shall be installed in the vertical position and sufficient clearance shall be provided for strainer removal.

2. Separators shall be adequately hung from the structural system or supported from the floor independently of the piping system.

3. A valved blowdown connection shall be provided and piped to the nearest floor drain.

3.7 INSULATION

A. Piping System:

1. Piping, valves and fittings shall be insulated as indicated on the drawings and specifications.

2. Where insulation is installed between hangers and pipe, install an 18" long section of rigid insulation of similar thickness suitable to support the pipe and its contents at each hanger, saddle, or support location. Insulation type and density shall be selected so that compression does not exceed 1/16".

3. Fitting insulation shall be covered with jacket covers. Jacket cover joints shall be fastened using stainless steel tack fasteners, pressure sensitive tape, brushed-on vapor barrier mastic or any approved combination.

4. Pipe Joints:

a. Fiberglass:

1) Transverse joints in exposed fiberglass insulation shall be secured by self-adhering butt strips.

2) Longitudinal joints in exposed fiberglass insulation shall be secured by self-adhering lap strips which are an integral part of the vapor barrier jacket.

3) Longitudinal joints in concealed fiberglass insulation shall be secured as specified for exposed insulation or may be stapled by using outward clinching staples.

4) Insulate fittings, flanges valves and piping accessories with factory molded or field mitered sections joined with adhesive and wired in place. Provide vapor seal at fittings with a layer of glass fitting tape embedded between two 1/16" coats of vapor retarder mastic. Fitting tape shall extend over the adjacent pipe insulation and overlap on itself at least 2".

5) If the self-adhering lap strips do not adhere firmly, the Contractor shall resecure the defective lap strips by stapling. Stapling will only be allowed in concealed spaces. Exposed insulation shall be replaced.

b. Cellular Glass:

1) Install cellular glass insulation in strict conformance with the manufactures's installation instructions for the specific application.

2) Insulate fittings, flanges valves and piping accessories with factory molded or field mitered sections joined with adhesive and wired in place. Provide vapor seal at fittings with a layer of glass fitting tape embedded between two 1/16" coats of vapor retarder mastic. Fitting tape shall extend over the adjacent pipe insulation and overlap on itself at least 2".

c. Foamed Elastomeric:

1) Where possible, tubular insulation shall be slipped onto the piping prior to joining piping.

2) When installing on already joined piping systems, insulation shall be slit longitudinally, snapped over the pipe and longitudinal and butt joints shall be coated with contact adhesive and glued together.

3) Fittings shall be insulated by mitering and notching insulation. Valves shall be insulated by using oversized insulation.

4) All joints, seams and spices shall be glued.

B. Protective Covering (Piping):

1. Where insulation is exposed on equipment platforms, or in equipment rooms, unconditioned open buildings or in areas of physical abuse, insulation up to 7'-0" above the floor or platform shall be covered with a metal jacket secured with metal bands on 12" centers.

2. Where insulation is installed in a crawl space or is exposed to the weather insulation shall be covered with two layers of 15 pound inorganic roofing felt secured in place with aluminum tie wires in 12" centers. Transverse joints of the felt shall be lapped a minimum of 6". The felt shall be covered with an aluminum jacket, as hereinbefore specified, secured by soft aluminum bands on 12" centers.

3. Where exterior piping is required to be insulated, the first 3 feet of the piping above the ground level shall be insulated with a nonabsorbent (foam-glass) type of insulation. The insulation shall be weatherproof as hereinbefore specified. The transition joint between the two dissimilar insulations shall be sealed to prevent the ground water from entering.

4. Fitting insulation shall be covered with UV stabilized PVC jacket covers. Joints shall be waterproofed.

5. Elastomeric insulation shall be weatherproofed by applying two coats of manufacturer approved paint to the exterior surface of the insulation and providing piping jackets on all straight lengths.

C. Ductwork:

1. Externally insulated ductwork:

a. Ductboard insulation shall be used for all exposed square and rectangular ductwork which is indicated to be externally insulated. **This includes ductwork exposed in mechanical and electrical rooms.** All ductwork which is not installed above suspended ceilings or is not concealed in furrings or chasses shall be considered exposed.

b. Ductwrap shall be used for round and oval ductwork and for concealed square and rectangular ductwork which is indicated to be externally insulated.

c. All supply, return and outside air ductwork which is not indicated to be internally lined shall be externally insulated.

2. External Wrap:

a. Joints and seams in the duct wrap shall be secured by a double row of staggered outward clinching staples on 6" centers. Staples and joints shall then be sealed by applying an approved pressure sensitive foil tape.

3. External Board Insulation:

a. Board insulation shall be impaled over weld pins or studs and secured with clips, spaced on not more than 16' centers. At pins or stud locations, apply a 4" x 4" layer of vapor barrier material adhered with vapor barrier adhesive at each pin or stud penetration.

b. Firmly butt sections of insulation board and cover with glass fiber reinforced vapor barrier tape.

4. Where insulated ducts or equipment connect to lined ducts the insulation shall extend over the lined duct a minimum of 6". For cold ducts the ends of the duct lap shall be sealed to the lined duct with vapor barrier tape and mastic.

D. Equipment:

1. Cold Equipment:

a. Insulate cold equipment, which has a normal operating temperature of 55° F or less. This shall include cold components of manufactured equipment which is not factory insulated. This shall include:

1) Chiller evaporator and adjacent cold surfaces.

2) Chilled water air separators.

3) Chilled water pumps and suction diffusers.

4) Chilled Water Heat exchangers.

5) Chilled water storage tanks.

6) Chilled water system expansion and compression tanks.

7) Chilled water pupping packages provided with air cooled chillers.

8) Other equipment and equipment componets with normal operating temperature of 55° F or less.

b. Insulation may be applied as a single layer or multiple layers of sheet-type elastomeric insulation which shall total 1½" in thickness.

c. Adhesive shall be applied in accordance with the manufacturers instructions.

d. Insulated parts of other prefabricated equipment such as, but not limited to ceiling diffusers, mixing boxes, variable volume control boxes, coils, dampers, heaters, filters, etc., installed in or part of a duct system which is required to be insulated or lined by these specifications shall be externally insulated to prevent condensation or excessive heat loss of equipment.

2. Hot equipment:

a. Insulate hot equipment, which has a normal operating temperature of 110° F or higher.

E. Duct Lining:

1. Ductwork shall be completely covered with liners. Liner shall be cut to assure overlapped and compressed corner joints. Transverse joints shall be neatly butted and shall have no gaps. The coated surface shall face the air stream.

2. Liner shall be attached to the sheet metal with 100 percent coverage of adhesive and exposed leading edges and transverse joints coated with adhesive. Liner shall additionally be secured using mechanical fasteners installed per SMACNA Duct Liner Application Standard.

3.8 DUCT SYSTEMS

A. Duct systems shall be constructed and installed in accordance with "SMACNA HVAC Duct Construction Standards" latest edition and good engineering practices.

B. Provide externally insulation for supply, return and outside air duct systems which are not indicated to be internally lined.

C. Open ends of ductwork including fittings and accessories shall be capped when stored on the site. Interior and exterior surfaces shall be cleaned just prior to installation. The open ends and open taps of each duct section shall be capped immediately after installation. Also cover grilles, registers and diffusers immediately after installation.

D. Per the National Electrical Code, ductwork shall not be routed over electrical panels or other electrical equipment. National electrical code service clearances shall be maintained for electrical equipment. Coordinate trades.

E. Fire, fire/smoke, and smoke dampers shall be installed in accordance with the manufacturer’s installation instructions and in accordance with the damper UL listing. Provide duct, wall and ceiling access doors at each damper for inspection and service.

F. Interior surfaces of ductwork visible through air distribution devices shall be painted flat black. All items visible through air distribution devices shall also be painted flat black. This includes items like turning vanes, liner pins, dampers and similar items.

G. There shall be no flex ductwork routed through partitions.

3.9 INSULATED FLEXIBLE DUCT

A. Maximum length of flexible duct between main, trunk or branch duct and diffuser shall be 8 feet. For sound attenuation, use full 8' long flex to diffusers and grilles with a minimum of one 90 degree ell.

B. Maximum length of flexible duct between main, trunk or branch duct and a VAV box shall be 5 feet. For sound attenuation, use 5' long flex to VAV box inlet connections.

C. Duct shall be supported at intervals not to exceed manufacturers recommended spacing using metal or approved fabric type hangers.

D. Flexible ducts shall not be installed through walls or partitions.

E. Cut duct to required length. Fold back outer vapor barrier jacket and insulation. Slide inner liner over the sheet metal "tap" and tightly secure the liner as follows:

1. High pressure side of equipment (between main, trunk or branch duct and VAV box) - Stainless steel "radiator type" draw bank with helical screw.

2. Low pressure side of equipment (between main, trunk, or branch duct and diffuser and between VAV box and diffusers) - Plastic "wrap-ties".

F. After inner liner is secured, slide insulation and vapor barrier jacket over inner liner and secure with a plastic "wrap-tie". Seal joint between outer jacket and insulation wrap (where required by specifications) with a vapor-proof mastic.

3.10 DUCT ACCESS DOORS

A. Access doors shall be installed adjacent to fire dampers, smoke dampers, duct smoke detectors, electric duct heaters and terminal heating coils.

B. Doors shall be installed in ductwork on the upstream side of the equipment, so that the door can be fully opened and item inside ductwork can be readily serviced.

C. Where required due to space problems, the hinge may be omitted and double cam locks provided.

3.11 DUCT SEALANT

A. Duct sealants shall be used as follows:

1. Gasket type may be used only on flanged joints.

2. Mastics may be used on flanged joints, as a fillet or groove sealant and as a surface sealant between ductwrap and a rigid duct system.

3. Embedded fabric shall be used on all other type joints.

4. Omit Sealant on ductwork exposed in finished areas.

3.12 VIBRATION ISOLATION

A. Install vibration isolators as hereinbefore specified for equipment specified on this project.

B. Specified type isolators shall be installed on each suspended piping system 1" diameter and larger. Piping/tubing systems coming from or going to equipment requiring isolators shall be provided with isolators for a minimum of 50 feet from each piece of equipment.

C. The first 3 hangers from the equipment shall be capable of handling the same deflection as the equipment isolators. Remaining isolators shall provide ¾" deflection.

3.13 EQUIPMENT

A. Floor-mounted mechanical equipment (heat pump units, pumps, boilers, etc.) shall be installed on concrete housekeeping pads.

B. Provide safety pan under equipment containing cooling coils (air handlers, heat pump units, etc.). Provide emergency drain piping to nearest drain.

C. If required due to excess vibration the Contractor shall statically and dynamically balance air handling and ventilating unit fan wheels after the equipment has been installed. Fan wheels must be balanced to within ½ the ARI tolerance levels.

D. The HVAC systems shall not be operated at any time without all filtration in place. Provide clean filters at substantial completion. Temporary filter media shall be installed across return and exhaust grilles and registers if systems are operated prior to occupancy. Temporary filter media shall be merv 8. Prior to starting a unit, the contractor must obtain the owner’s consent that it is acceptable to owner for the contractor to utilize the equipment during the construction phase. The systems shall not be started until the jobsite is throughly cleaned. Whenever floors or walls or sanded, the HVAC systems must be de-energized and the areas must be cleaned before the HVAC systems are restarted.

E. Keep interior surfaces of ductwork and air handling equipment clean throughout the construction period. Access doors to air handling units shall not be left in the open position. Inlet and outlets to air handling equipment shall be capped when stored on the site and shall remain capped until ductwork is connected.

3.14 AIR DISTRIBUTION DEVICES

A. Grilles, diffusers, door grilles, etc., shall be adequately secured using only oval-head, countersunk, sheet metal screws or screws specifically provided by the device manufacturer. Finish on head of fastener shall match the finish of the device.

B. Fully coordinate installation and supports for plenums and accessories associated with linear diffusers, flow bars and similar items with the ceiling systems.

C. Support all ductwork, plenums and air distribution system components from the building structure.

D. Where air distribution devices are cut into lay-in ceiling tiles, provide galvanized supports concealed above the ceiling tile so that the weight is transferred to the lay-in support system in lieu of the ceiling tile.

3.15 FLUSHING AND CLEANING

A. Piping, coils, heaters, etc., installed for heating, cooling or other operations of the building shall be thoroughly flushed of debris and foreign objects before any system is placed in operation. After flushing strainers, traps and dirt legs shall be checked and cleaned.

3.16 TESTS OF PIPING

A. Chilled Water

1. Piping systems shall be tested with air or dry nitrogen at 100 psi for a minimum of 12 hours with no more than 3% loss in pressure.

2. Piping shall be hydraulically tested for four hours with no drop in pressure. Test pressure shall be 125 psi or 1½ times the working pressure, which ever is greater.

B. Protection:

1. In systems in which are installed devices such as valves, gauges, steam traps, etc., having a design pressure less than the test pressure, the device shall be isolated or removed from the system during the pressure test.

3.17 PREPARATION FOR AND ADDITIONAL WORK ASSOCIATED WITH TESTING AND BALANCING OF AIR AND HYDRONIC SYSTEMS

A. Scope of Work:

1. The contractor shall have equipment in operation and shall field verify operation prior to HVAC testing and balancing.

B. Additional Work:

1. Install clean filters as described in other sections of the specifications, prior to the beginning of the testing and balancing work. Temporary filter media for the purpose of protecting permanent filters during balancing may be used.

2. Air Handling Unit total air flows shall be balanced for "dirty" filter conditions. If necessary, provide manual dampers or temporary perforated plates or other approved restriction to simulate these conditions.

3. Debris resulting from or caused by installation of air conditioning and exhaust duct work shall be removed. Suction and discharge plenums shall be clean and made ready before the commencement of the balancing work.

4. Debris resulting from or caused by installation of air conditioning and exhaust duct work shall be removed. Suction and discharge plenums shall be clean and made ready before the commencement of the balancing work.

5. Remove and clean strainers. Operate air vents at the high points of the system to eliminate air.

3.18 TESTING AND BALANCING OF AIR AND HYDRONIC SYSTEMS

A. Scope of Work:

1. The services of a single, independent air balance and testing agency, approved by the Architect, shall be obtained to test, adjust and balance supply, return, exhaust and hydronic systems. The agency shall specialize in the testing and balancing of heating, ventilating, air conditioning and hydronic systems.

B. General Requirements:

1. Testing and balancing shall be performed in complete accordance with the sections applicable to air distribution and hydronic balancing of the Associated Air Balance Council (AABC), National Standard for Field Measurement and Instrumentation latest edition.

2. The testing and balancing firm shall be an Agency whose primary responsibility is testing, adjusting and balancing of heating, ventilating, air conditioning and hydronic systems.

3. Testing and balancing shall not begin until systems have been completed and are in full-working condition. Heating, ventilating, air condition and hydronic equipment shall be put into full operation by the Contractor and shall continue the operation of same during each working day of testing and balancing.

4. The work required herein shall consist of setting air volumes, water flows, and speed adjustments to within 10 percent of design requirements as shown on the drawings or listed in the specifications.

5. A minimum of two visits to the job site, for inspection of duct installation and damper accessibility, pipe installation and flow measurement points are required during construction prior to the installation of the ceilings. Any inconsistencies found or additional balancing dampers or measuring points needed shall be reported to the Architect.

6. The Test-and-Balance Agency shall cooperate with the Architect, Mechanical, Controls and Sheet Metal Sub-contractors, to effect smooth co-ordination of the balancing work with job schedule.

7. Upon the completion of the test and balance work, with test data recorded, the Test-and-Balance Agency shall submit six copies of the completed report to the Architect for his review and evaluation.

8. Prior to review of the balancing of the air conditioning system, the Architect may request that the balancing Contractor perform a "spot check" a selected 10 percent of air outlets in his presence. If the readings do not coincide with the report or within specified tolerances, the system balance shall be rejected and the Test-and-Balance Agency shall be required to rebalance the system. This procedure shall be repeated until the balance of the system is acceptable.

C. Submittals:

1. Copies of a detailed procedure to be followed in the testing and balancing of each air distribution, exhaust and hydronic system being used in this project shall be submitted to the Architect as described in SECTION 15010 - MECHANICAL GENERAL PROVISIONS. An acceptable copy must be returned to the Architect before balancing work is begun.

2. Sample forms to be used in listing information and data shall be submitted.

D. Air Balancing Procedure:

1. Air Handling Unit total air flows shall be balanced for "dirty" filter conditions. If necessary, provide manual dampers or temporary perforated plates or other approved restriction to simulate these conditions.

2. Pitot transverses shall be taken in main ducts to obtain the cfm of each fan.

3. Minimum standards, as listed in the Associated Air Balance Council (AABC) National Standards shall be followed in balancing each system installed on this project.

4. 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.

a. Record fan numbers, manufacturers, model numbers and serial numbers.

b. Test, adjust and record required and measured total cfm for each fan system.

c. Test, adjust and record any required and measured outside air and return air quantities.

d. Test and record required and measured system static pressures; filter differentials, coil differentials and fan total static pressures.

e. Record any installed fan drive assemblies, fan sheaves, motor sheaves and belts.

f. Record each installed motor manufacturer and each motor horsepower together with nameplate electrical characteristics; i.e., voltage, amperes, hertz and rpm.

g. Test, adjust and record each blower rpm.

h. Test and record any entering and leaving air D.B. temperatures.

i. Test and record any entering and leaving air W.B. temperatures.

j. Test and adjust any supply, return, outside and return air ducts to proper design cfm.

k. Test and adjust the cfm delivery of each diffuser, grille, and register to within 10 percent of design requirements.

l. Identify and record the location of each diffuser, grille and register.

m. Record size, type and manufacturer of each grille, register and diffuser.

n. 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.

o. Diffusers, grilles and registers shall be adjusted to minimize drafts.

p. Tests shall be made with supply, return and exhaust systems operating, and doors, windows, etc., closed or in their normal operating condition.

q. Damper positions shall be permanently marked after air balancing is complete.

r. Cooperate with control contractor's representative. Automatically operated dampers shall be set and adjusted to operate as specified or indicated. Testing agency shall check controls for proper operation and calibration.

s. The final balanced condition for each area shall include the testing and adjusting of pressure conditions. Front doors, exits, elevator shafts, etc., shall be checked for air flow so that exterior conditions do not cause excessive abnormal pressure conditions.

E. Water Balancing Preliminary Procedure:

1. Balancing of hydronic water systems shall not begin until air balance is complete.

2. Prepare the hydronic water systems for balancing in the following manner:

a. Remove and clean each strainer.

b. Examine water in system and determine if water has been cleaned and treated.

c. Check pump rotation.

d. Check expansion tanks to determine that they are not air-bound or waterlogged and the system is properly charged.

e. Check air vents at the high points of the system to determine that they are installed and operating.

f. Open valves to full-open position. Close coils by-pass valves. Set mixing valves to full coil-flow.

g. Set temperature controls to full cooling for balancing chilled water and to full heating for balancing heating water coils.

F. Water Balancing Procedure:

1. After completion of preliminary procedure the following procedure shall be followed.

a. Test pumps at shut-off to establish impeller size and plot on approved, certified curve.

b. Set chilled and heating water pumps to specified gallons-per-minute delivery.

c. Set and record chilled, condenser, loop, and heating water flows at hydronic equipment (chiller, coils, heat exchangers, cooling towers, closed circuit coolers, etc.).

2. Upon completion of flow readings and adjustments at coils and by-passes, recheck settings at the pumps and readjust if necessary.

3. After each hydronic system has been balanced to design requirements the following test shall be performed and recorded in the final report.

a. Test and record leaving water temperatures and return water temperatures through chillers.

b. Test and record entering and leaving water temperatures at cooling coils, heating coils and heat exchangers.

c. Test and record entering and leaving air temperatures: wet bulb and dry bulb at each cooling coil and dry bulb across each heating coil.

d. List mechanical specifications of pumps, rated and actual running amperage, voltage, horsepower of pump motor and shut-off dynamic head.

e. Test and record final operating suction and discharge pressures and total dynamic head.

f. Test and record drops through each coil and coil by-pass in the system. Set each coil by-pass to match coil full-flow pressure drop.

g. Where flow devices are installed test and record actual flow-metered readings and corresponding gallons-per-minute.

4. Valve positions shall be permanently marked after the water balancing is complete.

3.19 ELECTRICAL WORK

A. Control or signaling wiring shall not be installed in raceways with power wiring. Wiring and raceways for line voltage interlocking shall be work of this Section. Voltage shall be 115 volts, 1-phase, 60 hertz. Provide transformer where required. Control and signaling wiring and raceways between equipment specified under this Section shall be work of this Section.

B. A source of power may be indicated under DIVISION 16 - ELECTRICAL for activating control devices where power for controls does not originate at the control transformer furnished with the starter or control panel. Work of this Section shall include

wiring required for controls from this source. If additional 120 volt power is required it shall be obtained from spare breakers at a location approved by the Architect/Engineer. The cost of installation of raceways, wiring, etc. shall be included as work of this Division. The Contractor shall review electrical drawings prior to bidding.

- END OF SECTION -

SECTION 15650 - HEATING, VENTILATING AND AIR CONDITIONING CONTROL SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

Work described in this Section includes providing labor, materials, and equipment indicated, specified, or necessary for a complete and operating energy management and control system. See SECTION 15010 - MECHANICAL GENERAL PROVISIONS which apply to this Section.

A. DESCRIPTION OF SYSTEM

1. The system shall be a fully integrated direct digital (DDC) type Energy Management and Control System (EMCS). The system shall incorporate direct digital control for energy management, equipment monitoring and control, and subsystems with open communications capabilities. The system shall include required equipment, wiring, raceways, appurtenances, engineering, labor and labor supervision. For the purpose of this specification, Energy Management and Control System (EMCS), Building Automation System (BAS) and Facility Management System (FMS) are used interchangeably.

2. The system shall be as manufactured by Johnson Controls, Siemens, Snyder Electric equal. To exhibit proven reliability, materials and equipment used shall be standard components, regularly manufactured for this and/or other systems and not custom designed especially for this project. Systems and components shall have been thoroughly tested and proven in actual use.

3. Surge transient protection shall be incorporated in design of system to protect electrical components in all DDC Controllers and operator's workstations.

4. Provide open communications system. The system shall be an open architecture with the capabilities to support a multi-vendor environment. To accomplish this effectively, system shall be capable of utilizing standard protocols as follows as well as be able to integrate third-party systems via existing vendor protocols.

a. System shall be capable of high speed Ethernet communication using TCP/IP protocol.

b. System shall be capable of BACnet communication according to ANSI/ASHRAE 135-2004.

c. The system shall be capable of supporting both standard and vendor specific protocols to integrate a wide variety of third-party devices and legacy systems.

d. The intent is to either use the Operator Workstations provided under this contract to communicate with control systems provided by other vendors or to allow information about the system provided in this contract to be sent to another workstations. This allows the user to have a single seat from which to perform daily operation.

5. The intent of the specification is to describe through specification paragraphs, the criteria for providing a control system consisting of control devices, control panels, wiring, relays, and other materials and devices required to accomplish the functions and operation described herein.

6. Furnish, install, program, and place into operations all controls. All hardware, software, and firmware points provided with the direct digital control system provided as part of this project shall be displayed and controlled through the operator interface.

7. Although such work is not specifically indicated, provide all supplementary or miscellaneous items, software, appurtenances, and devices necessary for a sound, secure, and complete system.

B. QUALIFICATIONS

1. The EMCS system shall be designed and installed, commissioned and serviced by factory trained personnel. EMCS contractor shall have an in-place support facility within 100 miles of the site with technical staff, spare parts inventory and necessary test and diagnostic equipment. The EMCS contractor shall provide full time, on site, experienced project manager for this work, responsible for direct supervision of the design, installation, start up and commissioning of the EMCS. The contractor shall be regularly engaged in the installation and maintenance of EMCS systems and shall have a minimum of ten (10) years of demonstrated technical expertise and experience in the installation and maintenance of EMCS systems similar in size and complexity to this project.

2. The EMCS contractor shall maintain a service organization consisting of factory trained service personnel and provide a list of 10 projects, similar in size and scope to this project, completed within the last five years.

3. Materials and equipment shall be the catalogued products of manufacturers regularly engaged in production and installation of automatic temperature control systems and shall be manufacturer's latest standard design that complies with the specification requirements.

4. The contractor shall have an established 24-hour emergency service organization to respond to service requests. A dedicated telephone number shall be provided to the Owner for requesting emergency service.

C. SHOP DRAWINGS

A complete set of control drawings and a complete sequence of control shall be submitted for approval prior to installation or fabrication of any equipment. The Submittal shall include a Schematic Flow diagram for systems and equipment showing locations of instruments and devices along with a written description of the sequence of operation for the system or subsystem depicted in the diagram. Submittal shall indicate interconnecting wiring between devices and equipment. Each drawing shall include a Bill of Material showing device number, quantity, and manufacturers' catalog number for devices shown. Submittal data shall include a schedule of devices to be located, including properly sized control valves. Drawings shall include interlock wiring components, motor starters, contactors and numbered terminals on equipment. Submittal shall include a detailed input/output summary and a list of proposed initial setpoints. Refer to SECTION 15010 - MECHANICAL GENERAL PROVISIONS for details.

D. ELECTRICAL WORK

1. Work of this Section shall include all wiring, conduit, disconnects, etc., required for controls. Where additional 120 volt power is required, provide breakers in and extend circuits from the nearest suitable 120 volt panelboard. The cost of installation of conduit, wiring, etc., shall be included as work of this Division.

2. Control and power wiring for control devices, including raceways, breakers, disconnects etc. required for a complete and operating control system shall be provided as work of this Section.

3. Power for each automatic damper, smoke damper, and combination fire and smoke damper shall be provided as work of this section.

4. Where equipment being controlled is powered from the emergency electrical service, the power for the associated controls shall also be obtained from the same emergency power circuit.

E. MISCELLANEOUS

1. Separable wells, orifices, and other provisions required for pressure, temperature and flow sensing devices in piping systems shall be provided and installed under this Section.

2. Pressure taps for static pressure sensors and any other devices installed in air handling systems shall be work of this Section.

F. OPERATION AND TYPE OF SYSTEM

1. General

a. The sequence of operations as described herein is intended to provide a general description of the operation, functions and capabilities required. Some detailed description of features of the control operation are included for clarity.

b. To assist in establishing a means by which certain operations can be accomplished as described, the following should be noted:

1) Where sequence control is required, an adjustable dead band shall be provided between modes.

2) Where a change of mode is specified, such as, but not limited to, activating or deactivating dampers or coil valves, start-up, or by limit controllers of any sort, the control signal to the controlled devices shall have a means to provide time delay (approximately 60 seconds-adjustable) in the action of the controlled device to prevent hunting. The exception to this is the operation of any device when either a firestat or other safety device is activated. Any exception shall be caused to occur quickly but without damage to the controlled device or equipment.

2. Type of Equipment

a. Any necessary relays, switches, or other devices required to accomplish the operating sequences and functions described shall be provided under this Section, whether or not mentioned herein.

3. Identification

Any devices associated with a given item of equipment shall be identified as shown on the drawings and shall be shown on the shop drawing submittal with a suffix number which identifies it with that equipment.

PART 2 - PRODUCTS

2.1 POWER, COMMUNICATION AND CONTROL WIRING

A. All wiring shall be copper and shall be UL labeled for 90°C minimum service.

B. Wire Sizing and Insulation

1. Wiring shall be selected and sized for the application, shall meet the requirements of the National Electrical Code and shall comply with minimum wire size and minimum insulation ratings based on services listed below:

Service	Minimum Gage/Type	Insulation Class
AC 24V Power	12 Ga Solid	600 Volt
DC 24V Power	10 Ga Solid	600 Volt
Class 1	14 Ga Stranded	600 Volt
Class 2	18 Ga Stranded	300 Volt
Class 3	18 Ga Stranded	300 Volt

2. Where exposed cable is permitted, provide plenum-rated cable.

3. Power Wiring:

a. 115V power circuit wiring above 100 feet distance shall use minimum 10 gage.

b. 24V control power wiring above 200 feet distance shall use minimum 12 gage.

4. Control Wiring:

a. Digital Input/Output wiring shall use Class 2 twisted pair, insulated.

b. Analog inputs shall use Class 2 twisted shielded pair, insulated and jacketed and require a grounded shield.

c. Actuators with tri-state control shall use 3 conductor with same characteristics.

5. Communication Wiring:

a. Ethernet Cable shall be minimum CAT5.

b. Secondary level network shall be 24 gage, TSP, low capacitance cable.

2.2 CONTROLS AND DEVICES

A. Automatic Control Valves

1. Automatic control valves shall be of the modulating spring return type and shall be constructed of bronze for valve sizes 2 inches and smaller and cast iron for valve sizes larger than 2 inches. Automatic valves up to 2½ inch size shall have screwed globe bodies, valves larger than 2½ inch shall have flanged bodies. All control valves shall have bronze trim, stainless steel stems with Ethylene Propylene Rubber ring packing. Nominal body rating shall not be less than 125 PSI.

2. The control valves shall be sized on the basis of 5 pounds per square inch maximum pressure drop unless otherwise indicated.

3. All automatic control valves shall be fully proportioning with modulating plug or V-port inner valves. Valves and actuators shall be quiet in operation and fail-safe in either normally open or normally closed position in the event of failure. All valves shall be capable of operating in sequence as required by the sequences of operations. Control valves shall have spring return actuators, normally open or normally closed type a required by the application.

4. Control valves shall be sized by the control equipment manufacturer to meet the cooling or heating loads as scheduled. Valve sizing calculations shall be submitted for approval. All control valves shall be suitable for the actual temperature and pressure conditions encountered and shall close against the differential pressure(s) involved under any operating condition.

5. Control valve actuators shall have manual operator with a hand/auto declutching lever for manual operator engagement. The manual operator shall allow for manually positioning the valve upon actuator or control system failure.

B. Control Valve Actuators

1. Control valve actuators shall be as described above under "Automatic Control Valves".

2. Actuators for 3-way valves shall be selected with adequate torque to control the respective valve as a 2-way valve (with the bypass valved closed).

C. Damper Actuators

1. Damper actuators shall have manual operator with a hand/auto declutching lever for manual operator engagement. The manual operator shall allow for manually positioning the valve upon actuator or control system failure.

D. Control Dampers

1. Damper frames shall not be less than 13 gauge galvanized steel formed for extra strength with mounting holes for flange and enclosed duct mounting. All damper blades shall not be less than 16 gauge galvanized steel roll formed for high velocity performance. Blades on all dampers shall be 6" wide or less. Blade bearings shall be nylon standard with ½" zinc plated steel shafts. All

blade linkage hardware shall be of corrosion-resistant finish and readily accessible for maintenance after installation. Neoprene reinforced blade edge seals and spring loaded stainless steel side seals shall be provided to insure leakage of not more than 1% at 1500 fpm approach velocity at 4" static closing to torque.

2. Dampers and seals shall be suitable for temperature ranges of -40 to 200 degrees F. Dampers shall be minimum leakage type for all applications. Temperature control contractor shall submit leakage and flow characteristics for all control dampers.

3. Dampers shall be Ruskin CD-60 or Johnson Controls D-1300.

E. Miscellaneous

Differential Pressure Switch for water shall have a single-pole, single-throw (SPST) contact, adjustable setpoint, UL rated 6 amperes at 120 volts, 100 psig design, with automatic reset. Each switch shall be provided with isolation and drain valves.

Differential Pressure Switch for air shall have a single-pole, single-throw (SPST) contact, adjustable setpoint, UL rated 9.8 amperes at 120 volts.

Low Limit Thermostats shall be of manual reset type, with setpoint adjustment. The sensing element shall be 20 foot minimum and shall be installed completely across the coil. When any one foot of the element senses a temperature as low as the setpoint, the thermostat contacts shall open. These shall contain double pole switches for simultaneous remote alarms or as desired.

Duct Type Temperature Transmitter shall be a general purpose RTD sensing element, moisture resistant transmitter for mounting into a duct. The operating range shall be as indicated with an accuracy of + 1% over the full range. The output shall be compatible with the panel it serves.

Duct Averaging Type Temperature Transmitter shall be a general purpose RTD sensing element, moisture resistant transmitter for mounting into a duct. The operating range shall be as indicated with an accuracy of + 1% over the full range. The output shall be compatible with the panel it serves. Transmitter shall be with 17 feet of sensor capillary.

Space Temperature Transmitter shall contain an RTD sensing element to monitor room air temperatures in the range of 30 degrees F to 90 degrees F, unless indicated otherwise. The transmitter shall be factory calibrated to an accuracy of + 1%. The assembly shall be installed within a metal ventilated enclosure suitable for wall mounting. The output shall be an compatible with the panel it serves. Transmitter shall be factory calibrated to an accuracy of + 1% over the full range.

Pipe Temperature Transmitter shall contain an RTD sensing element to monitor water temperature. The Contractor shall provide brass wells of sufficient size for the pipe to be installed. The output shall be compatible with the panel it serves. Transmitter shall be factory calibrated to an accuracy of + 1% over the full range.

Outdoor Air Temperature Transmitter shall contain an RTD sensing element mounting in an enclosure rated for outdoor use. The output shall be compatible with the panel it serves. Transmitter shall be factory calibrated to an accuracy of + 1% over the full range.

Humidity Transmitter Duct shall be capable of providing continuous measurement of percent relative humidity with an accuracy of + 4% over the range of 10 to 80% RH. The output shall be proportional VDC over a cable pair.

Humidity Transmitter Outside Air shall be capable of providing continuous measurement of percent relative humidity with an accuracy of + 2% over the range 20 to 90% RH. The output shall be a 4 to 20 Ma signal over a shielded cable pair. Transmitter shall have outside weather enclosure.

Humidity Transmitter Space shall be capable of providing continuous measurement of percent relative humidity with an accuracy of + 3% over the range of 20 to 60% RH. The output shall be proportional VDC over a cable pair.

Pressure Transducer shall be for steam service and have a stainless steel sensor. The device shall output a 4-20 milliamp signal which is linear in relation to the sensed pressure. Accuracy shall be + .05% of the full scale. Power shall be from the controller and range from 22-26 volts DC. The unit shall have temperature compensation so that thermal effects are no more than + .05% of the full scale from 0-175 DEGF. The unit shall be suitable for the media and pressure measured.

Differential Pressure Transducer shall be for air or water service. The device shall output a 4-20 milliamp signal which is linear in relation to the sensed pressure. Accuracy shall be + .01% of full scale. The power shall be from the controller and shall be in the range of 22-26 volts DC. The unit shall have temperature compensation so that thermal effects are no more than + .05% of the full scale from 32-100 DEGF. The transducer shall be suitable for the media and pressure measured.

F. AIRFLOW MEASURING STATION

1. Provide Ebtron Gold Series Multi-point thermal dispersion airflow measuring stations. Provide with local LCD display of flowrate. The installation shall be in strict conformance with Ebton's requirements for probe placement and other installation details.

G. Devices

1. Instrument Control Cabinets

a. Furnish and install, for components other than space thermostats, cabinets to house control equipment. Cabinets shall consist of extruded aluminum alloy frames with all corners securely riveted and supported by angle brackets. The cabinet is to have removable face and back panels and these panels are to be made of aluminum bonnet on both sides over a poly wood core. The cabinet door is to be supported by non-removable piano-type hinge which spans the entire height of the cabinet. A keylocking latch is to be provided on all cabinets to insure only authorized access. All temperature and status indications and toggle switches are to be flush mounted on the face of the cabinet. Cabinets installed outdoors shall be rated NEMA 3R or better.

2. Sensing/Control (Provide the following devices as required by the monitoring and control functions)

TEMPERATURE SENSORS

Room temperature:	
Local setpoint adjustment	Yes
Local RJ-11 communications	Yes
Temperature monitoring range	+32/+130F
Output signal	Changing resistance
Factory calibration point	70 degree F (21 C)
Accuracy at calibration point	+/- 0.7% @ 70F
Liquid immersion temperature:	
Temperature monitoring range	-50/250F up to 550F
Output signal	Changing resistance
Factory calibration point	+70 degree F (21 C)
RTD element	+0.5 degree F
RTD resistance	1000 ohms +/-1.0%
Duct temperature:	
Temperature monitoring range	+20/+120F
Output signal	Changing resistance
Factory calibration point	70 degree F (21 C)
Accuracy at calibration point	+0.5 degree F
RTD resistance	1000 ohms +/-0.1%
Outside air temperature:	
Temperature monitoring range	-20/+120
Factory calibration point	70 degree F (21 C)
Accuracy at calibration point	0.5 degree F
RTD resistance	1000 ohms +/-0.1%

HUMIDITY SENSORS

Relative humidity sensor:

Humidity monitoring range	10-90% RH
Output signal	0-5VDC or 4-20Ma
Factory calibration point	70F (21 C)
Accuracy at calibration point	+/- 3% RH
Sensing element	Polymer

START/STOP AND CONTROL RELAYS

Power requirements	24 VAC at .015 amps
Relay contacts	SPDT – 10 amps at 120 VAC
Data	UL listed, CSA approved
Indication	LED – on when energized
Override	built-in H-O-A switch

H. Application Specific Controllers

1. Digital Controller

a. Each controller shall operate as a standalone controller capable of performing its specified control responsibilities independently of other controllers in the network. Each controller shall be a microprocessor-based, multi-tasking, real-time digital control processor.

b. Controllers shall support, but not be limited to, the following configurations of systems to address current requirements described in the "Execution" portion of this Specification, and to address future expansion.

1) Single boiler or chiller plants with pump logic.

2) Air Handling Units.

3) Generic system interlocking through hardware.

c. Point types – Each Controller shall support the following types of point inputs and outputs:

1) Analog inputs shall monitor the following analog signals:

a) 4-20 mA Sensors
b) 0-10 VDC Sensors
c) 1000 ohm RTDs

2) Binary inputs shall monitor dry contact closures. Input shall provide filtering to eliminate false signals resulting from input "bouncing."

3) Counter inputs shall monitor dry contact pulses with an input resolution of one HZ minimum.

4) Analog outputs shall provide the following control outputs:

a) 4.20 mA – Sink or Source

b) 0-10 VDC

5) Binary outputs shall provide SPDT output contacts rated for 2 amps at 24 VAC. Surge and noise suppression shall be provided on all pilot relays.

d. Controllers shall have a built-in status, and adjust panel interface to allow for the local adjustment of all setpoints, temporary override of any input or output points, and status of any points in alarm.

e. Powerfail Protection – All system setpoints, proportional bands, control algorithms, and any other programmable parameters shall be stored such that a power failure of any duration does not necessitate reprogramming the controller.

f. The capability to extend the input and output capacity of the Controller via Point Expansion Modules shall be provided.

1) The Point Expansion Modules shall communicate to the controller over a local RS-485 expansion bus.

2) The Point Expansion Modules shall have available a range of configurations of 4, 8, 12, or 16 data points:

Analog Inputs – 0-10V, 4-20mA, 1000 ohm RTD
Analog Outputs – 0-10V, 4-20mA
Digital Inputs w/ digital counter
Digital Outputs – triacs or relay contacts

3) Expansion module data points shall be available for inclusion in all control strategies.

l. Miscellaneous devices

1. Valve and damper actuators shall be sized to operate their appropriate dampers or valves with sufficient reserve power to provide smooth modulating action.

2. Controllers for sensors shall have adjustable sensitivity.

3. Any necessary relays, switches, or other devices required to accomplish the operating sequences and functions described shall be provided under this Section, whether or not mentioned herein.

2.3 OPERATOR INTERFACE REQUIREMENTS

A. The EMCS shall fully support three different types of operator interface. Provide a 1) PC Workstation Interface, 2) Web Browser Interface and a 3) Portable Operator Terminal. Each of the operator interfaces shall be fully setup and programed.

2.4 PC WORKSTATION INTERFACE

A. Provide a personal computer operator workstation, associated peripherals and equipment required to set up dynamic color graphic PC console in **Mechanical Room HVAC 3**.

B. Workstation hardware:

1. Personal computer operator workstations shall be provided for command entry, information management, system monitor, alarm management and database management functions. All real-time control functions shall be resident in the Building Controllers to facilitate greater distribution, fault tolerance and reliability of the building automation control.

2. Workstation shall consist of a personal computer with minimum 8 GB RAM, hard drive with 500 GB available space, video card with 6 GB RAM capable of supporting a minimum of 1920 × 1080 resolution with a minimum of 192 Bit color, CD-RW, and DVD-ROM Drive, mouse and 101-key enhanced keyboard. Personal computer shall be a Windows 11 or comparable operating system. Provide a computer table for the workstation.

3. The PC monitor shall be of flat panel type and shall support a minimum display resolution of no less than 1920 × 1080 pixels. The display shall have a minimum of 17" visible area in diagonal measurement. Separate controls shall be provided for color, contrasts and brightness. The screen shall be non-reflective.

4. Alarm Display shall list the alarms with highest priority at the top of the display. The alarm display shall provide selector buttons for display of the associated point graphic and message. The alarm display shall provide a mechanism for the operator to sort alarms.

5. Operator Interface Software:

a. Provide software with the following functionality as a minimum:

1) Real-time graphical viewing and control of the BMS environment

2) Reporting

3) Scheduling and override of building operations

4) Collection and analysis of historical data

5) Point database editing, storage and downloading of controller databases.

6) Utility for combining points into logical Point Groups. The Point Groups shall then be manipulated in Graphics, trend graphs and reports in order to streamline the navigation and usability of the system.

7) Alarm reporting, routing, messaging, and acknowledgment.

8) "Collapsible tree," dynamic system architecture diagram application:

a) Showing the real-time status and definition details of all workstations and devices on a management level network.

b) Showing the real-time status and definition details of all Building Controllers at the Primary Network.

c) Showing the definition details of all application specific controllers

9) Definition and construction of dynamic color graphic displays.

10) Online, context-sensitive help, including an index, glossary of terms, and the capability to search help via keyword or phrase.

11) On-screen access to User Documentation, via online help or PDF-format electronic file.

12) Automatic database backup at the operator interface for database changes initiated at Building Controllers.

13) Display dynamic trend data graphical plot.

a) Must be able to run multiple plots simultaneously.

b) Each plot must be capable of supporting 10 pts/plot minimum.

c) Must be able to command points directly off dynamic trend plot application.

d) Must be able to plot both real-time and historical trend data.

14) Program editing.

15) Transfer trend data to 3rd party spreadsheet software

a) Scheduling reports

b) Operator Activity Log

c) Open communications via OPC Server

d) Open communications via BACnet Client & Server.

C. General:

1. Furnish the following applications software to form a complete operating system for building and energy management as described in this specification.

2. The software programs specified in this Section shall be provided as an integral part of Building Controllers and shall not be dependent upon any higher level computer or another controller for execution.

3. The Building Controller Software shall be capable of BACnet communications. The BACnet Building Controller (B-BC) shall have demonstrated interoperability during at least one BTL Interoperability Workshop and shall substantially conform to BACnet Building Controller (B-BC) device profile as specified in ANSI/ASHRAE 135-2004, Annex L.

4. Building Controllers shall have the ability to perform energy management routines including but not limited to time of day scheduling, calendar-based scheduling, holiday scheduling, temporary schedule overrides, start stop time optimization, automatic daylight savings time switch over, night setback control, enthalpy switch over, peak demand limiting, temperature-compensated duty cycling, heating / cooling interlock, supply temperature reset, priority load shedding, and power failure restart.

5. The Building Controllers shall have the ability to perform the following pre tested control algorithms:

a. Two position control

b. Proportional control

c. Proportional plus integral control

d. Proportional, integral, plus derivative control

e. Automatic tuning of control loops

2.5 WEB BROWSER INTERFACE

A. WEB BROWSER CLIENTS

1. The system shall be capable of supporting an unlimited number of clients using a standard Web Browser such as Internet Explorer™ or Netscape Navigator™. Systems requiring additional software resident on the client machine or manufacture-specific browsers shall not be acceptable.

2. The Web Browser client shall support at a minimum, the following functions:

User log-on identification and password shall be required. If an unauthorized user attempts access, a blank web page shall be displayed. Security using Java authentication techniques to prevent unauthorized access shall be implemented.

Graphical screens developed for the GUI shall be the same screens used for the Web Browser client. Storage of the graphical screens shall be in the system, without requiring any graphics to be stored on the client machine. Systems that require graphics storage on each client are not acceptable.

Depending on user access privileges, the user shall be able to view data, modify and command objects such as start/stop, and adjust set points. In addition, users can be provided with the ability to view logs and view and acknowledge alarms.

3. The system shall provide the capability to specify a user's (as determined by the log-on user identification) home page. The capability to limit the user to just their home page shall be provided. From the home page, links to other views, or pages in the system shall be possible.

4. Graphic screens on the Web Browser client shall support hypertext links to other Web pages on other Internet or Intranet site.

2.6 OBJECT LIBRARIES

A. A standard library of objects shall be included for development and setup of application logic, user interface displays, system services, and communication networks.

B. The objects in this library shall be capable of being copied and pasted into the user's database and shall be organized according to their function. In addition, the user shall have the capability to group objects created in their application and store the new instances of these objects in a user-defined library.

C. In addition to the standard libraries specified here, the supplier of the system shall maintain an on-line accessible (over the Internet) library, available to all registered users to provide new or updated objects and applications as they are developed.

D. The library shall include applications or objects for the following functions:

Scheduling Object. Provide a BACnet compliant, 7-day plus holiday & temporary scheduling object to allow for a minimum of 10 on/off events per day. Data entry to be by graphical sliders to speed creation and selection of on-off events.

Calendar Object. Provide a BACnet compliant 12-month calendar object to allow for holiday or special event data entry. Data entry to be by graphical "point-and-click" selection. This object must be "linkable" to any or all scheduling-objects for effective event control.

Duty Cycling Object. Provide a universal duty cycle object to allow repetitive on/off time control of equipment as an energy conserving measure. Any number of these objects may be created to control equipment at varying intervals

Temperature Override Object. Provide a temperature override object that is capable of overriding equipment turned off by other energy saving programs (scheduling, duty cycling etc.) to maintain occupant comfort or for equipment freeze protection.

Start-Stop Time Optimization Object. Provide a start-stop time optimization object to provide the capability of starting equipment just early enough to bring space conditions to desired conditions by the scheduled occupancy time. Also, allow equipment to be stopped before the scheduled un-occupancy time just far enough ahead to take advantage of the building's "flywheel" effect for energy savings. Provide automatic tuning of all start / stop time object properties based on the previous day's performance.

Demand Limiting Object. Provide a comprehensive demand-limiting object that is capable of controlling demand for any selected energy utility (electric, oil, and gas). The object shall provide the capability of monitoring a demand

value and predicting (by use of a sliding window prediction algorithm) the demand at the end of the user defined interval period (1-60 minutes). This object shall also accommodate a utility meter time sync pulse for fixed interval demand control. Upon a prediction that will exceed the user defined demand limit (supply a minimum of 6 per day), the demand limiting object shall issue shed commands to either turn off user specified loads or modify equipment set points to effect the desired energy reduction. If the list of sheddable equipment is not enough to reduce the demand to below the set point, a message shall be displayed on the users screen (as an alarm) instructing the user to take manual actions to maintain the desired demand. The shed lists are specified by the user and shall be selectable to be shed in either a fixed or rotating order to control which equipment is shed the most often. Upon suitable reductions in demand, the demand-limiting object shall restore the equipment that was shed in the reverse order in which it was shed. Each sheddable object shall have a minimum and maximum shed time property to effect both equipment protection and occupant comfort.

E. At a minimum, the library shall include services to support LonWorks and BACnet networks.

F. The library shall include control objects for the following functions at a minimum:

Analog Input Object - Minimum requirement is to meet the BACnet standard for data sharing. Allow high, low and failure limits to be assigned for alarming. Also, provide a time delay filter property to prevent nuisance alarms caused by temporary excursions above or below the user defined alarm limits.

Analog Output Object - Minimum requirement is to meet the BACnet standard for data sharing.

Binary Input Object - Minimum requirement is to meet the BACnet standard for data sharing. The user must be able to specify either input condition for alarming. This object must also include the capability to record equipment run-time by counting the amount of time the hardware input is in an "on" condition. The user must be able to specify either input condition as the "on" condition.

Binary Output Object - Minimum requirement is to meet the BACnet standard for data sharing. Properties to enable minimum on and off times for equipment protection as well as interstart delay must be provided. The BACnet Command Prioritization priority scheme must also be incorporated to allow multiple control applications to execute commands on this object with the highest priority command being invoked. Provide sixteen levels of priority as a minimum. Systems not employing this contention resolution shall not be acceptable.

PID Control Loop Object - Minimum requirement is to meet the BACnet standard for data sharing. Each individual property must be adjustable as well as to be disabled to allow proportional control only, or proportional with integral control, as well as proportional, integral and derivative control.

Comparison Object - Allow a minimum of two analog objects to be compared to select either the highest, lowest, or equality between the two linked inputs. Also, allow limits to be applied to the output value for alarm generation.

Math Object - Allow a minimum of four analog objects to be tested for the minimum or maximum, or the sum, difference, or average of linked objects. Also, allow limits to be applied to the output value for alarm generation.

Custom Programming Objects - Provide a blank object template for the creation of new custom objects to meet specific user application requirements. This object must provide a simple BASIC-like programming language that is used to define object behavior. Provide a library of functions including math and logic functions, string manipulation, and e-mail as a minimum. Also, provide a comprehensive on-line debug tool to allow complete testing of the new object. Allow new objects to be stored in the library for re-use.

Interlock Object - Provide an interlock object that provides a means of coordination of objects within a piece of equipment such as an Air Handler or other similar types of equipment. An example is to link the return fan to the supply fan such that when the supply fan is started, the return fan object is also started automatically without the user having to issue separate commands or to link each object to a schedule object. In addition, the control loops, damper objects, and alarm monitoring (such as return air, supply air, and mixed air temperature objects) will be inhibited from alarming during a user-defined period after startup to allow for stabilization. When the air handler is stopped, the interlocked return fan is also stopped, the outside air damper is closed, and other related objects within the air handler unit are inhibited from alarming thereby eliminating nuisance alarms during the off period.

Temperature Override Object - Provide an object whose purpose is to provide the capability of overriding a binary output to an "On" state in the event a user specified high or low limit value is exceeded. This object is to be linked to the desired binary output object as well as to an analog object for temperature monitoring, to cause the override to be enabled. This object will execute a Start command at the Temperature Override level of start/stop command priority unless changed by the user.

Composite Object - Provide a container object that allows a collection of objects representing an application to be encapsulated to protect the application from tampering, or to more easily represent large applications. This object must have the ability to allow the user to select the appropriate

parameters of the "contained" application that are represented on the graphical shell of this container.

G. The object library shall include objects to support common LonMark devices. These devices shall include, but not be limited to, devices for control of HVAC, lighting, access, and metering.

2.7 GRAPHICS

A. Provide at minimum the following graphical displays:

1. A floor plan of the building including the chiller pad. Choosing an air handling unit, VAV box, fan coil unit, exhaust fan, or other piece of equipment within that floor plan with the mouse shall penetrate to a detailed flow diagram graphic of the chosen equipment showing piping and ductwork layouts, control valve location, sensor locations and dynamic point information.

2. Users shall be able to penetrate from one graphic to another from assigned key areas designed in to the graphic.

2.8 PRIMARY DDC PANELS

A. Provide a minimum one EMCS primary DDC panel for each mechanical room and for each area where air handling units, chillers, pumps, or other similar equipment is installed. The application specific controllers installed for the terminal units on a floor shall be connected to a primary DCC panel on the same floor. DDC Panels serving air handling units shall not to be used to meet this requirement. Separate panels will be required.

B. Provide stand-alone Application Specific Controllers (ASCs) for terminal equipment (such as VAV boxes, and fan coil units).

2.9 ELECTRICAL WORK

A. Materials shall be new and shall be Underwriters Laboratories labeled or listed.

B. Wiring and raceways shall be concealed wherever possible. Wiring in equipment rooms, wiring installed outdoors, wiring installed inaccessible spaces and wiring in areas without ceilings shall be contained in metallic raceways. Raceways shall meet the requirements of DIVISION 16 - ELECTRICAL.

C. All wiring which is not in raceway shall be U.L. rated for use in plenums.

D. Control or signaling wiring shall not be installed in raceways with power wiring.

E. Wiring and raceways for line voltage interlocking shall be work of this Section. Voltage shall be 115 volts, 1 phase, 60 hertz. Provide transformers where required.

PART 3 - EXECUTION

3.1 GENERAL

All temperature control and interlock wiring shall be installed in accordance with these specifications, and the approved engineered submittals and wiring diagrams. Power and interlock wiring shall be run in separate conduit from sensor wiring.

Thermostats or sensors mounted on outside walls shall be mounted on 1" minimum thickness rigid fiberglass (or equal) insulating base.

All temperature sensors located in water lines shall be installed in separable wells packed with heat conductive compound.

3.2 MOUNTING HEIGHTS

A. Adjustable devices in public areas shall be installed at ADA height. Control devices installed in equipment rooms shall be located at eye level so that it may be visually inspected and adjusted, unless otherwise indicated on the drawings or as required to accomplish the control sequence.

3.3 ELECTRICAL WORK

A. Power for control devices shall be obtained from one of the following sources:

1. A step-down transformer with fused primary and fused secondary connected to an equipment power source. The control power source must be intended for control devices associated only with that piece of equipment or system.

2. A circuit from an electrical panel at a location approved by the engineer.

3.4 COMMISSIONING

A. The control system to be set up and checked out by factory trained competent technicians skilled in the setting and adjustment of EMCS equipment used in this project. This technician to be experienced in the type of systems associated with this EMCS. All initial setpoints and the first year of start/stop schedules shall be programmed by the technician. The Contractor shall coordinate initial setpoints and schedules with the Owner.

3.5 TRAINING

A. Provide a minimum of 12 hours of instructions to Owner's personnel in the operation and maintenance of the control system during the first year warranty period. Provide training after the system has been installed and fully debugged & commissioned.

3.6 ADDITIONAL TRAINING AND SUPPORT

A. Provide a minimum of one four-hour visit per month during the 12-month period following substantial completion for the purpose of ongoing training and support. These visits shall be scheduled at the convenience of the Building Engineer and shall be in addition to warranty service visits and in addition to the Owner training described above. These visits are intended to assist the Building Engineer with changes, adjustments and other special needs which arise outside of formal training.

3.7 WARRANTY

A. Equipment shall be warranted for one year (including defects in workmanship and material) under normal use and service. During warranty period supplier shall also replace or repair, free of charge, any equipment proven to be defective in workmanship or material.

3.8 SEQUENCE OF OPERATION AND SPECIAL REQUIREMENTS

General

Where the sequence calls for opening of dampers when the a unit is started, provide an adjustable time delay to allow for dampers to open before the fan is started.

Control valves and dampers which are indicated to close when the respective unit is de-energized (stopped), shall be directly interlocked with the respective variable speed drive (or motor starter) so that it closes whenever the unit is de-energized by any means. The intent is to close the valve and/or damper regardless of how (manually or automatically) the unit is de-energized.

Electrical Power for Control Devices

Some electrical power for controls will be provided under DIVISION 16 at selected locations as indicated on the Division 16 drawings. Work of this section shall include wiring required for controls from this source. Where additional 120 volt power is required, it shall be obtained from spare breakers at a location approved by the Engineer. The cost of raceways, wiring, etc., shall be included as work of this Division. The contractor shall review electrical drawings prior to bidding.

Power for VAV boxes, automatic dampers, and other control devices shall be work of this section.

Graphic Displays

Color graphic floor plan displays, and system schematics (for each piece of mechanical equipment) shall be provided as a part of this contract.

Graphical displays that to be provided as a part of this scope shall at minimum consist of the following:

A floor plan of the building showing all HVAC equipment (including all HVAC equipment). Choosing a piece of equipment within that floor with the mouse will

penetrate to a detailed graphic and flow diagram graphic of the chosen equipment. The equipment graphic shall include all control and monitoring points and shall allow for adjustment to all control points and all setpoints.

Automatic Dampers

Where two position dampers (including smoke dampers and combination fire & smoke dampers) are interlocked to open and close when air handling units are started and stopped, provide an end switch at each damper to delay starting of the fan until dampers are in the open position. The EMCS shall monitor status of the end switch on each damper.

Space Temperature Sensors (Thermostats)

Space temperature sensors shall have adjustable setpoint dial and an override pushbutton. Space temperature shall be monitored by the EMCS. Space temperature setpoint from the space temperature sensor shall be limited by EMCS settings. The override pushbutton is to override night setback and trigger the occupied mode of operation. The units energized from the override button on each space temperature sensor and the length of the override period triggered from each space temperature sensor override button shall be programable from the EMCS. The intent is to allow for full control of space temperature setpoint and night setback override from space temperature sensors in private areas and similar spaces but to allow limited control of setpoints from space temperature sensors in public areas.

Carbon Dioxide Sensors

Provide space carbon dioxide sensors where indicated on the drawings and provide reset of outside air flowrates to the respective unit based on space conditions. Minimum outside air flowrates shall be equal to the space exhaust air flowrate plus an allowance for building pressurization. Where multiple carbon dioxide sensors are indicated for a single air handling unit, the outside air flow rate shall be reset based on the worst case zone.

Air Cooled Chiller CH-1

Air cooled chiller CH-1 is scheduled to be provided with a dual pump package. Each pump is sized sized for 100% of the peak design flow. Only one pump shall operate at a time. Lead/standby pump shall be selected through the EMCS.

A flow switch is indicated on the chiller schedule. Interlock the flow switch in accordance with the manufacture's requirements to lock-out compressors until evaporator flow is proven.

Both chilled pumps shall start for freeze protection whenever outdoor air temperature drops below 40 degrees F.

For each chiller the EMCS shall monitor status (on/off), chilled water supply temperature, chilled water return temperature and chiller safety status.

The EMCS shall start & stop the chillers and integral pumps. Chilled water supply temperature setpoint shall be controlled by the EMCS.

Control Valves

Chilled water control valves shall be 3-way.

VAV Air Handling Unit AHU-1 (AHU-2 & 3 similar)

With the hand-off-auto switch in the cover of the variable speed drive in the auto position, the fan shall be started and stopped by the EMCS. Provide a current sensing relay on the fan motor lead to monitor fan status from the EMCS.

When the air handling unit is de-energized, the outside air damper shall close.

Air handling unit smoke detectors are indicated in Division 16 - Electrical. Interlock the smoke detectors to de-energize the unit if products of combustion are detected.

Provide an averaging type temperature sensor (freezestat) with manual reset sensing mixed air temperature at the inlet of the cooling coil. The unit shall be de-energized if mixed air temperature drops below 40°F. Also provide an averaging type sensor for EMCS monitoring of mixed air temperature.

Provide a high limit static pressure switch with manual reset at the supply air discharge of the unit. Interlock the high limit switch to de-energize the fan if discharge static exceeds 4" W.G. (adjustable).

Fan kill switches are indicated on the air handling unit schedule. Interlock the switches to de-energize the fan before the access doors can be opened.

Provide an analog static pressure sensor in the supply air trunk ductwork 2/3 down stream in the longest run of ductwork. The supply fan variable speed drive shall be modulated to maintain constant static pressure at the sensor location. The static pressure setpoint shall be field determined during the HVAC system testing and balancing procedure. The location and static pressure setpoint shall be documented on the record drawings.

Provide an averaging type supply air temperature sensor and a three-way modulating chilled water control valve. The control valve shall be modulated to maintain supply air temperature setpoint. The initial supply air temperature setpoint shall be 55°. The supply air temperature setpoint shall be reset by the VAV box with the highest demand for cooling. The setpoint and reset schedule shall be fully adjustable through the EMCS.

Provide a temperature and humidity sensor in the pure return air stream. Supply air temperature reset shall be locked out when return air humidity exceeds 55%.

Provide and air flow monitoring station in the outside air ductwork. Outside air flowrate shall be monitored by the EMCS.

During the occupied mode of operation, mixing box dampers shall be modulated in sequence to maintain constant outside airflow as supply airflow varies. Occupied ourside airflow setpoint shall be reset based on space carbon dioxide sensors. Outside air flowrates in the occupied and unoccupied modes shall be fully independently adjustable from the EMCS. Provide a mechanical stop on the return air damper to keep return damper from closing completely so as not to overpressurize outside air ductwork. The stop

on the return air damper shall be adjusted to achieve design outside air flowrate with all associated VAV boxes in their minimum positions. Coordinate field adjustments with testing and balancing agency. The minimum return air damper position shall be permanently marked on the damper and shall be documented on the record drawings.

The outside air damper for each air handling unit shall close when the respective air handling unit is in the unoccupied mode and when the unit is de-energized.

Relief Hood for AHU-1 (Hood for AHU-3 Similar)

Provide 2-position smoke rated damper in the relief hood and interlock the damper to open when the air handling unit is started and close when the sir handling unit stops.

Blower Coil Unit BCU-1

Equipment schedules require blower coil units to be provided with a fan motor contactor built into the unit control panel eliminating the need for a separate motor starter. Provide an HOA switch at the unit. The unit shall be started and stopped by the EMCS acting through the "auto" position of the HOA switch.

Provide a current sensing relay on the fan motor power lead for EMCS monitoring of fan status.

Duct smoke detectors are indicated under Division 16. Interlock the smoke detectors to de-energize the respective unit if products of combustion are detected.

Provide a three-way modulating control valve and a space temperature sensor.

Blower coil units shall be individually started and stopped by the EMCS. Provide an application specific controller (ASC) for each blower coil unit. The ASC shall control the three-way modulating chilled water and electric heat to maintain space temperature.

Provide an averaging type supply air temperature sensor monitored by the EMCS.

Variable Air Volume VAV Boxes (shut-off type)

VAV boxes shall be equipped with full DDC control. A factory mounted control power transformer and multi-point inlet velocity sensor is to be provided by the box manufacturer. All other box controls shall be furnished under this section but factory mounted by the box manufacturer. Fully coordinate trades prior to bidding to provide complete and functional control system without duplication between trades.

Provide a space temperature sensor for each VAV box.

The EMCS shall monitor space temperature, discharge air temperature and primary air CFM for each box. Maximum cooling, minimum cooling and heating CFM setpoints shall be adjustable from the EMCS.

On a call for cooling, the VAV box shall be modulated from minimum to maximum CFM settings to maintain space temperature. On a call for heating, the VAV box shall open to

the heating CFM set point and electric heating shall be modulated to maintain space temperature.

Fan Powered VAV Boxes

VAV boxes shall be equipped with full DDC control. A factory mounted control power transformer and multi-point inlet velocity sensor is to be provided by the box manufacturer. All other box controls shall be furnished under this section but factory mounted by the box manufacturer. Fully coordinate trades prior to bidding to provide complete and functional control system without duplication between trades.

VAV box fans shall be interlocked to start when it's respective air handling unit supply fan is energized and stop when the air handling unit fan is de-energized.

Smoke detectors for VAV boxes 2000 cfm and greater are indicated in Division 16 - Electrical. Interlock the smoke detectors to de-energize both the respective fan powered VAV box and the air handling unit serving the Series VAV box if products of combustion are detected.

Provide a space temperature sensor for each VAV box.

The EMCS shall monitor space temperature, discharge air temperature and primary air CFM for each box. Maximum cooling, minimum cooling and heating CFM setpoints shall be adjustable from the EMCS.

Each series fan powered box shall provide constant supply airflow to the space. On a call for cooling, the VAV box primary air damper shall be modulated from minimum to maximum CFM settings to maintain space temperature. On a call for heating, the VAV box primary air damper shall close to it's minimum cfm setpoint and the electrical heating coil shall be modulated to maintain space temperature.

Safe Pan Interlocks

Provide a water sensor in safe pans below each air handling unit and interlock it to de-energize the respective unit if water is detected.

Also provide a water sensor for each blower coil unit and interlock it to de-energize the respective unit if water is detected.

General Exhaust Fans

Provide a high limit thermostat (firestat) at the fan inlet of all fans with a capacity of 600 cfm or greater. Interlock the firestat to de-energize the fan if entering air exceeds 135 degrees F.

See Fan Schedule for control interlocks for each fan.

Where the Fan Schedule indicates EMCS interlock - Each exhaust fan shall be independently started and stopped from the EMCS. Provide a current sensing relay on the fan motor lead of each fan to monitor fan status from the EMCS.

Where the Fan Schedule indicates Motion Detector interlock - Each exhaust fan shall be independently started and stopped from a motion detector in the space served.

Where the Fan Schedule indicates Thermostat interlock - provide a space thermostat interlocked to start the fan on a rise in temperature.

Ductless Split Systems

The ductless split systems are heat pump type.

A wall mounted thermostat for each indoor unit is indicated in notes below the equipment schedule.

Provide all field wiring in accordance with the equipment manufacturer's requirements.

Provide EMCS monitoring of space temperature for each indoor unit.

The EMCS shall enable / disable the systems associated with each condensing unit as a group. Once enabled, each indoor unit shall be controlled from its space thermostat.

Intranet Connections

The Owner will provide a single RJ45 connection for the EMCS at the Data backboard. The contractor shall provide all wiring to the RJ45 connection. The contractor will be assigned IP addresses to allow for communication through the Owner's backbone. However, the entire EMCS system shall be stand-alone and shall have completely independent communications wiring between its various components. Only a single connection to the Owner's backbone will be permitted.

The system shall be fully functional at substantial completion independent of the buildings internet.

The contractor shall meet with the Owner's IT representatives at completion of the shop drawing phase to coordinate details regarding use of the existing backbone.

Variable Speed Drives

For each variable speed motor drive, the EMCS shall be interfaced to control/access the following points:

1) Start/Stop
2) Speed Reference
3) Fault Diagnostics
4) Meter Points

    a) Motor Power in HP
    b) Motor Power in KW
    c) Motor kW-Hr
    d) Motor Current
    e) Motor Voltage
    f) Hours Run

Occupied / Unoccupied Setpoints

The EMCS shall be programed for occupied / unoccupied space temperature setpoints for all systems.

Testing of Fire Alarm System Interface

Work of this section shall include complete testing of the HVAC system fire alarm system interfaces under all modes of operation. Provide written certification that all systems have been tested. Provide the services of a fire alarm system subcontractor to assist in verification and certification.

Additional Controls

Provide controls for all HVAC system equipment and components for a complete and fully functional building HVAC system. Where a specific sequence of operation is not specified, provide controls in accordance with good engineering practices similar in type and function of the sequences included herein. Each of the control and monitoring points described in the sequences of operation or shown in the control schematics shall be included as an input/output point of the EMCS.

Outdoor Air Conditions

The EMCS shall monitor outdoor air temperature and outdoor air humidity.

END OF SECTION

SECTION 16010 - ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the contract, including general and special conditions and general requirements, apply to the work specified in DIVISION 16 -ELECTRICAL.

B. Separation of Division 16 into Sections is for convenience only and is not intended to establish limits of work. Sections are as follows:

16010 ELECTRICAL GENERAL PROVISIONS

16100 ELECTRICAL BASIC MATERIALS AND METHODS

16400 ELECTRICAL SERVICE AND DISTRIBUTION SYSTEMS

16500 ELECTRICAL LIGHTING

16600 ELECTRICAL SPECIAL SYSTEMS

1.2 SCOPE

A. The work under this Section includes furnishing and installing wires, conductors, cables, conduit and conduit fittings, wiring devices, junction and outlet boxes, panelboards, circuit breakers, fuses, time switches, motor starters, relays, contactors, safety switches, lighting fixtures, automatic lighting shut-off devices, lighting control systems, handholes, grounding connections, emergency lighting system, dimming system, engine generator docking station, raceways and wiring for voice/data outlets, fire alarm system, cable TV distribution system, sound system, security camera system, access control system, paging system, transformers, lightning protection system, and other equipment specified or necessary for a complete installation. The work also includes making building modifications if necessary to get these items to the locations for installation.

B. Also included in the work is the power wiring for the equipment specified in DIVISION 15 - MECHANICAL.

1.3 CUTTING AND PATCHING

A. Cutting and patching for the work of this Division shall be in accordance with the requirements of the General Conditions. Openings around conduit penetrations shall be sealed. At exterior walls, these shall be completely waterproofed.

B. Work of this Division shall include providing information for any required

openings to those responsible for concrete slabs and other concrete members.

C. Field cut openings in concrete shall be located to avoid the reinforcing. These areas shall be scanned (x-ray or other suitable method) to obtain locations of reinforcing and other obstructions. Locations shall be subject to approval of those responsible for DIVISION 3 - CONCRETE.

D. No structural members shall be field cut or pierced without the approval of the Architect.

E. Inserts in slabs and beams for fastening work shall be drilled type.

F. For post-tensioned slabs and beams, inserts for fastening work shall be drilled type. Drilling shall not penetrate the post-tensioning tendons. Powder driver fasteners shall not be used.

G. Grouting shall be provided around raceway penetrations through concrete floors equal to the fire rating of the floor using non-shrinking waterproof grout to inhibit water from leaking through the floor.

1.4 DRAWINGS

A. Outlets shown on electrical drawings are located approximately only. Refer to architectural drawings for necessary dimensions. Refer to architectural, structural, and mechanical drawings as well as equipment manufacturer's shop drawings and rough-in drawings, and adjust work accordingly to provide a coordinated installation. Contractor shall install fire alarm devices as near as possible to the locations indicated on the drawings but shall move them as necessary to avoid conflicts with equipment and to be located sufficiently away from hot objects.

B. Smoke detectors and heat detectors shall be located so that the maximum distance between detectors is 30'-0", and the maximum distance from walls is 15'-0". Smoke detectors shall also be located within 5' of smoke doors held open. Locations shall conform to other restrictions of NFPA 72 to include the requirement that smoke detectors be kept at least 36" away from HVAC grilles. Contractor shall plan for contingencies in connection therewith to include providing additional smoke detectors and heat detectors.

C. Visual signal unit and audiovisual signal unit locations shall be adjusted as necessary to avoid conflicts with other equipment.

D. Visual signal unit and audiovisual signal unit locations shall be adjusted as may be necessary to meet NFPA 72 Paragraphs 18.5.5.4 and 18.5.5.5.

1.5 LAWS AND PERMITS

A. The National Electrical Code (2020) and State, Parish, City and local building codes shall be considered a part of these specifications, and pertinent articles will not be repeated herein. These codes shall establish the minimum acceptable criteria where more stringent requirements have not been defined in these specifications and/or drawings.

B. The Contractor shall apply for permits and pay inspection fees incidental to electrical work.

C. No work shall be concealed until approved by the local inspector and local regulations shall be adhered to.

D. Upon completion, a certificate of approval from the appropriate regulatory agency shall be furnished to the Architect.

E. Where equipment is located at exterior of buildings or structures, the minimum elevation for their installation shall be the greater of 36" above curb or 12" above the FEMA Base Flood Elevation. Contractor shall obtain this flood elevation from a licensed surveyor and pay the cost associated therewith. Contractor shall provide documentation to the Architect to confirm that this requirement has been met.

1.6 VISITING SITE

The bidder shall visit the site of proposed work so that he may understand the facilities, difficulties, and restrictions attending the execution of the contract. He will be allowed no additional compensation for failure to be so informed.

1.7 TEMPORARY SERVICES

Any temporary services required shall be work of this Division. Allowance shall be made in the Contractor's bid for the cost of any overtime work in this connection.

1.8 GUARANTEE

The Contractor shall guarantee materials and workmanship for one year after final acceptance of entire project unless a longer guarantee is indicated hereinafter for specific equipment.

PART 2 - PRODUCTS

2.1 MATERIAL AND WORKMANSHIP

Equipment and materials shall be new and shall be listed by Underwriters Laboratories, Inc. in categories for which standards have been set by that agency. Whenever two or more of the same product are indicated, they shall be of the same manufacturer. In particular, panelboards shall be of the same manufacturer. Methods of installation shall be in full accord with the latest and best electrical and mechanical engineering practices.

2.2 SUBSTITUTIONS

A. Names of manufacturers or catalog numbers are mentioned herein in order to establish a standard as to design and quality. Other products similar in design and of

equal quality may be used if submitted to the Architect and found acceptable by him. Refer to General Conditions and other portions of the specifications for additional information.

B. When the Contractor elects to use an acceptable alternate manufacturer's equipment, the Contractor shall be responsible to coordinate the change with the trades affected. The Contractor shall also pay for any additional work required under this Division as well as any other Division if the alternate equipment is used.

C. Lighting fixture substitutions shall also be similar in appearance, construction and photometrics (photometric information shall be based on independent laboratory reports) to specified lighting fixtures.

D. If required by Architect because of substitutions, the Contractor shall submit for approval ¼" scale working drawings of equipment areas with both plan and section views, as well as samples.

2.3 SUBMITTALS

A. Within 30 days after award of contract, the Contractor shall submit to the Architect for review one PDF copy of descriptive literature or shop drawings for the following material which he proposes to use. He shall also submit one printed color (hard) copy of this directly to the Electrical Engineer without routing through the Architect:

Wiring devices and plates.
Floor boxes.
Automatic lighting shut-off devices.
Panelboards.
Time switches.
Fuses.
Safety switches.
Lighting fixtures.
Contactors.
Lighting control systems.
Engine generator docking station.
Fire alarm system.
Cable TV distribution system.
Transformers.
Lightning protection system.
Fault current & protective device coordination study.
Voice/data wiring and raceway system.
Security camera system.
Sound system
Access control system
Paging system

B. In addition, the name of the manufacturer of conduit, E.M.T., and conductors to be used shall be submitted for review. Contractor is reminded that 600V conductors shall be rated for wet locations at 90 degrees C.

C. Where applicable, submissions shall include installation drawings and brochures showing locations, methods of anchoring, connections to work of others, wall or ceiling conditions at each particular installation and special floor mounting conditions.

D. Submissions shall be identified with project name, equipment name and number (if assigned a number) same as the name and number indicated on the drawings; shall be properly marked to show model numbers and any accessories being furnished;

and shall have the Contractor's stamp showing he has reviewed the submittal and found it to be in accordance with the specifications and drawings. Items of Division 16 to be submitted shall be submitted in one package.

E. Submittals for voice/data wiring and raceway systems (and CATV systems) shall include shop drawings to show the raceway routings, and a riser diagram to show wiring, quantities of terminal blocks, patch panel ports, splitters for CATV, data switch ports, etc. An elevation layout of each rack shall be provided to show all equipment including Contractor-provided equipment and Owner-provided equipment.

F. Fault current and protective device coordination studies shall be submitted with printed color copies of coordination curves.

G. Submittals which do not comply with the above will be returned without review, for resubmittal.

PART 3 - EXECUTION

3.1 EXCAVATING AND BACKFILLING

A. Do excavating and backfilling required for the work of this Division. Removal of obstructions, hidden or otherwise, shall be part of this work. Backfill shall be river sand. Backfilling shall be done in two lifts each thoroughly tamped. Surplus earth shall be removed.

B. Before excavating or trenching, locate and stake out existing underground utilities which may be adversely affected by this work. Work shall be performed in a manner to avoid damage to existing utilities. Repair or replace, at no expense to Owner, any utilities damaged by him. Also, call 1-800-272-3020 per Louisiana Statutes.

3.2 RECORD DRAWINGS

At the completion of the work, unless noted otherwise in the General Conditions, mark-up a set of prints in a neat and understandable manner to show significant changes made during construction. Wiring and raceways installed shall be indicated (routings, wire size and quantity) on the record drawings even if not indicated on the contract drawings. Underground raceways and wiring shall be measured and dimensioned from above-grade structures. Copies of panelboard circuit directories shall be included. These prints shall be scanned and a PDF file (on an external electronic drive), as well as one set of prints made from the PDF, shall be provided. Final payment will be withheld until these drawings are furnished to the Engineer. The Contractor shall pay for the reproduction costs.

3.3 OPERATING INSTRUCTIONS

A. Before final acceptance, prepare and deliver to the Architect two bound copies of operating instructions, which shall include:

1. Description of major components of power systems and each special

system, including the function of major items.

2. Detailed operating instructions and instructions for making routine minor adjustments.

3. Routine maintenance operations.

4. Manufacturer's catalog data and service instructions and parts list for each piece of operating equipment.

5. Final reviewed submittals (including review comments).

B. Instruct Owner in the care and operation of equipment and provide the services of a competent mechanic for this purpose.

C. Literature shall be substantially bound in a suitable number of volumes so as to permit heavy usage and shall include wiring diagrams, fabrication drawings and other information as may be required.

3.4 MECHANICAL EQUIPMENT

A. Unless indicated otherwise, magnetic starters (including variable speed drives) will be furnished under other Divisions for installation under this Division.

B. Overload elements in starters shall be selected according to actual motor nameplate full load current. Responsibility for this coordination shall lie with the Division under which the particular starter is furnished.

C. Unless indicated otherwise, power disconnect switches and single speed manual starting switches shall be furnished and installed under this Division. Where combination magnetic starters are provided as work of another Division, the associated disconnect switch will be furnished as work of that Division.

D. Where Division 15 schedules indicate that equipment is furnished with a disconnect, the disconnect shall be installed and connected as work of Division 16.

E. Whether indicated on drawings or not, circuits to 480V, 3-phase VAV boxes shall include a neutral conductor.

F. Refer to DIVISION 15 - MECHANICAL, and to mechanical drawings for any additional electrical power work required.

3.5 WORK RELATED TO EQUIPMENT NOT FURNISHED AS WORK OF THIS DIVISION

A. Unless specifically indicated otherwise, any required electrical services for and required electrical connections to items shown on the architectural drawings or specified to be furnished in other Divisions of specification or by Owner shall be electrically connected as work of this Division.

B. As work of this Division, Contractor shall assure that the ceiling support requirements for lay-in lighting fixtures (described in execution portion of the Lighting Section) are met. Contractor shall determine which subcontractor is to include funds for this work.

3.6 PAINTING

Painting is specified under DIVISION 9 -FINISHES. Damaged surfaces of factory-finished items, however, shall be repaired to the satisfaction of the Architect as the work of this Division.

3.7 PROTECTION OF WORK

Protect the equipment, fixtures, and work from damage. Damaged work will be rejected and replaced at the expense of the Contractor. Lighting fixtures, panels and similar equipment shall likewise be protected from damage and from the weather. Provide adequate and proper storage facilities for such items during the progress of the work.

3.8 BUILDING CODE RESTRICTIONS

Contractor shall assure that he does not install electrical equipment including raceways in or through areas restricted by the building codes.

3.9 UTILITY CONNECTIONS

A. Coordinate connection of utilities (raceways, wiring, etc.) which are work of this contract to existing utilities and utilities installed as work of other contracts. Verify connections points prior to commencing any work. No additional compensation will be allow for conflicts that occur due to the lack of coordination.

- END OF SECTION -

SECTION 16100 - ELECTRICAL BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SCOPE

Work described in this Section includes providing labor, materials and equipment indicated, specified and necessary for a complete and operating electrical system and related systems in accordance with SECTION 16010 - ELECTRICAL GENERAL PROVISIONS.

PART 2 - PRODUCTS

2.1 CONDUIT AND TUBING

A. Rigid steel conduit and electrical metallic tubing shall be manufactured by Allied, Triangle-PWC, Republic, Wheatland, or approved equal. Conduit shall be threaded heavy-wall hot-dipped galvanized (inside and out) steel conduit. Electrical metallic tubing shall have galvanized exterior and galvanized or equivalent plastic coated interior to protect against corrosion.

B. Rigid aluminum conduit shall be manufactured by New Jersey Aluminum, or VAW of America from 6063-T42 extruded Schedule 40 pipe. The interior surface shall be coated with special approved lubricating liner.

2.2 CONDUCTORS

A. Conductors shall be copper.

B. Branch circuit wiring shall be #12 AWG or larger (as required for the particular equipment to be fed) with flame resistant insulation. Conductors #8 AWG and larger shall be stranded. Insulation on branch circuit conductors shall be type THWN-2 (rated 90 degrees C, dry or wet), unless indicated otherwise or otherwise required by the particular application.

C. Feeds to surface and/or suspended lighting fixtures shall be #12 AWG type THWN-2 or XHHW-2. Wiring through channels of continuous rows shall be #12 AWG and type THWN-2, or XHHW-2. Recessed lighting fixtures shall be fed with #12 AWG type THWN-2 or type XHHW-2 conductors.

D. Feeders shall be of the size as indicated, with type THWN-2 insulation (rated 90 degrees C, dry or wet), unless indicated otherwise.

E. Except as may be otherwise indicated, conductors shall be manufactured by Triangle-PWC, American Insulated Wire, Senator, Royal, Southwire, or approved equal.

F. The electrical system has been designed based on copper conductors.

2.3 OUTLETS

A. All boxes, fittings and supports (including wireways) shall be galvanized steel. However, where these items are located near cooling towers, they shall be stainless steel type.

B. Boxes for concealed wall outlets shall be 4" square by 1½" deep, or larger, with raised device covers. Device covers for 4" square boxes in masonry walls which are not plastered or otherwise finished shall be 1" minimum in depth with straight rectangular openings for dry wall type construction. Covers for boxes in sheetrock or wood walls shall be of the same depth as the sheetrock or wood thickness and shall have straight rectangular openings.

C. Where 4" junction boxes are indicated or installed, they shall be complete with raised device covers as hereinbefore specified. Blank plates shall be as specified for devices.

D. Boxes for concealed ceiling outlets shall be 4" octagonal by 1½" deep, or larger. Boxes in plaster ceilings shall have plaster covers. Fixture outlet boxes shall be equipped with fixture studs secured to the boxes. Boxes above lay-in ceilings shall be supported by bar hangers or other suitable means; they shall not be supported by ceiling tiles.

E. Concrete boxes shall be used for fixtures on concrete ceilings.

F. Outlet boxes for exposed work at dry locations in Mechanical and Electrical rooms (where exposed raceways are installed) shall be 4" square x 1½" deep or larger with Appleton ½" deep raised surface metal covers to accommodate the devices indicated. For other exposed work at dry locations inside buildings, Bell boxes of similar capacity shall be used, unless surface metal raceway system is specified for these areas. Outlet boxes for exposed work that is exposed to weather or in damp locations shall be of cast or malleable iron, similar to Crouse-Hinds type FS or FD condulets. Boxes shall have metal covers to accommodate the devices indicated. Hardware shall be tamperproof.

G. Floor boxes shall be of adjustable type Steel City #664 series, complete with one recessed duplex receptacle and two recessed jacks (see Section 16600 for jack requirements). Box shall have one full-sized hinged cover to be provided with floor insert. Edges of boxes shall be installed flush with the finished floor. Carpet flanges shall be provided for locations where carpet is indicated on architectural plans. Exact location of each floor box shall be confirmed with Architect.

H. In walls or ceilings of concrete, tile, or other noncombustible material, boxes and fittings shall be so installed that the front edge of the box or fitting will not set back of the finished surface more than ¼". In walls or ceilings constructed of wood or other combustible material, outlet boxes and fittings shall be set flush with the finished surface. If a fixture canopy or pan is used as an outlet box cover, any combustible wall or ceiling

finish between the edge of the canopy and the outlet box shall be covered with noncombustible material.

I. For conduits 1" and smaller, the following shall be the maximum number of conductors permitted in a box:

Trade Size	Max. No. #12
1-1/2" x 4" octagonal	6
1-1/2" x 4" square	9
1-1/2" x 4-11/16" square	12
2-1/8" x 4--11/16" square	16
2-3/4" x 3" x 2"	6
3-1/2" x 3" x 2"	8

J. Where a fixture stud is installed in box, the number of conductors permitted shall be reduced by one. Where a wiring device is installed in box, the number of conductors permitted shall be reduced by two. A conductor running through the box is counted as one conductor, and each conductor terminating in box is counted as one conductor.

K. Outlet boxes installed flush mounted in stud partitions shall be installed in such a way that boxes between any two studs shall penetrate only one wall face. Outlet boxes that penetrate opposite wall face shall be located between adjacent studs (to reduce noise transmission through walls). Where this cannot be accomplished, putty pads (such as those manufactured by Sound Isolation Company) shall be used.

L. Outlet boxes, junction boxes wireways, etc. used for fire alarm systems shall have permanent legible marking to identify these systems per NEC 700.11(A) and NEC 760.30.

2.4 WIRING DEVICES

A. Wiring devices shall be as manufactured by P&S/Sierra, Hubbell, Leviton, or Eagle. Comparable catalog numbers of devices furnished shall conform with the following:

1. Duplex receptacles 20A/2 pole, 3-wire, 125 volt, grounding type, tamper resistant, white -- HBL5362-WTR. Face shall be nylon or polycarbonate.

2. GFI duplex receptacles 20A/2 pole, 3-wire, 125 volt, GFI, tamper-resistant, weather-resistant, grounding type, white -- Hubbell #GFR5362-WTR. These shall be used for weatherproof applications, and damp locations. Unless noted otherwise, GFI receptacles shall not be used to control downstream receptacles.

3. Wall switches 20A/1 pole -- Hubbell #HBL1221-I, or equal.

4. Wall switches 20A, 3-way -- Hubbell #HBL1223-I, or equal.

B. All 20A/2 pole, 3-wire receptacles shall be mounted with a "U" shaped grounding connection at the top, except for weatherproof receptacles, and except for locations where existing receptacles are mounted with "U" shaped grounding connection at the bottom.

C. Where duplex receptacles are indicated to be located as required for electric water coolers and electronic faucets at sinks/lavatories, they shall be located where indicated on electric water cooler shop drawings and faucet shop drawings. Receptacles for these shall be GFI type. Where electric water coolers are hard wire type, a 20A, 1P toggle switch shall be provided behind the wall access panel in lieu of the receptacle from which concealed wiring in raceway is wired to unit; a dedicated circuit (for one or more of these) shall be provided using a GFI circuit breaker.

D. Where receptacles are located in wet or damp locations, they shall be weather-resistant type to meet NEC 406.9.

E. All dimmer switches shall be of the same manufacturer, unless indicated otherwise. They shall not be ganged together or with switches where heat ratings will be exceeded.

F. Unless indicated otherwise, lighting fixtures within each room shall be switched by the wall switch or switches indicated in the room.

2.5 DEVICE PLATES

A. Plates shall be of the one-piece type, white-colored nylon.

B. Where weatherproof switches are indicated, P&S/Sierra type 302 series WP plates shall be used, unless indicated otherwise on drawings.

C. Where weatherproof receptacles are indicated, metal canopy-type weatherproof covers similar to T&B Red Dot Code-Keeper (UL listed for wet locations at all times) shall be used with the weather-resistant receptacles, unless indicated otherwise on drawings.

D. Use multi-gang plates where switches, receptacles, and/or other devices are grouped.

E. Plates shall be installed with the four edges in continuous contact with finished wall surfaces without the use of mats or similar devices. Plaster fillings will not be permitted. Plates shall be installed with an alignment tolerance of 1/16" from the vertical or horizontal.

F. Plates for devices fed with exposed conduit shall be as hereinbefore specified.

G. Wherever a series of switches or pilot lights and switches are grouped, the

plates shall be furnished with suitable factory engravings (black filled). Where engraving of dimmer switch plates is impractical, engraved phenolic strips may be installed. Engravings shall indicate function/location names not subscript shown on drawings (names shall be approved by Architect).

H. Device plates shall not be installed until painting is completed. Device plates having paint on their surfaces, or having their finish marred by use of paint remover, shall be replaced at no additional cost to the Owner.

I. Where indicated, tamperproof hardware shall be used. Furnish two tools for each type of tamperproof hardware.

2.6 TIME SWITCHES

A. Time switches shall be Tork #7000-ZL Series, astrodial with skip-a-day and reserve power, 277 or 120/240 volt as required, 40 amps, independent 120 volt clock motor circuit and indoor surface enclosure. Mount switches over flush outlets so that raceways will be concealed. Time switches for mechanically held contactors shall be single pole, double throw; other types shall be double pole, single throw, unless noted otherwise on drawings. Provide 120V branch circuit for clock motor. Phenolic nameplate (white with black cut letters) shall be provided to indicate function of time switch.

2.7 LIGHTING CONTACTORS

A. Lighting contactors shall be SQ-D Class 8903, LXG series or equal mechanically held type, 480V, each pole rated 30A, quantity of poles as required plus two spares, 120V coil, coil-clearing contacts, NEMA 1 enclosure and HOA switch. Provide two wire interface relay option where contactor is controlled by time switch. Provide 120V branch circuit for coil. Phenolic nameplate (white with black cut letters) shall be provided to indicate function of contactor.

2.8 SAFETY SWITCHES

A. Safety switches shall be of the quick-make, quick-break visible blade-knife switch type. They shall be of the fused or nonfused type as required. Fused switches shall have positive pressure fuse clips. Heavy duty switches shall be fully interlocked, with provision to neutralize the interlock by a screw driver while under load without interrupting the circuit. Switches shall be complete with insulated base, and pressure or solderless lugs (suitable for use with 75 degrees C conductors). Handles shall be front or side operated. Switches shall be horsepower rated, capable of breaking stalled-rotor motor current at these ratings. Unless noted otherwise, outdoor locations shall have NEMA type 3R enclosures; indoor locations shall have NEMA 1 enclosures. Switches shall have provision for padlocking in the "off" position. 600 ampere or smaller switches shall be complete with rejection feature to ensure rejection of fuses other than Class R. Safety switches shall be Square D General Duty type for 208-240 volt non-fused switches and Heavy Duty type for 480 volt switches and 208-240 volt fused switches. Equal equipment as manufactured by GE, Siemens or Cutler Hammer will be acceptable.

B. Nonfused disconnect switches for single phase motors may be Hubbell #HBL1221I, 20A/1P horsepower rated (for 115V motors) or #HBL1222I, 20A/2P horsepower rated (for 208-240 motors) as required; in outdoor locations these switches shall be mounted in FS condulets with #DS 185 covers and gaskets.

2.9 FUSES

Provide one complete set of fuses, together with 33% spares, for each fuseholder. Fuses 600A and below shall be Buss Low-Peak, Littlefuse LL, or Ferraz Shawmut Amptrap 2000, Type RK-1, current limiting and time delay, rejection type, unless noted otherwise. Fuses above 600A shall be Bussman LCL, Littlefuse KLP-C or Shawmut Amptrap, UL listed Class L, current limiting and time delay, with 200,000 amp rms interrupting rating, silver plated contact surfaces. Where fuses are used with magnetic starters, fuses shall be reduced in ampere rating (from the sizes indicated) to the maximum rating allowed for each particular starter, as stated on starter nameplate. All fuses shall be of a single manufacturer.

2.10 AUTOMATIC LIGHTING SHUT-OFF DEVICES

A. Corner-mounted automatic lighting shut-off devices shall be Watt Stopper LMDX-100 series or equal, (mounted on ceiling at wall) with selectable passive infrared detection technology and active ultrasonic detection technology, and selectable “initial” and “maintained” settings. Passive ultrasonic sensors that listen for audible sounds are not acceptable.

B. Ceiling mounted automatic lighting shut-off devices shall be Watt Stopper LMDC-100 series or equal, ceiling mounted, low-profile, with selectable passive infrared detection technology and 360 degree active ultrasonic detection technology, and selectable “initial” and “maintained” settings. Passive ultrasonic sensors that listen for audible sounds are not acceptable.

C. Wall-mounted automatic lighting shutoff devices shall be Watt Stopper DW-311 series or equal, with selectable passive infrared detection technology and active ultrasonic detection technology, with selectable “initial” and “maintained” settings. Device shall have up and down buttons for 0-10V dimming control of fixtures. Passive ultrasonic sensors that listen for audible sounds are not acceptable.

D. Timer type wall mounted automatic lighting shut-off devices shall be Watt Stopper series TS or equal wall mounted, with digital countdown operation on LCD and with audible and blink shut off warning features.

E. On/off control stations shall be Watt Stopper LMSW-10x or equal, wall-mounted, with quantity of buttons as required for control of associated lighting fixture zones to be switched and with LED indicators.

F. Color of devices and associated device plates shall match that specified for wiring devices.

G. Dimmer control stations shall be Watt Stopper LMDM-101-W or equal, wall-mounted with on/off/raise/lower toggle push button and with LED array in bezel to indicate dimming level of associated zone of lighting fixtures.

H. Scene control stations shall be Watt Stopper LMSW-105 series or equal, wall-mounted with on/off/raise/lower toggle push button and four programmable scene selector push buttons, with LED indicators. Program each scene to suit Owner's requirements.

I. Each dimmer lighting control station and multi-button scene wall switch input shall contain a custom engraving (Watt Stopper LMSW-KIT-10x series or equal) to indicate function controlled. Exact engraving designation shall be as directed by Architect and included in the submittal.

J. Provide on/off room controllers (Watt Stopper LMRC-10x series or equal) and on/off/dimming controllers (Watt Stopper LMRC-21x series or equal) as required for control of lighting fixture zones in associated room/area. Provide wiring in raceway as required to interconnect automatic lighting shut-off device(s), master lighting on/off control stations, dimmer lighting control stations, room controllers, dimming controllers, lighting fixtures, etc. for a complete and properly operating lighting control system within each space to be provided.

K. Provide a digital wireless configuration tool (Watt Stopper LMCT-100 series or equal) to the Owner at the completion of the project. Each digital wireless configuration tool shall be capable of enabling system and device modifications via pushbutton control through two-way infrared communication.

L. Where automatic lighting shut-off devices control lighting fixtures, the automatic lighting shut-off system shall be compatible with the voltage of the lighting fixtures. Where automatic lighting shut-off devices control lighting contactors, the automatic lighting shut-off system shall utilize same control voltage as lighting contactor coil.

M. Lighting fixtures in a room/area shall be turned on by the associated control station(s) in the room/area. Automatic lighting shutoff devices shall have a programmable time delay before automatically turning off the lighting fixtures upon no sensing of occupants. This setting shall be a minimum of 30 minutes unless otherwise directed by the Owner.

N. Where an automatic lighting shut-off system is to control a fan, automatic lighting shut-off device (and associated power supplies/relay packs) shall be horsepower rated as required.

O. Automatic lighting shut-off devices with ultrasound detection technology shall be mounted no closer than 6'-0" from HVAC supply registers. Generally, automatic lighting shut-off devices shall not be mounted in areas with high volume of air flow.

P. Contractor shall furnish and install complete automatic lighting shut-off

systems including wiring and raceways, and all other equipment, whether specifically indicated or not, to provide complete and operating systems. Submittal shall be provided to show locations of components, (recommended by the manufacturer of the particular system), wiring, and operation.

Q. During submittal preparation, manufacturer should determine the appropriate sensing technology for both 'initial occupancy' and 'maintain occupancy' for its location and application and make alterations as necessary. Care should be taken when selecting the sensing technology when detecting occupants in rooms which contain windows, partitions, aisles, etc. These settings shall be indicated in the submittal. A factory-trained technician shall make adjustments to the sensors on the jobsite for proper performance. In addition, a factory-trained technician shall visit the project 3 months after substantial completion to review operation of these devices, review operation with Owner, and make adjustments. He shall also do this at 6 months, 9 months, and 1 year after substantial completion.

2.11 WARNING SIGNS

A. Standard industry "DANGER HIGH VOLTAGE" warning signs shall be provided as required by the National Electric Code and as follows:

1. On each door of pad-mounted transformer and on each side of surface available.

2. On each door of automatic transfer switches.

3. On each removable panel of transformers.

4. On other equipment (such as safety switches, time switches, contactors, etc.) containing energized components which are exposed when door is opened or access panel is removed.

B. A warning sign shall be provided on panelboards to warn of potential electric arc flash hazards.

PART 3 - EXECUTION

3.1 METHODS OF WIRING

A. Systems shall be 4-wire, 3-phase, 120/208 volts, A.C.; and 4-wire, 3-phase, 277/480 volts, A.C.

B. Provide power wiring as required whether indicated on drawings or not. Homerun raceways to panelboards shall be provided for wiring and shall be limited to the following combinations (which shall also include equipment grounding conductor):

1. One 1-pole circuit (hot and neutral conductors).

2. Two 1-pole circuits (2 hot conductors and 2 neutral conductors), if

derated per NEC table 310.15(B)(3)(a).

3. Three 1-pole circuits (3 hot conductors and 3 neutral conductors), if derated per NEC table 310.15(B)(3)(a).

4. One 2-pole circuit (2 hot conductors).

5. One 2-pole circuit (2 hot conductors and one neutral conductor).

6. One 3-pole circuit (3 hot conductors and one neutral conductor).

Where a neutral conductor is required for a branch circuit, it shall be dedicated to that branch circuit and shall not be shared by other branch circuits.

C. All wiring run underground or in fill beneath slab shall be contained in rigid threaded heavy wall hot-dipped galvanized (inside and out) steel conduit encased in a 3"' minimum thickness concrete envelope. Conduits and concrete envelopes under structural slabs shall be adequately supported from the slab using 3/8" diameter stainless steel rods properly spaced (not greater than 5'-0" spacing between rods) to support the load and to suitably distribute the load within the capacity of the structural slab. The rods shall pass under conduit and rise on both sides to tie into slab. Where multiple runs of conduits are installed, 2" minimum spacing shall be maintained between conduits.

D. Unless otherwise indicated on drawings or specified hereinafter, wiring installed outdoors (not underground or in fill beneath slab and under building) shall be contained in rigid threaded heavy wall galvanized steel conduit (hot dipped, inside and out).

E. Unless otherwise indicated on drawings or specified hereinafter, other wiring shall be contained in electric metallic tubing.

F. Unless specifically indicated otherwise on the drawings, aluminum conduit may be used in lieu of steel conduit, provided same does not run underground or in concrete. Where aluminum conduit is used, fittings, outlet boxes, junction boxes, and accessories shall be aluminum.

G. All raceways shall be concealed unless otherwise indicated.

H. Branch circuit raceways feeding outlets in masonry walls shall be concealed in the masonry. Where outlet boxes are indicated in bare masonry walls, the box shall be mounted so that two edges of the box or plaster cover will fall in a mortar joint. Where switch boxes will not accommodate the number of conductors required and 4" square or larger boxes are installed, provide device covers 1" minimum in depth with straight rectangular openings for dry-wall type construction. Where grouting is required to fill up improperly cut openings in the masonry, the work will be rejected. The work of this section shall be coordinated with the masonry work to insure a neat and workmanlike job.

I. Solderless spring type connectors similar to Scotchlok connectors, Ideal colored Wingnuts, or Ideal Crimps with Wrapcaps shall be used for branch circuit wiring

and fixture splice connections. Solderless connectors of the split-bolt type shall be used for splices on conductors #8 and larger.

J. Splices in low voltage wiring (50 volts and less) shall be made at terminal blocks furnished with the equipment. At junctions or where other splices are required, these splices shall be soldered or made with approved compression connectors.

K. Termination of branch circuit and feeder conductors shall be made using mechanical or compression lugs, unless noted otherwise. Where lugs are not furnished with equipment (including Owner-furnished equipment), Contractor shall provide lugs as required for a complete installation. Also, where conductors are to be connected to equipment furnished with lugs not sized for the conductors, Contractor shall change the lugs to the appropriate size.

L. Termination of low voltage wiring (50 volts and less) and control/monitor/ instrumentation wiring (120 volts and less) shall be made using compression type (ring or spade) terminals similar to T&B Sta-Kons.

M. Connections to motors (not equipped with a portable cord) shall be made with a short piece of steel flexible metal conduit between rigid conduit system and motor terminal box. Where the motor is located inside a vibrating housing, connection between housing and motor terminal box shall be made with a short piece of steel flexible metal conduit, and connection between rigid conduit system and housing shall be with a short piece of steel flexible metal conduit. Ground bond of separate copper conductor shall be made between motor frame and rigid conduit system. In outdoor locations and other locations subject to moisture or water leakage, liquid-tight flexible metal conduit shall be used. Wiring within these flexible metal conduits shall be stranded. “Short piece of flexible metal conduit” is defined as the shortest piece that will provide proper vibration isolation.

N. Taps in feed-thru panelboards and/or wireways and junction boxes shall be made with clear-taps, or OZ gutter taps, complete with bakelite covers.

O. Recessed LED troffers shall be wired with #12 AWG type THWN-2, or XHHW-2 conductors in 4 to 6 feet of ½" flexible metal conduit from a box at least 1 foot from the fixture. Recessed downlights shall be wired with conductors as heretofore specified in 4 to 6 feet of flexible metal conduit from a box at least 1 foot from the fixture, unless the fixture is of the pre-wired type with an integral outlet box approved for the number and type of branch circuit conductors indicated and/or specified. Not more than two individual fixtures shall be connected to any of these outlet boxes. This box shall be located above the ceiling and shall be accessible from attic, by removing acoustical tile in accessible ceiling or by removing fixture in a non-accessible ceiling. Installing blank covers on ceilings to provide access to such boxes will not be acceptable.

P. Typewritten directory of circuits shall be provided for each panelboard to include spares and spaces. The room numbers and items served shall be indicated for each circuit. (Circuit numbers indicated on the drawings are shown for the purpose of clarifying the grouping of outlets. The actual number assigned to the circuits in the panelboard shall suit the bussing and branch circuiting to panelboard. Phenolic

nameplates (white with black-cut letters) shall be provided in lieu of directories for panelboards without doors.

Q. Branch circuit wiring through lighting fixtures shall be in accordance with Articles 410.11, 410.31,410.32, and 410.33 of the National Electrical Code; however, conductor types shall be as specified hereinbefore.

R. Unless a larger size is indicated or required by code or manufacturer, raceways shall be sized in accordance with Table 1 for the number and conductor size (AWG and MCM) shown or specified. Where combination of secondary (0-600 volt) conductor sizes are indicated, the raceway shall be sized in accordance with Table 2 based on the insulated conductor areas of Table 3, for the project conductor sizes (AWG and MCM) indicated even though the actual diameters and areas of the conductors to be installed may differ from those in Table 3.

Table 1

Maximum Number of Conductors in Trade Sizes of Conduit or Tubing													
	Conduit Trade Size (Inches)												
	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Conductor Size AWG, MCM													
14	3	6	10	18	25	41	58	90	121	155			
12	3	5	9	15	21	35	50	77	103	132			
10	2	4	7	13	18	29	41	64	86	110	138		
8	1	2	4	7	9	16	22	35	47	60	75	94	137
6	1	1	2	5	6	11	15	24	32	41	51	64	93
4	1	1	1	3	5	8	12	18	24	31	39	50	72
3	1	1	1	3	4	7	10	16	22	28	35	44	63
2		1	1	3	4	6	9	14	19	24	31	38	56
1		1	1	1	3	5	7	11	14	18	23	29	42
0		1	1	1	2	4	6	9	12	16	20	25	37
00			1	1	1	3	5	8	11	14	18	22	32
000			1	1	1	3	4	7	9	12	15	19	28
0000			1	1	1	2	4	6	8	10	13	16	24
250				1	1	1	3	5	6	8	11	13	19
300				1	1	1	3	4	5	7	9	11	17
350				1	1	1	2	4	5	6	8	10	15
400				1	1	1	1	3	4	6	7	9	14
500				1	1	1	1	3	4	5	6	8	11
600					1	1	1	2	3	4	5	6	9
700					1	1	1	1	3	3	4	6	8
750						1	1	1	3	3	4	5	8

Table 2

Dimensions and Percent Area of Conduit and of Tubing										
			Area – Square Inches							
			Not Lead Covered			Lead Covered				
Trade Size	Internal Diameter Inches	Total 100%	2 Cond. 31%	Over 2 Cond. 40%	1 Cond. 53%	1 Cond. 55%	2 Cond. 30%	3 Cond. 40%	4 Cond. 38%	Over 4 Cond. 35%
1/2	.622	.30	.09	.12	.16	.17	.09	.12	.11	.11
3/4	.824	.53	.16	.21	.28	.29	.16	.21	.20	.19
1	1.049	.86	.27	.34	.46	.47	.26	.34	.33	.30
1 1/4	1.380	1.50	.47	.60	.80	.83	.45	.60	.57	.53
1 1/2	1.610	2.04	.63	.82	1.08	1.12	.61	.82	.78	.71
2	2.067	3.36	1.04	1.34	1.78	1.85	1.01	1.34	1.28	1.18
2 1/2	2.469	4.79	1.48	1.92	2.54	2.63	1.44	1.92	1.82	1.68
3	3.068	7.38	2.29	2.95	3.91	4.06	2.21	2.95	2.80	2.58
3 1/2	3.548	9.90	3.07	3.96	5.25	5.44	2.97	3.96	3.76	3.47
4	4.026	12.72	3.94	5.09	6.74	7.00	3.82	5.09	4.83	4.45
4 1/2	4.506	15.94	4.94	6.38	8.45	8.77	4.78	6.38	6.06	5.56
5	5.047	20.00	6.20	8.00	10.60	11.00	6.00	8.00	7.60	7.00
6	6.065	28.89	8.96	11.56	15.31	15.89	8.67	11.56	10.98	10.11

Table 3

Dimensions to be Used for Insulated Conductors		
Size AWG MCM	Approx. Diam. Inches	Approx. Area Sq. In.
Col. 1	Col. 2	Col. 3
18	.146	.0167
16	.158	.0196
14	.204	.0327
12	.221	.0384
10	.242	.0460
8	.328	.0854
6	.397	.1238
4	.452	.1605
3	.481	.1817
2	.513	.2067
1	.588	.2715
0	.629	.3107
00	.675	.3578
000	.727	.4151
0000	.785	.4840
250	.868	.5917
300	.933	.6837
350	.985	.7620
400	1.032	.8365
500	1.119	.9834
600	1.233	1.1940
700	1.304	1.3355
750	1.339	1.4082
800	1.372	1.4784
900	1.435	1.6173
1000	1.494	1.7531
1250	1.676	2.2064
1500	1.801	2.5475
1750	1.916	2.8895
2000	2.021	3.2079

S. However, unless a larger size is indicated or required by code or manufacturer, raceway for communication wiring (defined by NEC Chapter 8) shall be sized as a minimum per Table 1 in NEC Chapter 9.

T. In 277/480 volt systems, wall switches grouped or ganged in an outlet box shall be so arranged that voltage between adjacent switches does not exceed 300 volts, or the box shall be equipped with permanently installed barriers between adjacent switches.

U. Approved thread lubricant containing powdered zinc or lubricating graphite shall be applied to the male threads only of aluminum conduit to prevent joint seizure.

V. Other routings than those indicated may not be used without the approval of the Architect, but the Contractor shall make allowance for possible obstruction to routes indicated.

W. Certain areas and hollow spaces between suspended ceilings and slabs above are being used for environmental air and electrical work therein shall be in accordance with Article 300.22 of the National Electrical Code and the local building code.

X. Raceways shall be supported in accordance with the National Electrical Code for the particular type of raceway; however, for rigid metal conduit and electrical metallic tubing, the maximum spacing between supports shall not exceed ten feet.

Y. Wall switches indicated by doors shall be located on the strike side (lock side), 6" maximum from door frame to the side of the outlet box; however, for double doors switches shall be located where shown, usually clear of the door in the full open position.

Z. The Contractor shall install additional boxes or fittings in raceways as required to properly install conductors. The locations of these boxes or fittings shall be subject to the Architect's approval.

AA. Top of wooden poles shall be cut on an angle to allow for drainage of rain water.

BB. In multi-section panelboards, circuit breakers, fusible switches, and spaces shall be divided equally between sections (unless indicated otherwise). The circuit arrangement on panelboard schedules is used only to convey circuit assignment, not locations of circuit breakers in panelboard.

CC. Where a maximum fuse (or circuit breaker) rating is indicated on the nameplates of the magnetic starters, control panels, contactors, etc. (or equipment containing these components) for the specific mechanical equipment, the Contractor shall reduce ampere rating of fuses (or circuit breaker) to be installed (from the sizes indicated). These ratings shall also be increased as necessary to comply with NEC Paragraph 430.52 (C)(1), Exception 2.

DD. Suitable waterproof cable identification tags shall be installed on each power

feeder in each manhole, handhole, and pull (junction) box.

EE. Where conductors without raceway penetrate smoke partitions and/or fire rated partitions and floors, a conduit sleeve shall be installed rigidly in the penetration so that the conductors can pass through it. A UL listed fire-stop putty such as Nelson Flameseal shall be installed around the sleeve and inside the sleeve after the conductors are installed.

FF. Where roof penetrations are required for conduits supplying roof-mounted HVAC equipment, these penetrations shall be of the piping roof curb type per National Roofing Association standards.

GG. Where variable speed drives are used, the disconnect switch at the motor shall have an auxiliary contact wired to the variable speed drive to turn off the drive when the disconnect is opened.

HH. Where electrical work penetrates or is installed in fire and/or smoke partitions, this work shall be installed per UL standards. A U.L. listed fire-stop putty such as Nelson Flameseal shall be installed around raceway penetrations.

II. A branch circuit neutral conductor shall be installed to each lighting switch outlet box, and if not connected, it shall be terminated with a wire nut. This requirement also applies to wall-mounted occupancy sensors. This conductor is not shown on drawings.

JJ. Where a safety switch, toggle switch, etc. is to be used as a Code-required in-sight disconnect switch for an item of equipment, Contractor shall obtain dimensional data of the associated equipment prior to rough-in and the location of the disconnect switch shall be adjusted as necessary so that the switch is readily accessible after equipment is installed.

3.2 WIRING IN CONDUIT (APPLIES ALSO TO E.M.T.)

A. Where several conduits (concealed and/or exposed) are run parallel to each other, they shall be grouped together on galvanized P-1 000 Unistrut, with suitable clamps, which shall be attached to the wall or hung from the roof or structural ceiling. Where exposed conduit is indicated, the conduit shall be installed parallel with or at right angles to the building walls and/or ceiling (roof) and shall be supported adequately by pipe straps or other approved devices. Where a single conduit is run exposed in a damp and/or wet location, standoff straps of the type which permit a ¼" air space between the conduit and the wall should be used. Fastening of conduit shall be as follows: to wood by means of screws; to masonry by means of threaded metal inserts, metal expansion screws, or toggle bolts; and to steel by means of machine straps, bolts, or power actuated fasteners. Raceway fasteners shall be approved for the purpose (tie wire, zip-ties, ty-raps shall not be used).

B. Conduit in concrete slabs shall be located so as not to affect the structural strength of the slabs. Conduit in general shall be located in the center 1/3 thickness of

concrete slabs and when installed in slabs poured on grade or fill shall have at least one inch of concrete between conduit and plastic or other waterproof membrane; conduit shall not be installed under the plastic or other waterproof membrane unless it is to be installed "In fill beneath slab" in which case the installation shall meet the requirements indicated heretofore. The maximum size of conduit that may be run in a slab shall be as directed by the Architect. Conduit larger than ¾", if permitted in reinforced concrete slabs, shall be parallel with or at right angles to the main reinforcement; when at right angles to the reinforcement, the conduit shall be close to one of the supports of the slab.

C. Conduits which must cross building expansion joints shall, where practicable, cross same in furred ceilings areas rather than in slabs or walls, arranged with sufficient flexibility to accommodate the building expansion. However, where such routing is not possible, galvanized expansion fittings shall be provided in each raceway in concrete or attached to the structure whenever the raceway crosses an expansion joint in the concrete structure. Expansion fitting shall be installed on one side of the joint with its sliding sleeve end flush with the joint and with a length of bonding jumper in the expansion joint equal to at least three times the normal width of the joint. Each expansion fitting shall be zinc-coated steel and contain heavy factory installed packing and internal copper braid packing and shall be complete with UL approved bonding jumper.

D. Underground runs of multiple conduits shall be provided with plastic separators to insure 2" minimum of concrete between adjacent conduits.

E. Unless noted otherwise on drawings, underground runs of conduits shall be installed in concrete envelope of 3" minimum thickness at top, bottom, and sides, so that the top of the concrete envelope shall not be less than 42" below grade for conductors operated over 600V and not less than 24" below grade for 600V or less except that under roads and pavements the minimum for 600V or less shall be 30" below grade. In non-concreted areas, encasement around conduit stub-ups shall extend to a location just above grade, and top shall be sloped to drain.

F. Concrete and reinforcing shall conform to DIVISION 3, CONCRETE. Concrete strength shall be 3000 psi unless noted otherwise on drawings. Concrete shall be colored red for underground conduit applications with an approved admixture.

G. Conduits shall be kept at least 6" from runs of hot water piping, flues, or other hot object.

H. Where conduits rise through a concrete floor, the curved portion shall not be visible above the finished floor. Approved waterproof compound or conduit sealing bushing shall be used where underground conduits enter building, and outdoor transformer pad. For buildings, the installation shall meet NEC 225.27. Where these conduits penetrate areas below grade, conduit-sealing bushings that resist water head-pressure shall be used.

I. Where conduit fittings are installed, these shall be Crouse-Hinds or Appleton cast type.

J. Connectors and couplings for electric metallic tubing shall be of the steel

compression type. Couplings for rigid heavy wall conduit shall be of the threaded type; two locknuts and one bushing shall be provided where heavy wall conduits enter boxes or equipment. Flexible metal conduit connectors shall be of the squeeze type with screw and locknut. Liquid-tight connectors shall be steel compression type.

K. Insulated bushings shall be provided for conductors #4 and larger.

L. From each flush panelboard and cabinet (including fire alarm control panels, telephone cabinets, etc.), provide three empty ¾" conduits to elbow out 6" into space above ceiling for future use.

M. No wiring shall be installed in raceways until the raceway system is complete. Only approved type pulling lubricant shall be used.

N. During construction, outlet boxes and conduit stub-ups shall be suitably protected against the entrance of foreign materials.

O. Conduit in suspended ceilings shall be located, where practicable, in the space between the ceiling and the concrete slab above. Raceways shall not be installed immediately above accessible acoustical ceiling (restricting tile removal) without written approval of Architect for the specific location. Raceways shall also not be installed in such a manner to restrict or block access to plenums, equipment, etc.

P. Tie-wires shall not be used for support of raceways. Raceways shall be supported by threaded rods, strut, building structure, etc. that secure the raceways (to prevent both vertical and horizontal movement) in addition to supporting them.

Q. Where concrete joist construction is employed, arrange with those responsible for DIVISION 3 - CONCRETE to provide in contact ceilings and in unfinished ceilings such headers as may be required to receive boxes for fixtures.

R. Threaded heavy-wall galvanized conduit with vapor-proof fittings shall be used in cold storage rooms, and drain and sealing fittings (and expansion fittings, where necessary to compensate for thermal expansion) shall be provided where conduits enter room. Type MI cable may be used in lieu of threaded conduit for this wiring, in which case drain and sealing fittings will not be required.

S. Where raceways pierce walls of HVAC housings, these penetrations shall be made per requirements of the HVAC housing manufacturer.

T. Where underground raceways stub up on exterior of building, the Contractor shall install two support rods to keep raceways from sinking relative to building. These support rods shall be 3/8" stainless steel, and shall extend concealed through the concrete encasement and tie into the concrete slab of the building.

U. Raceways shall not be installed within 24" of VAV units, fan-powered boxes, and other mechanical equipment located above ceilings, except for those raceways that serve these units. Raceways shall be located to allow maintenance personnel to remove

ceiling tiles below these spaces to service this equipment.

V. Where flexible metal conduit or liquid-tight flexible metal conduit is installed, it shall be securely fastened within 12" of connection point, and additional supports shall be provided per NEC 348 & 350.

W. Where conduits are installed on roofs, unless indicated otherwise, they shall be installed on supports consisting of rubberized base with galvanized strut (B-Line Dura-Blok series DB or Caddy Pyramid series ST fixed strut supports).

X. Where installed under metal-corrugated sheet roof decking, cables, raceways, and boxes shall be installed and supported so there is no less than 1 1/2" between the lowest surface of roof decking and the top of the cable, raceway, or box.

3.3 GROUNDING

A. The metallic raceway system and the neutral conductor of the wiring system shall be grounded at the service equipment and building disconnects. The insulated copper service grounding electrode conductor shall be extended with no splices in raceway from the service to within 5 feet of the point of entrance of the metal underground water service pipe that is electrically continuous and is in direct contact with the earth for at least 10 feet per NEC 250.68(C). It shall also be extended without splice to building structure steel frame. Where the raceway routing is via finished areas, it shall be run concealed. Ground connection shall be visible, and connection of raceway and conductor to the water pipe shall be made with an approved ground connector similar to T & B conduit hub and water pipe clamp. Also, see Article 250.50, Grounding Electrode System and Grounding Electrode Conductor of the National Electrical Code for bonding requirements to other items to form the grounding electrode system (this includes bonding to metal frame of building and to a concrete-encased electrode to be located near the service equipment).

B. The above requirements shall be supplemented by grounding to ¾" diameter by 10' long copper clad ground rods, and to an encased electrode (consisting of a 20' minimum length of 4/0 B.C. cast in a grade beam or similar concrete-encased foundation member below the vapor barrier, or in a concrete-encased conduit bank that is in contact with earth.

C. At each point of voltage transformation (including but not limited to transformers and inverters), the secondary neutral conductor and the secondary raceway system shall be grounded with a common insulated ground conductor as described in Article 250.30 of NFPA 70, National Electrical Code. The grounding electrode conductor described therein shall be continuous (no splices) and shall be in a raceway. Where the raceway routing is via finished areas, it shall be run concealed. Ground connection shall be visible. Where water pipe connection is used, connection of raceway and conductor to a water pipe shall be made with an approved ground connector similar to T & B conduit hub and water pipe clamp and the connection shall be within 5 feet of the point of entrance of the metal underground water service pipe that is electrically continuous and is in direct contact with the earth for at least 10 feet per NEC 250.68(C).

D. Where a grounding electrode conductor exits a metal raceway, (conduit or EMT), T&B or equal rigid threaded conduit grounding hub/clamp fitting shall be used.

E. Grounding bushings with bonding jumpers shall be used around concentric or eccentric knockouts on equipment and on raceways stubbed up below open-bottom equipment such as pad-mounted transformers.

F. Grounding pole of each polarized receptacle (non-isolated ground type) shall be bonded to its outlet box with conductor sized in accordance with Table 250.122 of the National Electrical Code and a machine or self-tapping screw, unless the receptacle is of the approved self-grounding type.

G. Grounding conductors used to bond across flexible metal conduits containing transformer secondary conductors shall be sized per NEC Table 250.66 based on size of the secondary conductors.

H. Each branch circuit and feeder shall be provided with a ground conductor installed with the circuit conductors. Each ground conductor shall be a green insulated copper conductor, with minimum size in accordance with Table 250.122 of the National Electrical Code NFPA-70. These grounding conductors are not shown on the drawings.

I. A ¾" diameter by 10' long copper clad ground rod shall be installed at service pole, and the raceways installed vertically up the service pole shall be bonded thereto with #2 B.C.

J. Where water pipe grounding connection is made underground, a suitable plastic pipe sleeve and flush metal cover shall be installed to provide access to the connection.

K. Where ground connections are made in walls or inaccessible ceilings, access panels shall be installed. Access panels in walls shall be stainless steel.

L. See drawings for additional grounding requirements.

3.4 MOUNTING HEIGHTS

A. If not otherwise indicated, mounting heights to centerline of outlets shall be as follows:

1. Receptacles -- 18" above floor.

2. Switches -- 48" above floor.

3. Panelboards – not more than 5'6" from topmost operating handle to floor.

4. Bracket fixtures -- 7'0" above floor or, where mounted above exterior door, mirror or medicine cabinet, at a height just sufficient to clear the swing of the

door or medicine cabinet.

5. Exit lights -- at a height just sufficient to clear the swing of the door, unless noted otherwise.

6. Fire alarm pull stations -- 48" above floor.

7. Fire alarm visual units and audio/visual units -- see Section 16600.

8. Voice/data outlets -- 18" above floor.

9. TV outlets -- 18" above floor.

B. The above mounting heights may be adjusted as required to permit bottom or top of plate to align with mortar joints in unfinished masonry walls, provided joints are not raked. Where joints are raked, adjust height as required to insure that center of outlet box will be in the center of masonry unit. Where outlets at different levels are shown adjacent, they shall, where possible, be installed on a common vertical centerline. Where these adjustments are made, 18" shall be the minimum mounting height for receptacles, telephone outlets, and computer outlets, and 48" shall be the maximum mounting height for switches.

3.5 MARKING OF STARTERS, SAFETY SWITCHES, AND PANELBOARDS

A. Each surface manual starting switch out of sight of the motor which it controls, and each panelboard, transformer, enclosed circuit breaker, automatic or manual transfer switch, contactor, magnetic starter, safety switch, and toggle switch used as an in-sight disconnect for any equipment regardless of location, shall be suitably identified by means of ¼" high letters cut in white laminated phenolic strips to show black letters. Strips shall be attached to cover by means of two screws. Device plate for each flush manual starting switch and wall switch used as starting switch or safety switch shall be suitably engraved to identify the equipment controlled. Device plate for each switch for heat trace cable connection shall also be engraved.

B. A phenolic nameplate shall be provided on transformers, panelboards, and switchboards to indicate the upstream device (panelboard, switchboard, etc.) where the power originates (e.g. "Panel ___ (fed from Panel _____)", "Transformer is fed from ____", etc.).

C. A phenolic nameplate shall be provided on equipment directly connected to the load side of a manual transfer switch to indicate both the preferred source and alternate source from which the associated automatic transfer switch is fed (e.g. “Preferred source of power supplied from Panel ___. Alternate source of power supplied from engine generator.”).

- END OF SECTION -

SECTION 16400 - ELECTRICAL SERVICE AND DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.1 SCOPE

Work described in this Section includes providing labor, materials, and equipment indicated, specified, and necessary for a complete and operating distribution system and related systems, in accordance with SECTION 16010 - ELECTRICAL GENERAL PROVISIONS.

1.2 APPLICABLE PARAGRAPHS

Applicable paragraphs of SECTION 16100, ELECTRICAL BASIC MATERIALS AND METHODS, shall apply to this Section as though repeated herein.

1.3 EQUIPMENT LOCKS

Panelboards, cabinets, and other electrical equipment having doors with locks, shall be keyed alike. Keys (one set for each electrical equipment item containing locks) shall be provided to the Owner.

1.4 SERVICE EQUIPMENT

Safety switches, panelboards, and manual transfer switches used as service equipment shall be Underwriters Laboratories listed and labeled for the application. Barrier shall be included in these panelboards (including load centers) and transfer switches per NEC 408.3(A)(2). A phenolic nameplate (white with black-cut letters) shall be provided on service equipment to indicate "maximum available fault current is ____KA" and date that "calculation was made on ____".

1.5 CIRCUIT BREAKER ARRANGEMENT

In multi-section panelboards, circuit breakers, fusible switches, and spaces shall be divided equally between sections (unless indicated otherwise). In general, each section of multi-section panelboards shall have the same quantity of pole capacity (i.e. two sections with 36 poles in each rather than one section with 42 poles and one section with 30 poles). The circuit arrangement on panelboard schedules is used only to convey circuit assignment, not locations of circuit breakers in panelboard.

1.6 CIRCUIT DIRECTORIES FOR PANELBOARDS/SWITCHBOARDS

Type-written circuit directories shall clearly indicate the associated room as well as the load and location of the load (e.g., Classroom 101 - Lighting Fixtures, Storage 102 - Receptacle on Northwest Wall, Mechanical 103 - Heat Trace on South Wall, etc.).

1.7 JOB NAMEPLATE

An 8" x 5" white micarta job nameplate with black-cut letters as directed shall be provided on the main distribution panel MDP; it shall include name of Architects, name of Engineers, name of Contractor, and year. Submittal shall include a full-size representation of this for review.

1.8 PANELBOARD CONFIGURATION

Panelboard configurations shall be altered (bus ratings, heights, etc.) as necessary to suit specified panelboard options (feed through lugs, surge protection devices, etc.).

PART 2 - PRODUCTS

2.1 CIRCUIT BREAKER LIGHTING BRANCH CIRCUIT PANELBOARDS (120/208V)

A. Unless noted otherwise boxes shall be approximately 20" wide by 5¾" deep with 5" minimum side and end gutters. Boxes shall be constructed of code gauge galvanized steel.

B. Fronts shall be for flush or surface mounting as indicated and shall be complete with door and flush chrome-plated combination cylinder lock and catch. Fronts shall be full finish code gauge steel with prime coat and finish coat of baked enamel in manufacturer's standard color, with concealed adjustable trim clamps and circuit directory with transparent covers. Door shall have concealed hinges.

C. Bussing shall be copper, and lugs or main breaker, and branch circuit breakers shall have ampere ratings indicated. Breakers shall be connected to the bus in a sequence phase arrangement using full size breakers (double module breakers shall not be used).

D. Two-pole and three-pole breakers shall have common trip. Branch circuit breakers shall be of the bolted type, quick-make, quick-break, thermal magnetic, 10,000 amp minimum interrupting capacity at 250 volts a.c. Trip position shall be between the "on" and "off" positions to positively identify faulted or overloaded circuits from "off' circuits. Where specifically indicated, breakers shall be complete with ground fault circuit interrupter. 15A and 20A one-pole breakers shall be approved for switching duty. Where used to switch H.I.D. lighting, circuit breakers shall be rated (calibrated) to properly carry the inrush current (labeled "HID"). Where used to switch fluorescent lighting, they shall be labeled "SWD" or "HID".

E. Panelboards shall be Square D type NQ, or equal, factory assembled. Equal equipment as manufactured by GE, Cutler Hammer, or Siemens will be acceptable.

2.2 CIRCUIT BREAKER LIGHTING BRANCH CIRCUIT PANELBOARDS (277/480V)

A. Boxes shall be approximately 20" wide by 5 3/4" deep with 6" minimum side gutters and 7½" minimum end gutters, and shall be constructed of code gauge galvanized steel.

B. Fronts shall be flush or surface mounted as indicated and shall be complete with door and flush chrome-plated combination cylinder lock and catch, with locks keyed alike. Fronts shall be full finish code gauge steel with prime coat and finish coat of baked enamel in manufacturer's standard color, with concealed adjustable trim clamps and circuit directory with transparent covers. Doors shall have concealed hinges.

C. Bussing shall be copper, and lugs or main breaker, and branch circuit breakers shall have ampere ratings indicated. Breakers shall be connected to the bus in sequence phase arrangement using full size breakers (double module breakers shall not be used).

D. Two-pole and three-pole breakers shall have common trip. Branch circuit breakers shall be of the bolted type, quick-make, quick-break, thermal magnetic, 18,000 amp minimum interrupting capacity at 277 and/or 480 volts a.c. Trip position shall be between the "on" and "off" positions to positively identify faulted or overloaded circuits from "off' circuits. 15A and 20A one-pole breakers shall be approved for switching duty. Where used to switch H.I.D. lighting, circuit breakers shall be rated (calibrated) to properly carry the inrush current (labeled "HID"). Where used to switch fluorescent lighting, they shall be labeled "SWD" or "HID".

E. Panelboards shall be Square D type NF, or equal, factory assembled type. Equal equipment as manufactured by GE, Cutler Hammer, or Siemens will be acceptable.

2.3 CIRCUIT BREAKER DISTRIBUTION PANELBOARDS

A. Boxes shall be not more than 42" wide by 9½" deep and shall be constructed of code gauge galvanized steel. Ample UL approved wiring gutters shall be provided, and no gutter shall be less than 4" wide. Fronts shall be for flush or surface mounting as indicated and shall be complete with door and chrome-plated combination cylinder lock and catch, with locks keyed alike. Fronts shall be full finish code gauge steel with prime coat and finish coat of baked enamel in manufacturer's standard color, with indicating type adjustable trim clamps and circuit directory with transparent covers. Doors shall have flush hinges. However, when panelboards are NEMA 3R, a phenolic nameplate (white with black-cut letters) shall be provided for each circuit breaker to identify the load in lieu of providing the circuit directory.

B. Bussing shall be copper, and lugs or main breaker, and branch circuit breakers shall have ampere ratings indicated. Breakers shall be connected to bus in a sequence phase arrangement.

C. Two-pole and three-pole breakers shall have common trip and pad-lock off feature. Breakers shall be quick-make, quick-break, thermal magnetic (18,000 AIC RMS symmetrical minimum at 240V, and 18,000 AIC RMS symmetrical minimum at 480V unless indicated otherwise) having mechanism insuring full contact pressure until the time of

opening, whether actuated either automatically or manually. When automatically actuated, the breaker mechanism shall be trip free of the handle so that the contacts cannot be held closed against a short circuit or abnormal overload. Circuit breaker contacts shall be non-welding silver alloy, housed in arc chambers equipped with arc quencher plates and the circuit breaker mechanisms, enclosed in molded insulating cases, shall be sealed to eliminate tampering. Trip position shall be between the "on" and "off" positions to positively identify faulted and overloaded circuits from "off' circuits.

D. Panelboards shall be factory-assembled type rated maximum 600V AC (Square D I-Line, GE Spectra, Eaton POW-R-Line 4, or Siemens P4 or P5 will be acceptable).

2.4 CIRCUIT BREAKERS

A. Each circuit breaker shall have continuous current rating visible without removing an enclosure cover, and the rating shall be engraved. This may be accomplished by installation of a phenolic label (white with black cut letters) adjacent to the circuit breaker. Circuit breakers shall be suitable for use with 75 degree C conductors. Where circuit breakers are used to supply HVAC equipment having motor group combinations, type HACR circuit breakers shall be used. Circuit breakers used for vending machines, hard-wired electric water coolers, hand dryers, dwelling unit refrigerators within 6' of sink, and dwelling unit dishwashers, and for other indicated equipment shall be GFI type.

B. Unless indicated otherwise, circuit breaker spaces and spare circuit breakers shall be divided equally between sections of multi-section panelboards.

C. Where ground-fault protection is provided for 3-pole circuit breakers (or fusible switches), performance testing of the ground fault protection system shall be provided after installation. Written documentation for this test shall be provided to the Engineer.

D. Where a circuit breaker with adjustable long time trip (where cover over adjustment is not lockable per NEC 240.6 (C)) is used, conductor size for the protected feeder shall be increased by the Contractor to match maximum long time setting of the circuit breaker.

E. Circuit breakers in panelboards shall be fully rated for AIC; that is, series ratings are not acceptable.

F. Circuit breakers used to supply power to transformers shall have pad-lock “off” feature, unless the circuit breaker is within sight of the transformer.

G. Where the highest continuous current trip setting of a circuit breaker is rated or can be adjusted to 1200A or higher, the circuit breaker shall have electronic trip unit with clearing time reduction feature per NEC 240.87.

H. Circuit breakers for circuits feeding appliances that are hard-wire connected and do not have integral disconnects or sight disconnects shall be provided with

permanently-attached handle padlockable lock-off to meet the requirements of NEC 422.31(B) & (C). Examples of this would be hand dryers, fire alarm panels, hardwired electric water coolers, engine generator water jacket heaters, and battery chargers.

I. Circuit breakers used for power sources to fire alarm system equipment shall be dedicated to fire alarm equipment. Each shall have red-colored marking and labeled “FIRE ALARM CIRCUIT”, as well as provided with a circuit breaker lock-on device.

2.5 DRY TYPE TRANSFORMERS

A. Transformers shall have copper windings, 220 degree insulation, and maximum 115 degree C rise. Transformers shall be 480 volt single phase to 120/240 volt with 2 - 5% FCBN taps, and 480 volt 3-phase delta to 120/208 volt, 4-wire, 3-phase, wye, with 4 - 2½% FCBN and 2 - 2½% FCAN taps. Transformers shall have built-in vibration dampening system, and sound level shall not exceed NEMA ST-20 standards. Transformer shall have DOE 10 CFR Part 431 (2016) efficiency.

B. Unless noted otherwise on drawings, transformers 30 KVA and below shall be wall mounted, and transformers above 30 KVA shall be floor mounted on 3" high concrete base reinforced with 6 x 6 - 6/6wwf. Where walls cannot properly support transformer, galvanized strut frames supported to floor and ceiling structure shall be provided to support transformers.

C. Unless noted otherwise on drawings, transformers installed indoors shall have ventilated enclosures; transformers installed outdoors shall have totally enclosed enclosures approved for outdoor applications or shielded, ventilated enclosures approved for outdoor applications.

D. Transformer submittal shall include inrush current data plotted on primary overcurrent device curves.

E. Equipment shall be manufactured by GE, Cutler Hammer, Square D, or Siemens.

F. Contractor shall set the transformer taps to the optimum setting after loads are applied.

2.6 ENGINE GENERATOR DOCKING STATION

Docking station shall be manufactured by Trystar and shall be service-entrance rated, 800A, 277/480V, NEMA 3R, wall mounted with 800A/3P/65KA circuit breaker, phase rotation meter with fuses, color-coded male cam-lock panel-mount assembly (2 per phase and neutral) with flip covers for engine generator connection, 600KC-MIL mechanical lug assembly (2 per phase and neutral) attached to cam-lock buses, and lockable door for generator hookup. Provide phenolic nameplate (white with black-cut letters) to read “Portable engine generator must be properly grounded prior to connection. Circuit breaker shall be turned on only after engine generator is turned on and operating properly.”

2.7 FAULT CURRENT AND PROTECTIVE DEVICE COORDINATION STUDY

A. A fault current and protective device coordination study shall be prepared by the Contractor within 30 calendar days following final review of circuit protective devices, including circuit breakers, fuses, overloads, and protective relays. The study shall include calculations and composite time-current characteristic coordination curves (in color) to demonstrate optimum coordination of protective devices to be installed and to protect equipment and conductors against fault currents and sustained overload conditions for conductors and equipment to be installed. The study shall include the proper ratings of fuses and proper settings of adjustable circuit breakers associated with the protection of equipment and conductors and optimum selective coordination. If necessary, the study shall also make recommendations for changes to new protective devices, and these changes shall be made by the Contractor at no additional cost to the Owner; for this reason, the study shall be finalized prior to Contractor releasing equipment for production. Also for this reason, the Contractor should consider using the panelboard manufacturer to make this study. Contractor shall test and calibrate protective devices in accordance with the manufacturers' specification after making the proper device settings and before the initial energization of the conductors and equipment. Contractor shall obtain required data from the utility company for coordination with the utility company's facilities. The Study shall be submitted as printed copies using color copies for the coordination curves. The Study shall be prepared by a registered professional Engineer and shall contain his signed and dated seal on the first page.

B. The scope of this study shall not only be limited to the equipment indicated on the Schematic Feeder Diagram; rather, the study shall also address safety switches, motor starters, branch circuits (including those rated 20A and less), etc. This will require a complete understanding of the entire set of construction documents by the preparer of the study.

C. Unless otherwise noted, selective coordination shall consist of localization of an overcurrent condition to restrict outages to the circuit or equipment affected, accomplished by the selection and installation of overcurrent protective devices and their ratings or settings for the full range of available overcurrents, from overload to the maximum available fault current, and for the full range of overcurrent protective device opening times associated with those overcurrents.

D. Partial or limited coordination, such as coordination for operating times of only 0.1 seconds or longer, will not be considered acceptable. Selective coordination shall be documented in the study for all times, including those (below 0.01 seconds) that may not be able to be represented using time-current curves. This documentation may further require manufacturer-specific testing results, ampacity ratio tables for specific fuses, coordination testing results for circuit breaker frame sizes at specific fault current levels, etc.

E. The study shall be prepared by a licensed professional engineer engaged primarily in the design, installation, or maintenance of electrical systems. Furthermore, the study shall contain the engineer’s seal and date indicating responsibility for the correctness

of the study. The selection shall be documented and made available to those authorized to design, install, inspect, maintain, and operate the system.

F. A phenolic nameplate (white with black-cut letters) shall be provided on each of the panelboards and the manual transfer switch to indicate "available fault current is ____KA" and date that "calculation was performed on ____".

G. An ARC flash hazard study in accordance with NFPA 70E guidelines shall be prepared by the Contractor, along with the study indicated above, to provide a summary table to include energy levels/faults, equipment characteristics, working boundaries, and hazard/risk categories for panelboards, transformers, circuit breakers, safety switches, motor starters, etc. The study shall include complete descriptive narratives of methods used and effect of the results. The Contractor shall also install the specific NFPA 70E arc flash labels on the exterior surfaces of each equipment item.

PART 3 - EXECUTION

3.1 UNDERGROUND MAIN SERVICE

A. Arrange with local power company to provide 4-wire, 3-phase, 277/480 volt main service to the point indicated.

B. Main underground service feeders shall be furnished and installed from the building service equipment to the connection to the power company service as work of this Section.

C. Provide primary raceways from transformer to power company pole with nylon pull rope in active raceway.

D. Provide concrete pad and ground grid for pad-mounted transformer.

E. Primary cable and transformer will be provided by the power company.

F. Metering equipment, including current transformers and enclosure, meter, conduit and wiring, shall be in accordance with the power company's regulations.

G. Work of this Section shall begin at the point where the power company terminates its work.

H. Fees and charges in connection with the above shall be paid as work of this Section and shall be included in the bidder’s price.

3.2 EMERGENCY LIGHTING SYSTEM

A. Emergency fixtures including internally illuminated exit signs shall be permanently fixed in place and connected to building branch circuits. Fixtures shall contain

a rechargeable battery, battery charging means, one or more lamps and other components to be UL approved and meet NEC Article 700.12(F).

B. Where battery backup for fixtures is used with switched branch circuits, the sensor circuit of each fixture shall be connected ahead of any local switching. This will permit "switching-off" fixture without signaling to sensor circuit that a power failure has occurred and "turning-on" of lamps on battery circuit. A failure of the branch circuit shall cause the lamps to turn on whether the switch is in the on or off position.

C. Exit fixtures shall not be switched.

3.3 RACEWAY STUB-UPS

A. Where raceways were stubbed up under pad-mounted transformers, grounding bushings shall be installed on the raceways.

1. Bonding jumpers shall be installed between bushings and ground bus (sized per NEC Table 250.66 or Table 250.122 as applicable).

3.4 PANELBOARD SIZING AND LOCATIONS

A. Panelboards shall be sized so that they are located above the Base Flood Elevation and that all circuit breakers and cables meet the requirements of NEC 404.8 to be used as switches.

3.5 ELECTRICAL EQUIPMENT AREAS

A. Contractor shall review the physical sizes of the substations, panelboards, transformers, etc. (based on shop drawings) and assure that they will fit in the electrical rooms with proper code clearances. The locations may require adjustment. Contractor shall provide a 1/4" scale drawing of each area containing electrical equipment to demonstrate that the equipment fits properly.

3.6 POWER COMPANY SERVICE

A. The location of power company facilities (power poles, manholes, pads, etc.) are shown where designated by power company during the design phase. Contractor shall coordinate the exact locations of these with power company and plan for contingencies.

- END OF SECTION -

SECTION 16500 - ELECTRICAL LIGHTING

PART 1 - GENERAL

1.1 SCOPE

Work described in this Section includes labor, materials, and equipment indicated, specified, and necessary for a complete and operating lighting system and related systems in accordance with SECTION 16010 - ELECTRICAL GENERAL PROVISIONS.

1.2 APPLICABLE PARAGRAPHS

Applicable paragraphs of SECTION 16100 - ELECTRICAL BASIC MATERIALS AND METHODS, shall apply to this Section as though repeated herein.

PART 2 - PRODUCTS

2.1 EXIT LIGHTS

A. Exit lights shall be Lithonia LES-R-120/277/ELN-SD series with red letters on a metal stencil. Stencil and trim shall be cast aluminum. Housing shall have matte black finish and stencil shall have brushed aluminum finish. Each fixture shall have concealed LED's. Unit shall be rated for dual voltage 120/277V. Housing thickness shall be maximum 1 7/8". Units shall be UL approved with nicad battery, two-stage solid state charger, pilot light to indicate charging mode, test switch, and accessories (operation in emergency mode shall be 1½ hours minimum). Each shall have an NFPA approved self-test feature that tests the battery and provides visual signal upon sensing a battery failure. See symbol schedule on drawings for mounting details. Fixtures shall meet NFPA 101, with Chevron style arrows.

2.2 LIGHTING FIXTURE GENERAL REQUIREMENTS

A. Fixtures shall be as specified in schedule on drawings.

B. Fixtures to be installed in damp or wet locations shall be labeled by Underwriters' Laboratory for that purpose.

C. Fixtures shall be finished (painted or other finish as specified) after fabrication.

D. Trims for recessed fixtures shall be of the type necessary for compatibility with each ceiling type (such as concealed T, wide T, slot grid, flange trim, etc.). Coordinate with architectural drawings and specifications.

E. Where ceiling tiles are thicker than standard ceiling tiles, fixture throat/trim ring assemblies shall be custom-made to accommodate the ceiling system.

F. Fixture/pole/concrete foundation assemblies shall be provided to meet the local building code for wind loading with minimum requirement of 100 miles per hour at 30 feet above grade. Submittal shall clearly indicate that this requirement will be met.

2.3 LED (LIGHT EMITTING DIODE) LIGHTING FIXTURES

A. Provide LED fixtures complete with LED module, aluminum heat sink, drivers, [base, pole,] and other accessories as shown on drawings.

B. Fixtures shall be completely designed based on LEDs and not designed around an LED-based lamp meant to install into an existing fixture. Retrofit LED lamp/module into an existing fixture shall not be allowed.

C. Aluminum Heat Sinks: All LED luminaires shall have an aluminum heat sink integral to fixture housing and designed for proper electrical bonding of LED module to allow maximum heat dissipation and to provide thermal management within the allowable operating range of the LED as specified by the LED manufacturer. The junction temperature (Tj) of each LED shall not exceed the maximum junction temperature specified in the manufacturer's product data sheet.

D. Unless noted otherwise on the drawings, LEDs installed in each fixture shall be of the type specifically recommended by the manufacturer of the fixture for use in the fixture.

2.4 LED (LIGHT EMITTING DIODE) DRIVERS

A. Provide LED system drivers, of ratings, types and makes as recommended by LED manufacturer. Driver for LED systems shall be electronic, 1 phase, 60 hertz, high power factor, constant current without elevated inrush current, electronic, low noise level, a minus 40 deg C temperature rating, and shall be furnished by the manufacturer of each type or particular lighting fixture specified.

B. Driver shall have a Class A sound rating.

C. Driver shall have a guaranteed minimum power factor of 0.90. (PF = Watts/Volt-Amps).

D. Driver shall be installed inside an electrical enclosure. Wiring inside electrical enclosure shall comply with 600V/105degC rating or higher.

E. Driver shall be available in a plastic/metal can or all metal can construction to meet all plenum requirements.

F. Driver shall be provided with poke-in wire trap connectors or integral leads color coded per ANSI C82.11.

G. Driver shall comply with UL standard UL1012

H. Driver shall have a rated lifetime of 50,000 hours

I. Driver shall operate from 60 Hz input source of 120 to 277V with sustained variations of +/- 10% (voltage and frequency) with no damage to the driver.

J. Driver output shall be regulated to +/- 5% across published load range.

K. Driver input current shall have Total Harmonic Distortion (THD) of less than 20%

L. Driver shall reduce output power to LEDs if its case temperature exceeds 85C - thermal protection.

M. Driver shall tolerate sustained open circuit and short circuit output conditions without damage and without need for external fuses or trip devices

N. Driver shall be IP64 rated except as indicated.

O. Driver shall not contain PCBs.

P. Driver shall comply with ANSI C62.41 Category A for Transient protection.

Q. Driver shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 15, Non-Consumer (Class A) for EMI/RFI (conducted and radiated).

R. Driver shall be manufactured in a factory certified to ISO 9002 Quality System Standards.

S. Driver shall carry a five-year manufacturer's warranty from date of manufacture against defects in material or workmanship, including replacement, for operation at a maximum case temperature of 90C.

T. Driver manufacturer shall have a fifteen year history of producing electronic drivers for the North American market.

U. Battery backup shall be manufactured to provide a minimum of 1400 lumens per fixture for 1½ hours operation during the emergency mode. Fixture shall contain an integral manual test button for testing purposes to provide a visual and audible alarm. A test button remotely installed from the fixture is not acceptable.

2.5 LED (LIGHT EMITTING DIODE) MODULES

A. LED Modules shall be of the type, color, and optical distribution indicated, as shown, and scheduled

B. LEDs shall be handled and soldered to printed circuit boards (PCBs) according to the manufacturer's specifications.

C. LEDs shall produce a white light of the color temperature shown on the Fixture Schedule located on the drawings and not less than 75CRI value on the color rendering index.

D. LEDs shall be high brightness and high output.

E. LED performance and lumen maintenance testing shall be performed in accordance with IES LM-79-08 and LM-80-08.

F. LEDs shall provide approximately 50,000 hours of lighting at a level not less than 70% of initial lumen output. LEDs shall operate from 60 Hz input source of constant 350mA with sustained variations of +/- 10% (current and frequency) with no damage to the LEDs.

G. LED lumen output shall be regulated to meet or exceed the published standard minimum Luminous flux.

H. Unless stated otherwise, LEDs shall be 3500K in color and shall be within +/- 200K of specified color temperature and shall be from the same bin.

I. LED manufacturer shall utilize strict binning and labeling techniques to ensure consistent brightness within +6 lm of published standard luminous flux and consistent chromaticity within +/-200K of specified color temperature per bin. Each bin shall be labeled with appropriate bin code relative to luminous flux and chromaticity.

J. LEDs shall have a minimum operating temperature of -40C.

K. LEDs shall be environmentally friendly, contain no mercury, lead or other heavy metals, and manufactured in compliance with RoHS and REACH.

L. LEDs and associated components of the LED Modules shall be manufactured in a factory certified to ISO 9002 Quality System Standards.

M. LEDs and associated components of the LED Modules shall carry a five-year manufacturer's warranty from date of manufacture against defects in material or workmanship, including replacement, for operation within specified system design parameters.

N. LED manufacturer shall have a fifteen year history of producing LEDs for the North American market.

PART 3 - EXECUTION

3.1 SUPPORTS

A. For any type ceiling which itself does not provide sufficient support for fixtures, either arrange with other subcontractors to strengthen ceiling or support fixtures from structure above independently of ceiling.

B. Suspended linear fixtures in continuous rows shall have one stem at the beginning of the row, one stem at each channel joint, and one stem at the end of the row.

C. Linear fixtures mounted individually on stems shall each have two single stem hangers. Linear fixtures individually surface mounted shall be supported at both ends.

D. Linear fixtures surface mounted in continuous rows shall have one support at the beginning of the row, one support at each channel joint, and one support at the end of the row.

E. Recessed fixtures installed in plaster ceilings and gypsum board ceilings (including ceilings with glue-on acoustical tiles) shall be furnished with metal plaster frames or other suitable mounting frames.

F. Recessed fixtures shall be so adjusted to their supports that their trim flanges fit tightly and evenly against the surface of the ceiling.

G. In acoustical tile ceilings with exposed mechanical suspension systems, recessed linear fixtures (fluorescent and LED) shall be lay-in type. Fixtures so supported shall be securely fastened to the ceiling's framing members by approved fixture support clips (4 required per fixture). Metal fixture appendages that simply fold down over the ceiling's framing members are not acceptable. Arrange with other subcontractors to support ceilings at each corner of each of these fixtures (not more than 6 inches from each corner) in order to assure that the ceiling will not sag (or fail) during construction or in the future due to the weight of the fixtures. Providing independent fixture support tie-wires from the structure in lieu of proper ceiling support is not acceptable.

H. Large fixtures (generally, those required by manufacturer) shall be supported from the structure above ceiling with ⅜" diameter threaded galvanized rods and necessary Unistrut or angles, in addition to the support furnished by ceiling.

3.2 LOCATION OF FIXTURES

A. Work of this Section includes advising other trades of exact location of recessed fixtures so that ceiling construction and/or spacing may be coordinated as necessary to permit symmetrical positioning of fixtures in room.

B. Locations for lighting fixtures shall be per Architectural reflected ceiling plans.

C. For acoustical tile ceilings, surface and/or suspended fixtures shall be centered on a tile or a tile joint, unless indicated otherwise.

D. The locations of fixtures in Mechanical Equipment Rooms and Boiler Rooms are approximate. The Contractor shall determine exact locations based on exact locations of mechanical equipment.

E. Where installed under metal-corrugated sheet roof decking, lighting fixtures shall be installed and supported so there is no less than 1 1/2 “ between the lowest surface of roof decking and the top of any part of the lighting fixtures.

3.3 INSTALLATION AFTER PAINTING

Fixtures to be installed in or on painted ceilings and/or walls shall not be installed until painting is completed. Fixtures installed with paint applied over factory finishes will be rejected.

3.4 CLEARANCE

Thermal or acoustic insulation shall not be installed over the top or within 3 inches of the sides of a recessed fixture enclosure, wiring compartment, or driver unless the equipment is labelled for the purpose. Thermal or acoustic insulation shall not be installed over the top of a recessed fluorescent fixture. Work of this Section includes advising other trades of this requirement, so that proper clearances are maintained.

3.5 FIXTURE COORDINATION

Lighting fixture submittal shall include data on each type of ceiling suspension system and associated acoustical tile. Information on the ceiling suspension systems shall include types of recessed fixture suitable for use with each type as well as recommended installation details.

3.6 FIXTURE ADJUSTMENT

Aim adjustable fixtures at night as directed by Architect or his designated representative. Furnish any equipment necessary for aiming fixtures. Equipment shall include but not be limited to bucket trucks, aerial booms, ladders, tools, meters and personnel. Use a factory prepared aiming diagram.

3.7 TAMPERPROOF TOOLS

Provide to the Owner two tools for each type of tamperproof hardware.

- END OF SECTION -

SECTION 16600 - ELECTRICAL SPECIAL SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

Work described in this Section includes providing all labor, materials, and equipment indicated, specified, and necessary for complete and operating systems in accordance with SECTION 16010 - ELECTRICAL GENERAL PROVISIONS.

1.2 APPLICABLE PARAGRAPHS

Applicable paragraphs of SECTION 16100 - ELECTRICAL BASIC MATERIALS AND METHODS, shall apply to this Section as though repeated herein.

1.3 SYSTEMS INVOLVED

A. Systems involved include the following:

1. Lightning Protection System
2. Fire Alarm System
3. Raceways and Wiring for Voice/Data Outlets
4. Cable TV Distribution System
5. Sound System
6. Security Camera System
7. Access Control System
8. Paging System

1.4 FIRE ALARM SYSTEM SUBMITTALS

A. Contractor shall have a certified fire alarm installer prepare the submittal (consisting of equipment brochure booklet and shop drawings with plan view and one line schematic drawings for the work of this contract.)

B. Equipment brochures shall consist of items specified hereinafter and items that are pertinent to the work. The brochures shall include a sequence of operation, battery calculations, and statement identifying "type of system". These brochures shall be submitted for review per Paragraph 16010.2.3. Where remote station monitoring is required, brochures shall provide the name of the monitoring company (which must be Fire Marshal approved). Where system is high-rise type, submittal shall include type of

signaling system, type of evacuation system ("zoned" or "general"), and methods of protection for panels, circuits, etc.

C. Shop drawings shall indicate sizes, quantities, and types of conductors, cables and details necessary to install the work, to include strobe candela ratings.

D. A PDF file of the submittal shall be provided to the Architect for review. In addition, a PDF file and one full-sized printed (hard) copy of the submittal shall be provided to the Electrical Engineer for review,

E. After the A/E completes their review and the Contractor has incorporated the comments, Contractor shall make his online application and payment to the Fire Marshal and attach the final reviewed submittal containing the A/E review stamp. He shall select the option “STAMPED SHOP DRAWINGS ATTACHED”, which will allow Fire Marshal review without further involvement by Professional of Record.

F. If additional clarifying details and/or components are required by the Fire Marshal, Contractor shall prepare the details, provide components, and secure approval at no additional cost to the Owner. Installation shall not begin until the Fire Marshal's review is complete.

G. Operating instructions provided to the Owner shall include submittal brochure, shop drawings, and booklet including device addresses to match shop drawings, and control commands for doors, HVAC, elevators, etc.

1.5 SURGE PROTECTION

A. Surge protection equipment shall be provided for each system where wiring enters building. This shall be in compliance with NEC Chapters 7 and 8.

1.6 VOICE/DATA AND TV COMPANY SERVICE

A. The location of voice/data and Cable TV utility company facilities (power poles, manholes, etc.) are shown where designated by voice/data and Cable TV utility company during the design phase. Contractor shall coordinate the exact locations of these with voice/data and Cable TV utility company and plan for contingencies. All raceway routings associated with voice/data and Cable TV utility company facilities shall contain large radius elbows. Contractor shall also provide additional pull boxes as required by the voice/data and Cable TV utility company facilities and plan for contingencies. A minimum of 36" of separation shall be maintained between raceway routings associated with power utility service and raceway routings associated with voice/data/TV utility company facilities.

B. Contractor shall notify the Owner in writing to remind them no less than 12 weeks prior to the scheduled project completion date that the Owner is responsible for scheduling telephone and data services by setting up accounts, etc.

PART 2 - PRODUCTS

2.1 LIGHTNING PROTECTION SYSTEM

A. Lightning protection system equipment shall be installed on the building/ structure and shall be copper and shall be as manufactured by Advanced Lightning Technology or East Coast Lightning Equipment. Aluminum material may be used only where a material compatibility issue occurs (roofs that utilize aluminum, galvalume, or galvanized metal parapets); for this , the down leads and grounding shall utilize copper with bimeter transition occurring at the thru-roof assemblies. Installed system shall comply in all respects with the requirements of Underwriters' Laboratories, Inc. for Master Label Certificate of Inspection, which necessitates that the installation be made by an accredited installer and that the appropriate UL listed surge protection devices (per UL1449, latest edition) are installed on the exterior of the service equipment (to be visible to the inspector). The installer shall be LPI certified (submit copy of LPI certificate with submittals). Before acceptance of project, an LPI Master Certificate of Inspection shall be provided to the Owner.

B. Prior to the commencement of any work, the Contractor shall submit for approval complete installation drawings, including roof plan, manufacturer's catalog data, and field installation details including references to UL and LPI.

C. Air terminals shall extend above the roof or parapet not less than 10" nor more than 36". Air terminals exceeding 24" in height shall be supported with suitable brace located at a point not less than one-half of the air terminal. Air terminals shall be of the blunt-end type.

D. Conductors shall be copper and not less than 204 lbs per thousand feet for buildings up to 75 ft. high.

E. Downleads of lightning protection system shall penetrate roof similar to N.R.C.A., details M-2 and U, 1989, using stainless steel threaded rod thru-roof assembly in 2" schedule 40 PVC capped conduit. Pitch pockets will not be allowed. Submittal shall include proposed detail.

F. The lightning protection Contractor shall submit specific details of the proposed system to both the roofing Contractor and roofing material manufacturer, and secure their written approval of the system including a statement that nothing in the lightning protection system will compromise the warranty/bond required to be furnished for the roofing system.

2.2 FIRE ALARM SYSTEM

A. Contractor shall furnish and install smoke detectors, air-stream smoke detectors, heat detectors, pull stations, signals, monitor modules, control modules with relays, control panel, DACT, remote annunciator, wiring and raceways, and all other equipment, whether specifically indicated or not, to provide a complete and operating addressable analog, voice notification, non-coded, supervised fire alarm system to meet the requirements of NFPA 72 and all other applicable Life Safety Codes.

B. Contractor shall provide wiring as recommended by the manufacturer and it shall be indicated in the point-to-point interconnection drawings that shall be included with the submittals. The completed installation is to conform to applicable sections of NFPA 72, local and state code requirements and the National Electrical Code. Entire system shall have battery backup to meet NFPA and local codes plus 20% spare capacity.

C. Wiring for initiation devices shall be arranged per NFPA 72, to limit the quantity of devices connected to each addressable interface point in control panel. Wiring for voice notification systems shall be provided in separate zones to accommodate the voice zone selector switches.

D. Pull stations shall be addressable, double action type, metal or Lexan housing with red finish on flush outlet box.

E. Smoke detectors shall be photoelectric, low profile, addressable, analog type with base mounted on flush outlet box. Smoke detectors shall communicate actual smoke chamber values to the system control panel. Sensors shall be listed to UL 268. Sensors shall be listed as compatible with the control equipment and shall, in combination with this control equipment, be able to generate sensitivity reports acceptable to the Authority Having Jurisdiction as automatically meeting NFPA sensitivity testing requirements. Sensors shall be fully field programmable for sensitivity levels and indicate when maintenance is required. Each sensor base shall contain an LED that will flash each time the detector is scanned. LED shall also indicate when the sensor is in alarm.

F. Air-stream smoke detectors shall be addressable analog detectors. Performance shall be as described for smoke detectors. A remote test station (with indicator light and keyed test switch on a single-gang plate to be engraved with associated air unit designation) shall be provided for each air-stream smoke detector. Each shall be in a flush outlet box at a location as directed (generally in corridor wall near the detector), or at a readily accessible place in the associated mechanical room, unless a location is indicated on the drawings. Provide wiring in raceways from detector(s) to remote test station (test station shall not be addressable device with a different address than the detector). Provide an addressable control module with relay at the air handling system associated with each air-stream smoke detector and program the control module for fan/damper shutdown control resulting from activation of each detector associated with only that air handling system. However, in accordance with IBC and NFPA, when multiple air handling systems are associated with a common air plenum, fan/damper shutdown shall occur for all of these air handling systems upon activation of any air stream smoke detector associated with these air handling systems. The control module shall be located within 2' of the starter or control panel. Provide wiring and raceways from control module relays to the mechanical control equipment (starters, control panels, etc.) for this control unless it is being done by the mechanical controls contractor. Air-stream smoke detectors shall be as follows:

1. Where air-stream to be sensed passes through a duct, the air-stream smoke detector shall be a duct type smoke detector with housing and air sampling tubes. These shall be located in accordance with NFPA 72 requirements with exact

location to be coordinated with the Division 15 contractor. Multiple duct smoke detectors shall be provided at each location where ducts split into multiple ducts that cannot be monitored by a single detector. However, where an air-stream smoke detector is indicated to be installed in either the supply of an unconditioned outside air duct or located outside exposed to ambient air, a smoke detector shall be pendant-mounted inside the duct. The smoke detector shall be air-handling system rated (UL 268A) and shall be suited for high humidity and high velocity (minimum 2,000 feet-per-minute) environments. Coordinate with other trades to provide an access panel in duct to allow access to the smoke detector.

2. Where air-stream to be sensed does not pass through a duct (or the detector type indicated above is impractical), the air-stream smoke detector(s) shall be located in accordance with NFPA 72 Paragraphs 17.7.5.4.2 and A17.7.5.4.2 and shall be of the type (and quantity) suitable and UL listed for the application (including air velocity). Verify opening sizes which may require a large quantity of detectors.

G. Heat detectors shall be used where indicated and in lieu of smoke detectors where moisture will cause the smoke detectors to malfunction. Each shall be addressable and shall be rate-of-rise or fixed temperature type as appropriate.

H. Bases for addressable smoke detectors shall be identical to bases for addressable heat detectors so that smoke detectors can be changed by simply unplugging the smoke head and plugging in a heat head. The system shall automatically recognize the new device and operate on a default program designed for the new device. The Fire Alarm Control Panel shall automatically be notified of any device changes and the exact location of these changes.

I. Ceiling-mounted fire alarm devices (smoke detectors, heat detectors, signal devices, etc.) shall be installed in the center of the ceiling tile where installed in lay-in ceiling systems.

J. Provide a small permanent label on each addressable device to indicate the address.

K. Audiovisual signal units shall be a combination of ceiling and wall mounted speakers with strobe lights with off-white plate/housing. Strobe lights shall be xenon flasher, with the word "FIRE" and shall be ADA compatible and listed to UL 1971. Units shall be mounted on flush outlet boxes. Mounting height to the bottom of the device lense shall be 80" above the highest floor level within the space. Strobe intensity at each location shall be selected to meet ADA and NFPA 72. Where there are more than two units in a space, units shall flash in synchronization. Audio unit shall be selected to provide adequate volume at each location. Speakers shall be rated 88.8 db at 10' for 2-watt setting; lower wattage settings may be used as long as sound levels are sufficient for all occupants to clearly hear the voice messages (generally 15 db above ambient). However, where sufficient intelligibility cannot be attained using wall-mounted speakers, ceiling-mounted speakers with appropriate frequency response and signal-to-noise ratios shall be used. This may also require 25V or 70V systems in some areas with speakers that have

matching transformers. The fire alarm supplier may have to use computer programs such as EASE Evac.

L. Visual signal units shall be xenon flasher on an off-white plate/housing with the word "FIRE", shall be ADA compatible, and shall be a combination of ceiling and wall mounted on flush outlet boxes. Mounting height shall be the same as audiovisual signal units. Strobe intensity at each location shall be selected to meet ADA and NFPA 72. Where more than two in a space, units shall flash in synchronization.

M. Provide a Sprinkler System Valve Supervisory Switch, including all additional hardware (valve position tamper switches, etc.) as required for each valve of each fire water backflow preventer, whether specifically indicated or not. Associated wiring shall be routed in conduit routed underground to suit installation. Contractor shall refer to Civil drawings as well as documents of other trades for exact locations.

N. Provide addressable monitor modules for each sprinkler flow switch, sprinkler valve supervisory switch (including those at backflow preventers), sprinkler pressure switch, and for other equipment as shown. Provide wiring in raceways from monitor modules to the equipment to be monitored. Modules shall communicate any change in status to the fire alarm control panel (alarm for flow switches, and trouble for valve supervisory switches, and pressure switches).

O. Provide addressable control modules (with relays as needed) at air handling systems (as hereinbefore indicated), and for other equipment as indicated on the drawings. Provide wiring in raceways from control modules to the equipment to be controlled; distance from control modules to controlled equipment shall be maximum of 2'. Provide custom programming as required.

P. Fire alarm control panel shall be Notifier NFS-2-640 series, or Edwards System Technology EST-3 series, surface mounted with battery backup (including charger, transfer switch, and batteries, with 24-hour capacity in standby mode and 5-minute capacity in alarm mode, (15 minute capacity in voice alarm mode), microprocessor based monitoring and control, 80 character LCD display, 400 event historical logging, point selectable alarm verification feature (alarm verification shall not be programmed at this time), dedicated supervisory service indicator, acknowledge trouble silence reminder (time interval and signal type to be programmable to suit Owner), interface addressable devices (equipped with hardware for 318 analog points and 318 monitor/control points). The quantity and capacity of the addressable interface points shall be as required to meet the limitations of NFPA 72. Fire alarm control panel shall include a voice communication center (in the control panel cabinet) with audio control board, audio amplifiers (sized for all speakers simultaneously plus 50 percent, minimum), voice zone selector switches, a microphone, and a recorded message programmed per Fire Marshal and Owner's requirements. Voice messages shall be preceded by chime tones per NFPA 72. There shall be one N.O. and one N.C. dry contact that shall change state during any alarm condition. There shall be an RS-232 port for on-site maintenance, another RS-232 port programmed for plug-in of a future printer, and an internal modem with interface assembly for off-site viewing of system status for maintenance. There shall be a signal silence switch with ring back that does not cancel the strobe lights. Strobe lights shall flash and audible

signal shall sound until all devices are restored to normal and system is reset. Custom labeling and programming shall be provided for proper use of system. Power supplies and batteries shall be sized for 150% capacity for future additions. Where amplifiers, power supplies, and batteries will not fit in fire alarm control panel, they shall be provided in cabinets to be located in closets with locations to be approved. Provide dedicated 120 volt circuits as necessary and identify the location of the circuit disconnecting means at the control panel. A smoke detector shall be provided at each control panel.

Q. Remote annunciator shall be flush mounted and compatible with control panel. It shall have 80 character LCD display with key operated door, reset button, silence button, alarm and trouble lights with audible signals. A smoke detector shall be provided at each remote annunciator.

R. Power supply panels shall be provided (in closets) as necessary and shall be provided with batteries and 120V circuits. A smoke detector shall be provided at each power supply panel.

S. Voice evac panel shall include a voice communication center with audio control board, audio amplifiers (sized for all speakers simultaneously plus 50 percent, minimum), voice zone selector switches, a microphone, and a recorded message programmed per Fire Marshal and Owner's requirements. Voice messages shall be proceeded by chime tones per NFPA 72. A smoke detector shall be provided at each voice evac panel.

T. An IP type digital alarm communicator transmitter (DACT) shall be provided in the fire alarm control panel. It shall be used to transmit system status (for each device in alarm and trouble, simultaneously, to a remote station receiver via a cellular communicator. The cellular communicator shall be similar to Honeywell HWF2V-COM or HWF2A-COM and shall connect directly to the primary and secondary ports of the fire alarm control panel internal DACT. Batteries shall be provided to provide back-up power for the built-in power supply. A hand held programmer shall be provided for ease of programming unit. The communicator shall be installed near the fire alarm control panel. If required due to lack of signal strength, external antenna cables shall be provided at location as directed by Architect. Contractor shall provide programming, make all connections, and provide one year of remote monitoring service of the DACT using the monitoring company selected by the Owner.

U. Programming shall be provided as required.

V. System shall operate in such a way that activation of any pull station, smoke detector, heat detector, air-stream smoke detector, beam detector, or sprinkler system flow switch shall cause all audio and visual signals to operate, zone annunciator in the fire alarm control panel and remote annunciator and voice evac panel to operate, sonalert to sound until acknowledged by the operator, and signal to be transmitted to the remote monitoring system. Acknowledgment shall silence sonalert and this operation shall be logged in memory. Operation of the signal silence button shall silence all audible signals and turn off all visual signals) and this operation shall be logged in memory. Audio visual signals shall remain on until the system is reset. A break in an initiating loop, signal loop,

monitor or control circuit, wiring to a control circuit, loss of power, activation of valve supervisory switch to off normal position, failure of any amplifier or oscillator circuit shall cause a system trouble condition to occur, the system trouble lamps to flash, the sonalert to sound and signal to be transmitted to the remote monitoring system. Acknowledging the trouble condition shall cause the sonalert to be silenced and the trouble LED's to come on steady, and shall be archived in memory. All alarm and trouble conditions shall be archived in the memory by time and date of occurrence. Alarm conditions shall also provide other control functions such as selected HVAC functions and the following:

1. Any alarm condition shall cause a control module at the sound systems to turn off the sound systems.

2.3 RACEWAYS AND WIRING FOR VOICE/DATA OUTLETS

A. Contractor shall furnish and install backboards, fiber optic cables, terminal blocks, patch panels, outlets, category 6 wiring, cables and raceways, and all other equipment, whether specifically indicated or not, for a complete and properly operating system.

B. Voice/data wall outlets shall consist of outlet box (4" square x 1½"deep, or larger), 1 gang raised device cover, and 6-module plate with two data jacks (blue color, 8-position, category 6 module) and module blank covers. Finish and type of plate shall match that specified for wiring devices plates. Plate shall contain ID windows at top and bottom with appropriate label designations (type written). Finish color of plate shall match that specified for wiring device plates. These jacks will be used for data and VoIP.

C. Ceiling-mounted wireless access points shall consist of voice/data outlet mounted on a flush ceiling outlet box (4" octagon x 1 1/2" deep, or larger) with one data jack (violet color, 8-position, category 6 module) on round plate. Wireless access points shall be Ubiquiti U6-Enterprise-US. The access point controller shall be a Ubiquiti Dream Machine SE with 1TB of storage and shall be mounted in the data rack. A Ubiquiti Switch Pro 48 PoE data switch shall be provided and mounted in the data rack. Provide patch cords (quantity as required).

D. Data outlet in floor box shall consist of (2) jacks (blue color, 8-position, category 6 module) in floor box specified heretofore and labeling (type written).

E. Provide a cable for each jack which shall be UL listed, 4-pair, 24 AWG, UTP (unshielded twisted pair) jacketed, plenum type, category 6. The data cables shall have blue-colored jacket and shall route up the raceway stub-up and then above the ceiling (attached with J-hooks) to terminate on patch panels on nearest special systems backboard. The data cables for wireless access points shall have violet-colored jacket in lieu of blue. The patch panels for the VoIP shall be separate from the data patch panels.

F. Backboards shall be 8' high by width as indicated by ¾" thick plywood. Bottom of backboards shall be 6" above floor unless noted otherwise. Provide raceways from each backboard to space above accessible ceiling for routing cables to backboards.

Raceways shall be terminated with bushings even with top and/or bottom of backboards. Backboards shall be painted with two coats of fire retardant paint prior to cable installation.

G. Cable runway shall be a minimum of 18" wide and shall be black in color. All cable runways shall be installed and secured as per the manufacturer's installation instructions. All cable runways crossing above racks shall be secured to and supported above each rack using a cable runway standoff support. All cable runways shall be properly grounded.

H. Racks shall be 7' in height and shall support 19" rack-mount widths (42U type). Racks shall be installed and secured as per the manufacturer's installation instructions. Racks shall be positioned within the room to allow access to both the front and rear of all racks. When planning access to the rear of the racks, consideration should be made for the fact that equipment mounted in the rack will often extend at least 24 –30" behind the rack. As such, adequate allowance shall be made to the rear of the rack to allow for access behind the racks even after equipment is permanently installed. Racks shall be Atlas full-height with door and accessories for equipment mounting. All racks shall be properly grounded.

I. Vertical managements shall be a minimum of 10" wide. Vertical managements shall be double-sided to allow routing of cables front and rear. Both front and rear vertical managements shall have hinged doors to hide cables. A vertical management shall be installed between each rack in the room. All vertical managements shall be installed and secured as per the manufacturer's installation instructions.

J. Cable runway drops shall be installed to accommodate the cable bend radius in order to transition cable routing from horizontal cable runways and into each of the vertical cable managements. Cable runway drops shall be mated for 18" cable runway. All cable runway drops shall be installed and secured as per the manufacturer's installation instructions.

K. Provide the appropriate quantity of patch panels at backboards for termination of all cables, and terminate each conductor in each cable from data jacks and VoIP voice jacks where VoIP is used. The patch panels for VoIP cables shall be separate from patch panels used for data cables. Each patch panel shall be Category 6, with 48 ports, rack mounted. Wall mounted racks and/or floor-mounted racks shall be provided to accommodate patch panels, data switches, UPS’s, etc. and other equipment including Owner-furnished equipment. Wire management accessories shall be provided for proper, neat installation. Properly label (with permanent labeling means) each cable with room number of jack connected thereto. Also, label patch panels with room numbers. Provide patch cords as directed by Owner to connect patch panels to Owner-furnished data switches.

L. Where patch panels are used for other POE equipment such as wireless access points, IP-based cameras, etc., they shall be in addition to and separate from patch panels for voice/data.

M. Fiber optic cables shall generally be "fiber channel grade". Multi-mode cables shall be 50/125 micron core/cladding diameter, plenum rated. Single-mode cables shall be 62.5 micron, plenum rated. (Verify type with Owner prior to submitting for review). Provide the appropriate connector on each end of each strand [with SC connector] and terminate on each end in a rack-mounted fiber optic cable patch panel to be provided as necessary for complete tie-in. Also provide an individual fiber patch cord from each data switch to the fiber optic patch panels to each of the [Owner-furnished] data switches. Provide the appropriate interface devices on each end as necessary for complete tie-in. This will require coordination with the Owner's I.T. personnel.

N. Where fiber optic cables are to be installed in raceways, raceways shall contain innerducts (size and quantity as directed by Owner) to fill raceways.

O. Where underground non-metallic conduits are to be installed without any copper wiring, a single TH/THW #12 tracer wire with yellow PVC insulation shall be installed in conduit. Provide labeling on each end of wire to read "TRACER".

P. Arrange with the Owner's communication service provider for them to provide their fiber and/or copper cables to the main backboard and terminate.

2.4 CABLE TV DISTRIBUTION SYSTEM

A. Contractor shall provide wiring, raceways, outlets, connectors, splitters, and other equipment, whether specifically indicated or not, to provide a complete and properly operating cable TV distribution system.

B. Work shall include providing a complete and operable RF distribution system. The installer shall present evidence of having successfully completed at least three similar projects, and installation shall be under the supervision of factory authorized organization. Complete description of present service facilities shall be provided by supplier.

C. All electronic equipment shall be approved by Underwriters' Laboratories, Inc., and shall be products of a single manufacturer of established reputation and experience. Furnish all necessary equipment, labor, and installation materials, whether individually specified or not, to provide a complete and operating system.

D. System shall provide for reception of monochrome or color T.V. transmission at every outlet equal to that obtainable on a single standard receiver connected directly to Cox Cable's service cable. System shall be designed for a 43 DB signal-to-noise ratio and minus 46 DB cross-modulation level at the output of the amplifier.

E. The outlets, located as shown on drawings, shall provide the following minimum signal levels, all measured across 75 ohms: Plus 6 DBMV.

F. All equipment shall be UL rated for 24 hours a day continuous operation.

G. Amplifiers, if required, shall be capable of accommodating all of Cox Cable's channels. Amplifier shall be manufactured by Blonder Tongue or Jerrold and shall be as required for the application.

H. Each outlet shall consist of outlet box (4" square x 1½" deep, or larger), 1-gang raised device cover, and device plate with panel-mount dual female "F" type connector. Cable inside box shall be provided with a male connector to connect to the dual connector. Finish and type of plate shall match that specified for wiring device plates.

I. The CATV cable from each outlet shall be West Penn #25841 or Belden #9114 type RG-6 (75 ohm) double shielded (foil and braid) plenum-rated, and shall be routed continuously (without splice) to nearest CATV backboard and shall be connected to splitters. The CATV cable linking the CATV backboards shall be type RG-11 (75 ohm), unless the CATV utility company requires a different type of cable.

J. Provide sufficient slack cable and connectors at backboards to terminate all cables. Provide splitters to properly connect and distribute the CATV signal. Arrange with the Owner’s CATV service provider for them to provide their cable to backboard and terminate their cable to provide cable TV service.

2.5 SOUND SYSTEM

A. Contractor shall furnish and install speakers, microphones, headend equipment, raceways, outlets, cabinet, cables raceways and all other equipment whether specifically indicated or not, for complete and properly operating sound systems.

B. Meeting Room Sound System shall include the following:

1. Tascam BD-MP1 DVD/Blu-ray Player (mounted in rack).

2. Shure Model #PGA48-LC microphone with M-25 cord (quantity of 3).

3. Microphone floor stands - Provide two microphone stands. Each microphone floor stand shall be of the telescoping two-piece type, adjustable from 34" to 62" in height, and shall be locked securely in any position desired by means of a positive grip-action clutch. Each shall have a low-profile black base equipped with one-piece base pads to prevent marring of floor surfaces. Each shall provide standard 5/8" - 27 threads for microphone mount. The entire assembly shall be finished in satin-chrome. Each shall be Atlas/Soundolier MS-12.

4. DBX 220I Equalizer/feedback eliminator (mounted in rack).

5. Shure BLX24R/B58 handheld wireless microphone, dual diversity. (quantity of 1).

6. Shure BLX14R/W85 clip-on lapel microphone (quantity of 2).

7. Speakers shall be a JBL Control Series 26CT, 6 ½" speaker, 150 watt, 16 ohms (woofer and coaxially mounted 0.75" tweeter) with grill, and backbox for recess installation.

8. Amplifier - The powered amplifier shall be a Crown XTI-1002 amplifier. The amplifier shall be solid state dual channel model employed multi mode grounded bridge output circuitry. The amplifier shall contain protection circuitry, which will limit the drive level placed on the output devices before their known safe operation area is exceeded. It shall be rated 120V and shall draw 60 watts or less. It shall have steel chassis with flow-through ventilation, (mounted in rack). The power amplifier shall meet or exceed the following performance criteria:

a. Input sensitivity for rated output shall be 0.775V unbalanced.

b. Rated FTC output in dual mode with less than 0.1% THD.

c. 660 watts per channel into 4 OHMS, 400 watts per channel into 8 OHMS.

9. Mixer/Preamplifier/Equalizer (mounted in rack):

a. Mixer shall accommodate eight line/mic and one mixing bus. Mixer shall be a Behringer RX 1202 FX. Contractor shall provide the proper microphone level modules as required for up to 6 microphones.

10. Power Conditioner (mounted in rack):

a. Power conditioner shall be Furman M-8x2 eight outlets in rear, one outlet in front, 15A output, with on/off switch.

11. Rack shall be an Atlas/Soundolier Series 340-21B wall rack with door and key lock.

12. An MP3 player shall be installed in rack.

13. A 3U heavy metal storage drawer shall be installed in rack for accessories.

14. 2U rack shelves to support equipment shall be installed in rack (Quantity of 2).

15. There shall be an Assistive Listening System for Meeting Room 109.

a. Assistive listening system, receiver quantities per audience seating capacity (4%).

b. Receiver shall be Listen Technologies LR-3200-072 or equal.

c. Ear bud shall be Listen Technologies LA-404 or equal.

d. Amplifier shall be Listen Technologies LR-100-216 or equal.

e. Transmitter shall be Listen Technologies LT-800-072-P1 or equal.

16. Microphone outlets shall be a Soundilier S601-13C or equal, three microphone three-pin female connectors mounted on single gang stainless plate.

17. System shall interface with fire alarm system for shut down during alarm condition so that fire alarm voice notifications can be heard.

2.6 SECURITY CAMERA SYSTEM

A. Contractor shall furnish and install cameras, data switches, patch panels, network surveillance server, UPS's, software, power supplies, wall racks, flat-screen monitor, wiring, raceways, and all other equipment, whether specifically indicated or not for a complete and properly operating security camera system. All equipment and accessories shall be the standard products of one manufacturer and shall bear the manufacturer's name, catalog number and U.L. Label on a plate securely attached to the component.

B. Cameras shall be a ceiling mounted dome cameras. Cameras shall have 4MP resolution, 30 frames-per-second progressive scan, PoE type and each camera shall have an IP address. Cameras shall be meet requirements of IEEE 802.3af with 0.25 lux minimum illumination. Cameras shall be adapted for wall mounting where indicated or required.

C. Fish-eye cameras shall be a ceiling mounted dome with 360 degree panoramic view, 12MP resolution, 30 frames-per-second, PoE type, with .32 lux minimum illumination in color. Each camera shall have an IP address.

D. Outdoor cameras shall have weatherproof outdoor housing.

E. POE camera data switches shall be provided to accommodate all cameras plus minimum of 20% spare for future cameras.

F. Provide a network surveillance server (minimum Windows 10 Pro 64 bit Intel Core i7 with suitable graphic card, 16 GB Ram and all applicable licenses for Windows). It shall support up to 64 cameras and shall have 18 TB hard drive capacity for recording.

G. Provide a 19" flat-screen security monitor at a workstation at location as directed with mounting hardware to suit Architect. Monitor shall be connected to the security camera system using wiring in raceway as required. Monitor shall have a resolution of 1280 x 1024, maximum brightness of 450cd/m2, maximum contrast ratio of 1000:1, and response time of 5ms.

H. Provide a CAT 6 data cable from each POE camera to a dedicated patch panel for communication with the server. Provide patch cords as necessary.

I. UPS's should be provided for data switches and server.

J. Wall-mounted racks shall be provided on backboards for switches, patch panels, server, UPS's, etc.

K. System shall be programmed to meet the specific needs of the Owner.

L. Equipment shall be the products manufactured and supplied by Axis, Bosch, Flir, Vivotek, Amano, or Pelco.

2.7 ACCESS CONTROL SYSTEM

A. Contractor shall furnish and install proximity card readers, power supplies, interface modules, patch panels, card access system controller, data switches, wiring, raceways, and all other equipment, whether specifically indicated or not, to provide a complete and operating card access control system that logs every entry.

B. A door controller shall be provided for each door to be controlled/monitored. These shall be installed to interface with door hardware (electric strike) and proximity card reader. These shall be located above accessible ceiling near each proximity card reader (and on the secure side of the door). Provide CAT 6 cable to a patch panel at the nearest security backboard (using raceway and j-hooks) and terminate as required on patch panel for communication with the system controller. Provide data switch with copper to fiber interface device to provide a fiber link to data switch at the card access controller. Provide jumpers, patch panels, power supplies, etc. as necessary to tie the card access system components together. Provide programming and labeling at card access controller. Provide wiring in raceway as require to interconnect the power connection with the nearest adequate 120V circuit for control power.

C. Card access system controller shall control entries and keep a log of entries. It shall be a server system with PC and DVD. It shall include Windows licenses, alarm monitoring, Map-designer, CCTV interface, and shall support up to 64 card readers. Provide programming for each door with respect to "allowed users", "time of day", etc. to satisfy the Owner's requirements.

D. Proximity card readers shall be mounted on flush wall mounted outlet box.

E. Battery Backup shall be provided to maintain continuous programming and operation.

F. Provide 100 proximity cards to the Owner that can be programmed for the system.

G. Card access system shall be manufactured by Cisco, Bosch Security Systems, Amano, Galaxy Control Systems, or Identicard.

2.8 PAGING SYSTEM

A. Speakers, amplifier, raceways, cables and accessories shall be furnished and installed as work of this Section.

B. Interior ceiling mounted speakers shall consist of a flush mounted speaker enclosure, a trim (or cover) and a speaker with transformer.

1. The speaker enclosure shall be designed to house an 8" speaker and hold a trim, shall be made of sheet steel, shall be about 11 5/8" x 11 5/8" x 4" and shall be coated with a rust preventative. The enclosure shall be mounted with its sides parallel to the walls of the room in which it is installed and with its top parallel to the floor. The enclosure shall be Rauland ACC1100, or approved equal. The location of speaker enclosures in the ceiling shall be approximately as shown on the drawings, except that the installation shall be coordinated to avoid interference with lighting fixtures, air-conditioning ducts or outlets, structural members, or fire detection devices.

2. The cover, or trim, shall be a steel sheet about 12½" square with perforations for appearance and sound, shall have a beveled edge, shall be of a type made by a manufacturer for proper appearance, and be flat poplar white in color. The rim shall be attached to the enclosure flush with the ceiling. The trim shall be Rauland ACC1004, or approved equal.

3. The speaker shall be 8" in diameter, have 8 ohms impedance, have an Alinco or ceramic magnet with a weight of 3.16 ounces, have a continuous rating of 10 watts, or greater, have a cadmium plated steel frame, have a mounting step to mount a matching transformer, be a Rauland USO215, or approved equal. The speaker transformer shall match a 70.7 volt line to an 8 ohm speaker with various load taps. These shall be at least 3 load taps within the range of 0.05 watt to 5 watts. The taps may be made with lugs or wire leads. The transformer shall be mounted on the speaker. The 8 ohm output side of the transformer shall be connected to the speaker. If the speaker or transformer have solder lugs, the wires shall be soldered. If the speaker has screw terminals, crimp type spade lugs shall be attached to the wires. Merely wrapping a stripped wire around the screw shall not be acceptable.

C. The one-pair cable used in wiring the paging speakers (interior and exterior) to the terminal in the paging cabinet shall be one twisted pair, color coded insulation, 20-gauge copper stranded (10 No. 300) conductors, with vinyl (polyvinylchloride) insulator over each conductor and a vinyl jacket, over the pair. The cable shall be Belden 8205, Alpha 1895, or Consolidated 5580, or approved equal.

PART 3 - EXECUTION

3.1 LIGHTNING PROTECTION SYSTEM INSTALLATION

A. Conductors shall be concealed wherever possible. Conductors may be installed exposed on parapet walls and on membrane roofs. Downleads (and associated conduit that may be required) shall be concealed; however, structural steel may be used in lieu of downleads, if adequate. Conductors shall not be installed on top of metal roofs; conductors shall be installed neatly and inconspicuously on the structure located below metal roofs. The Contractor shall cooperate with the roofing and sheet metal Contractor to insure adequate flashing where conductors pierce the roofing material. Where necessary to run conductors in conduit, the conductor shall be bonded to the top and bottom of the conduit.

B. No bend of a conductor shall form an angle of less than 90 degrees nor have a radius of bend of less than 8". Fasteners shall be spaced not more than 3 feet apart on all conductors and shall be of the same material as the conductor. Nails, screws, or bolts employed to secure the fasteners shall be of the same material as the fasteners or shall be of a material that is as resistant to corrosion as that of the fasteners. Galvanized or plated steel nails, screws, or bolts are not acceptable. Fasteners in masonry shall have anchors employing machine screws having a thread diameter of not less than ¼" and shall be set with care. Holes made to receive the shank of the fastener or fitting shall be of the correct size, made with the proper tools, preferably made in the brick or stone rather than in the mortar joints. When set, the fit shall be tight against the moisture and the effect of frost and shall be capable of withstanding a test pull of 100 pounds. Acceptable connector fittings shall be used on all lightning conductors at end-to-end, tee or wye splices, they shall be attached so as to withstand a test pull of 200 pounds.

C. Connections of down conductors to ground electrodes shall be made at a point not less than 1 foot below grade level and 2 feet away from foundation wall. The lightning conductor, or acceptable electrodes, shall extend vertically not less than 10 feet into the earth; the earth shall be thoroughly tamped and made tight against the conductor or electrodes the full distance to which they are sunk. Clamps used to connect the down conductors to driven ground rods shall make contact with the ground rod for a distance of 1½", measured parallel to the axis of the ground rod. Electric and telephone service water pipe grounds shall be bonded to the lightning protection system ground.

D. Housing of roof exhaust fans shall be connected to the lightning conductor system, using bolt tension fittings of an acceptable type. Soil vent pipes within 6 feet of a main conductor shall be connected thereto. Antenna masts shall also be bonded to the main conductor.

3.2 FIRE ALARM SYSTEM INSTALLATION

A. Wiring shall be provided as necessary for proper system operation and shall be of the type as recommended by system manufacturer. Wiring shall be contained in concealed raceways unless noted otherwise. There shall be minimum of 40% spare analog capacity and 40% spare binary capacity in each data line. Audio circuit and strobe circuit shall have 50% spare capacity for future additions.

B. System shall be installed by a qualified fire alarm technician licensed by the State of Louisiana. Devices shall be individually tested. A final operational test shall be conducted on the entire system. After wiring and construction is completed, system shall be certified by equipment supplier in writing as being complete and properly operating. The certification letter shall include NFPA 72 forms.

C. Contractor shall adjust volume tap on each audible signal unit for proper volume at each location.

D. Contractor shall meet with the Owner to establish name for each device address.

E. Contractor shall meet with the Owner (or security contractor) to properly program as required.

F. Provide 10 spare smoke detectors, 5 spare audiovisual signal units, 5 spare visual signal units, 2 spare heat detectors, and 3 spare air-stream (duct type) smoke detectors to the Owner.

G. Install 5 additional monitor modules and 5 additional control modules with relays at locations as directed. Connect them to the system and to monitored and controlled devices. At end of construction, any of these modules not used shall be turned over to the Owner.

H. Contractor shall demonstrate proper operation of system to the Fire Marshal and demonstrate system to him, as many times as required.

I. Contractor shall, at the completion of the project, arrange with equipment supplier to train designated Owner personnel in the proper operation, programming and minor maintenance of the system. This shall include training on programming to make changes in device addressing, to make other specified programming changes (to include changes to smoke detector sensitivity settings), and to generate system reports. Training shall be minimum of 4 hours.

J. The completed systems shall be guaranteed free from electrical, mechanical, software, and/or operational defects for a period of one year.

3.3 RACEWAY AND WIRING INSTALLATION FOR VOICE/DATA OUTLETS

A. Raceways shall contain not more than two 90 degree bends.

B. Where wiring is installed above ceilings (without raceways and not in cable trays), they shall be properly supported from structure per National Electrical Code. Where ceilings are accessible, Contractor shall use J-hooks (equal to Mono Systems Series H-433-S or H-233-S) and/or cable trays; and the routing shall generally be from each outlet to nearest corridor, then through corridor (above ceilings) to nearest voice/data backboard and patch panel. Routing through corridor ceiling space shall make use of cable trays (where shown and/or preferred by Contractor) or J-hooks with 12" cable support extenders

(equal to Mono Systems Series H-CSE-12). Where ceilings are inaccessible, Contractor shall provide raceways that span these areas.

C. At backboards, for each outlet served, provide a sleeve through the wall and/or ceiling to the area above the accessible ceiling to provide openings of sufficient size for cables.

D. Installers shall be certified.

E. Submittal shall include a 1-line diagram showing all components of the system including Owner-furnished equipment. Also see Specification Section 16010, Paragraph 2.3.E.

F. All wiring and connections shall be tested per ANSI/TIA/EIA standards. Test reports shall be provided.

G. Provide a copper Telecommunications Grounding Busbar (TGB) to satisfy TIA/EIA and BICSI requirements at each backboard. TGB shall be 1/4" x 2" x 12" in size and contain pre-drilled to suit the User's requirements. TGB shall standoff from the backboard by 2' using insulator. Provide a #6 THHN ground conductor in raceway from the TGB (at backboard used for voice/data service) to the grounding electrode used for electric service. Also provide a #6 THHN ground conductor in raceway to link all backboards and terminate.

H. When underground conduit(s) are installed for voice/data service from utility company, Contractor shall coordinate the exact location for termination of conduit(s) (and points of demarcation) with utility company.

3.4 CABLE TV DISTRIBUTION SYSTEM INSTALLATION

A. Backboards shall be ¾" thick plywood of the sizes indicated. Bottom of backboards shall be 6" above floor unless noted otherwise. Raceways shall be terminated with bushings even with top and/or bottom of backboard. Backboards shall be painted with two coats of fire retardant paint prior to cable installation.

B. In areas with accessible acoustical tile ceilings, the raceways from the outlets may be bushed and terminated above the ceilings at the locations indicated. At the backboards, for each outlet served, provide a sleeve through the wall and/or ceiling to the area above the accessible tile ceiling to provide openings of sufficient size for cables. Removal and replacement of the acoustical tiles in the accessible ceilings to permit installer to install his cable shall be the responsibility of the DIVISION 16 Contractor; any tile damaged, marred, and/or soiled in this process shall be replaced at his expense.

C. Where wiring is installed above ceilings (without raceways and not in cable trays), they shall be properly supported from structure per National Electrical Code. Where ceilings are accessible, Contractor shall use J-hooks and/or cable trays. Where ceilings are inaccessible, Contractor shall provide raceways that span these areas.

D. When underground conduits are installed for CATV service from utility company, Contractor shall coordinate the exact location of termination of conduit(s) (and point of demarcation) with utility company.

3.5 SOUND SYSTEMS INSTALLATION

A. All wiring shall be installed in raceways. Wire and cable for audio systems shall be multi-conductor type with heavy duty, weatherproof type and water, acid and heat resistant jacket. Microphone cable shall be shielded. Speaker wiring shall be minimum 18 gauge twisted pairs.

B. Terminations of audio wiring shall be made using miniature plug-in terminal blocks with barriers and screw terminals. No pigtail splice or solder type connections will be acceptable.

C. However, some of the wiring for the Meeting Room sound system shall be ethernet cables (type as required), using IP addresses with data switches.

D. All equipment and wiring shall be installed and connected under the direct supervision of a qualified sound system technician. All components shall be individually adjusted and tested. Final operational tests shall be conducted on the entire system. The system shall be certified by the equipment supplier in writing as being complete and properly operating.

3.6 SECURITY CAMERA SYSTEM INSTALLATION

A. Supplier's firm shall have been engaged in the supervising, installation of, and servicing of the supplied equipment. The firm, who is and has been for three years prior to bid date, shall be a factory authorized service organization in the local area of the manufacturer whose system will be provided. The supplier must be headquartered within 40-mile radius of the project; staff of experienced technicians specifically trained in servicing system, and has personnel available 24 hours per day, 7 days per week call basis.

B. The new system components and devices shall be guaranteed, free from inherent mechanical and electrical defects for a period of one year from date of building acceptance. Manufacturer shall furnish gratis to the Owner a one-year contract effective from date of building acceptance, for maintenance and service of manufacturer's equipment. Maintenance and service shall be on a 24-hour a day, 7 days a week basis. In addition, the supplier shall offer service and maintenance contracts on the equipment furnished for the period extending beyond the one (1) year guarantee.

C. Prior to acceptance, Supplier shall certify in writing to the Architect that each component of system is in working order and that the entire system has been tested and certified.

D. In addition, Contractor shall furnish a qualified technician to instruct Owner's representative and Architect in charge, in the proper operation of the CCTV system at a

time most convenient to the Owner and Architect. A complete brochure with written and easily understandable operating instructions shall be furnished to the Owner or his representative and it shall include the detailed point- to- point connection diagrams. Operating instructions shall be very explicit.

E. All conductors for system shall be as recommended by the manufacturer of the system, and shall be plenum rated. All conductors shall be in raceways and shall be marked and identified, in all junction boxes, terminal cabinets, etc.

F. Supplier shall prepare a specific point-to-point connection diagram with all wiring and raceways shown, that schematically illustrates the exact installation of the system as detailed in these plans and specifications.

G. System shall be installed by a qualified CCTV System installer. System shall be completely tested after installation. Written certification with Test Reports shall be provided by the system installer indicating that the system is complete and properly operating. Training shall be minimum of 8 hours.

3.7 ACCESS CONTROL SYSTEM INSTALLATION

A. Exact location of devices shall be as required for proper system performance.

B. Wiring shall be concealed in walls and above ceilings, and shall be properly supported to meet code requirements. Wiring sizes and types shall be as recommended by system manufacturer, and shall be plenum rated. Cables shall be labeled at each end with permanent wire markers. Connections shall be made only at terminal strips (to be numbered) in terminal cabinets and junction boxes.

C. System components, and cable shields shall be properly grounded.

D. Fiber optic cable shall be type required for the system.

E. System shall be installed by a qualified card access system installer. System shall be completely tested after installation. Written certification with Test Reports shall be provided by the system installer indicating that the system is complete and properly operating. Training shall be minimum of 4 hours.

3.8 PAGING SYSTEM INSTALLATION

A. All wiring shall be installed in raceways. Wire and cable for audio systems shall be multi-conductor type with heavy duty, weatherproof type and water, acid and heat resistant jacket. Microphone cable shall be shielded.

B. Terminations of audio wiring shall be made using miniature plug-in terminal blocks with barriers and screw terminals. No pigtail splice or solder type connections will be acceptable.

C. All equipment and wiring shall be installed and connected under the direct supervision of a qualified sound system technician. All components shall be individually adjusted and tested. Final operational tests shall be conducted on the entire system. The system shall be certified by the equipment supplier in writing as being complete and properly operating.

-END OF SECTION -